

“Why not use it more?” Sources of self-efficacy in researchers’ use of social media for knowledge sharing

Purpose: To investigate the sources of self-efficacy that researchers rely on when using social media for knowledge sharing and to explore how these sources impact their use.

Design/methodology/approach: The study employed 30 semi-structured interviews with researchers at a major Scottish university. Researchers analysed the interview transcriptions using directed content analysis.

Findings: The researchers relied on the four sources of self-efficacy proposed by Bandura (1977) when using social media for knowledge sharing. These sources lead researchers to use social media effectively and frequently for sharing knowledge, although some may discourage its use.

Research limitations/implications: It extends the self-efficacy integrative theoretical framework of Bandura (1977) by presenting the relative amount of the influence of these sources for researchers to share their ideas, experiences, questions, and research outputs on social media. While the participants included academic staff, postdoctoral researchers, and PhD students, the majority were PhD students.

Practical implications: The findings can help universities understand how to promote productive use of social media. For example, academic staff who have high personal mastery experience could mentor those who do not.

Originality/value: This is the first known study to investigate the sources of self-efficacy that impact researchers’ use of social media for knowledge sharing.

Keywords: self-efficacy, social media, knowledge sharing, researchers, academics, social cognitive theory

1. Introduction

In the last decade, society has increasingly used social media as a method of communicating and sharing. Facebook, Twitter, LinkedIn, YouTube, and other social media platforms facilitate people’s sharing of ideas, pictures, comments, and other forms of knowledge (Kaplan and Haenlein, 2010). Researchers routinely share knowledge with others either to improve their own ideas or to help others develop theirs, and they employ social media platforms to facilitate this (Panahi et al., 2016a). The benefits of using social media for knowledge sharing includes the removal of space and time constraints that are inherent in traditional methods of sharing knowledge, online tools that enable one to share multimedia content, and easy-to-use interfaces that enable even non-specialists to share and connect (Fotis, 2015).

Social media platforms allow researchers around the world to communicate and share their knowledge (Panahi et al., 2016a). For example, they can learn what was discussed at any conference without traveling long distances. In addition, researchers use social media as a channel for visibly presenting themselves and their outputs to those who share the same interests (Veletsianos, 2016). In other words, social media affords exceptional opportunities for researchers to engage and interact with each other (Carrigan, 2016).

Researchers can share their research outputs with large numbers of other researchers using social media, which makes it an important channel for them, since dissemination is essential (Ellison et al., 2015). Knowledge here refers to *tacit* (cognitive experience) and *explicit* (research outputs). Online, researchers can share what they have learnt and practiced in their work as well as what they have produced as written communication.

Previous studies discuss either the use of social media for knowledge sharing or the factors that affect this use (e.g. Bilgihan et al., 2016, Cheung et al., 2013, Cho et al., 2010, Eid and Al-Jabri, 2016, Kwahk and Park, 2016, Ma et al., 2014, Oh and Syn, 2015). However, understanding of these phenomena are still in the early stages and need more investigation (Edwards et al., 2017, Panahi et al., 2012, Razmerita et al., 2014).

According to prior work (e.g. Cheung et al., 2013, Cho et al., 2010, Kwahk and Park, 2016, Vuori and Okkonen, 2012), self-efficacy is one of the most significant factors that influences the use of social media for knowledge sharing. Self-efficacy is defined as “a judgment of one’s capability to accomplish a certain level of performance” (Bandura, 1986, p. 391). This is operationalised in this study as researchers’ perceived ability to use social media for knowledge sharing. According to Bandura (1977), self-efficacy is constructed from four main sources: performance accomplishments; vicarious experience; verbal persuasion; and emotional arousal. These four sources are defined in this study as follows:

- *Performance accomplishments* or *personal mastery experiences* refer to the positive or negative past experiences that influence researchers’ ability to use social media for sharing knowledge.
- *Vicarious experience* refers to the mimicry of other researchers who effectively use social media for knowledge sharing by observing their performance and successes, and then attempting to replicate their behaviours.
- *Verbal persuasion* refers to encouragement and discouragement from colleagues or institutions that influences the researchers’ decisions surrounding whether to use social media for knowledge sharing.
- *Emotional arousal* refers to psychological reactions based on researchers’ positive and negative experiences of this use.

Despite the importance of self-efficacy in the use of social media, no attention has been paid to its relationship to social media use. Therefore, this study aimed to investigate the sources of self-efficacy that researchers rely on to use social media for knowledge sharing, and to explore how these sources impact this use. Thus, this study addresses the following research questions:

RQ1: What sources of self-efficacy do researchers rely on in the use of social media for knowledge sharing?

RQ2: How do these sources impact the use of social media for knowledge sharing?

The remainder of the article is organised as follows. First, a relevant literature review is provided. Next, the methodology used in the study is explained. Then the findings of the study are presented. Finally, the article concludes with a discussion of the findings and future research directions.

2. Literature Review

2.1. Self-efficacy and its sources

Self-efficacy, a theoretical component of social cognitive theory, is defined as “a judgment of one’s capability to accomplish a certain level of performance” (Bandura, 1986). Several studies have investigated the importance of self-efficacy and how it influences behaviours and skills. For example, Pajares and his colleagues have conducted numerous studies regarding specific variables such as learning disability (Pajares and Kranzler, 1994), problem solving (Pajares and Miller, 1994), and age (Pajares and Miller, 1995). Based on their studies, self-efficacy plays an important role in student performance. Several studies have examined the self-efficacy of technology users. Celik and Yesilyurt (2013) have argued that users’ perceived self-efficacy of computer use and computer anxiety are important predictors of teachers’ attitudes toward using computers to support education.

Gegenfurtner et al. (2013) studied the longitudinal development of the relationship between performance self-efficacy and transfer of computer training before and after training, and there was a positive population correlation estimate between them.

Self-efficacy beliefs affect a number of psychological processes such as improving performance (Bandura, 1977, 1986, Wiedenbeck, 2005, Wiedenbeck et al., 2004), achieving personal goals (Bandura, 1994), expending effort (Askar and Davenport, 2009, Bandura, 1977, 1982, 1986, 1994), persevering in the face of difficulties (Bandura, 1977, 1982, 1986, 1994), maintaining resilience after failures (Bandura, 1994), and choosing situations, activities and environments (Askar and Davenport, 2009, Bandura, 1977, 1982, 1986). Although self-efficacy affects motivation levels, it cannot produce improved performance if an individual is lacking in the subskills necessary to practice personal agency. If these subskills are lacking, efficacy-sustained effort helps their development (Bandura, 1986). Self-efficacy affects personal outcome expectations. Thus, high self-efficacy will result in positive outcomes (Bandura, 2004). Bandura (1994) wrote, “self-efficacy affects life choices, level of motivation, quality of functioning, resilience to adversity and vulnerability to stress and depression” (p.80). Indeed, self-efficacy is a central part of human agency (Bandura, 1982, 1986, 1989).

According to Bandura (1977), self-efficacy comes from four main sources: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal. Performance accomplishments is the influential source of efficacy information and is based on personal mastery experiences. Bandura (1997) wrote, “A resilient sense of efficacy requires experience in overcoming obstacles through perseverant effort. After people become convinced they have what it takes to succeed, they persevere in the face of adversity and quickly rebound from setbacks “(p.73). Successes can build strong confidence for individuals, whereas failure can weaken confidence (Hendricks, 2016). However, a high sense of self-efficacy built on past successes can enhance the capability to face failures (Hendricks, 2016). Failure in some cases may strengthen an individual’s ability to cope with other situations. Thus, the experience levels of researchers in using social media may either strengthen or weaken their use.

The second source is vicarious experience. Seeing others’ activities can enhance the expectations of observers to intensify and persist in their efforts (Bandura, 1977). Thus, they convince themselves that they are able to achieve improvement in performance if others can do it (Bandura, 1977). Bandura (1986) claims that “people convinced vicariously of their inefficacy are inclined to behave in ineffectual ways that, in fact, generate confirmatory behaviour evidence of inability” (p. 400). Observing others can provide individuals with a sense of confidence about their abilities to perform similarly to what others do (Hendricks, 2016). Researchers could experience a boost in their self-efficacy for using social media to share knowledge by observing others’ successes in doing so.

The third source is verbal persuasion. Because of the ease and availability of this source, it is widely employed (Bandura, 1977). Bandura (1997) claimed, “People who are persuaded verbally that they possess the capabilities to master given activities are likely to mobilize greater effort and sustain it than if they harbour self-doubts and dwell on personal deficiencies when problems arise” (p.74). Verbal persuasion involves encouragement from others, such as colleagues and institutions that serve to enhance an individual’s belief that they possess the abilities to achieve a desired level of performance (Tschannen-Moran and McMaster, 2009). Researchers may receive encouragement from their colleagues or institutions to use social media.

The fourth and last source of self-efficacy is emotional arousal. Stressful and psychological situations elicit emotions, and they depend on the circumstances which might provide valuable information about personal competency (Bandura, 1977). Bandura (1997) stated, “Positive mood enhances perceived self-efficacy, despondent mood diminishes it” (p. 75). Positive and negative experiences can leave researchers with a high or low perception, respectively, of their confidence in using social media for knowledge sharing (Hendricks, 2016).

Many researchers have studied these sources of self-efficacy. Usher and Pajares (2008) completed a critical review of the literature for the period between 1990 and 2007. They categorised these studies into quantitative and qualitative studies; most were quantitative, and they mainly focussed on education and performance.

Joët et al. (2011) studied the influence of the sources on the academic and self-regulatory efficacy beliefs of third grade elementary school students. They found that the sources and mean classroom level predicted self-efficacy for self-regulated learning. Likewise, Loo and Choy (2013) found in a study of 178 third year engineering students that these sources were correlated, but the main predictor for academic achievements of mathematics and related engineering modules was mastery experience. Warner et al. (2014) found that mastery experience, self-persuasion, and reduction in negative affective states are the significant predictors of self-efficacy for physical activity in community-dwelling older adults.

There are a few qualitative studies of the sources. For example, Garlin and McGuiggan (2002) investigated the sources of self-efficacy in consumer behaviour through ten in-depth interviews. The findings provided supporting evidence for the significance of these sources and their impact on an individual's sense of self-efficacy in the course of consumption.

2.2. *Knowledge Sharing*

Knowledge sharing has received a great attention from scholars in recent years and has been defined in many different ways. For example, knowledge sharing has been defined as a set of behaviour that includes assistance in knowledge exchange with others (Chow and Chan, 2008, Connelly and Kelloway, 2003). Bukowitz and Williams (2000), Lee (2001) define knowledge sharing as the activity that supports the transfer or dissemination of knowledge from one person, group or organisation to another. Knowledge sharing can be defined as a cultural, social interaction which involves the exchange of knowledge, experience and skills among employees within organisations (Šajeva, 2014, Zawawi et al., 2011). Sohail and Daud (2009) define knowledge sharing as "exchanging experience, events, thought or understanding on anything (in general) with an expectation to gain more insights and understanding about something for temporary curiosity" (p. 129). The term can refer to the exchange of knowledge among two parties or more in a reciprocal process which allows them to reshape and formulate the knowledge in a new context (Willem, 2004). Bircham-Connolly et al. (2005), Ma and Chan (2014), Sharratt and Usoro (2003) define knowledge sharing as the process of capturing knowledge from a source and transfer it to a recipient. Knowledge sharing refers to exchange of the relevant information, ideas, concepts, suggestions, solving problems, and expertise (Bartol and Srivastava, 2002, Cummings, 2004, Singh Sandhu et al., 2011, Srivastava et al., 2006). Knowledge sharing is furthermore defined as "the combination of one or both parties seeking knowledge in response to the request, such that one or both parties are affected by the experience" (Scott and Ghosh, 2007). In this study, the researchers define knowledge sharing as a process of interactions through which knowledge is exchanged between individuals, groups, and organisations. This interactive exchange occurs through the use of social media, which is highly interactive.

Knowledge sharing enhances individuals' learning and understanding. Through sharing, they learn new knowledge, and can then better perform their work (Brown et al., 2013). Knowledge sharing among researchers has been classified into four categories: contributing knowledge by publishing books or articles, participating in formal interactions such as meetings or workshops, engaging in informal interactions, and interacting with communities (Ramayah et al., 2013). They obtain benefits from sharing by acquiring rewards or improving performance. Srivastava et al. (2006) stated, "Knowledge sharing may lead to better team performance for at least two reasons: improved decision making, and coordination" (p.1242).

Many organisations encourage knowledge sharing to obtain competitive advantage (Liebowitz, 2001), so it is a vital component to organisational success (Sohail and Daud, 2009). It has been

argued that the outcome of practicing knowledge sharing is improved organisational effectiveness and performance. The importance of knowledge sharing can be clearly observed in knowledge-based organisations such as universities (Al-Hawamdeh, 2003, Gupta and Govindarajan, 2000, Olivera, 2000, Petrash, 1996).

Nowadays, organisations’ increased attention toward knowledge sharing has been stimulated by the needs of knowledge sharing amongst people. As a result, they achieve their competitive advantage (Gaál et al., 2015). When shared knowledge is available for employees within organisations, the quality of work and efficiency improves (Brown et al., 2013).

These studies demonstrate the importance of knowledge sharing for individuals and organisations. Amongst the various channels used for it, the latest and the most powerful channel is social media. For instance, Panahi (2014) explored how social media can facilitate tacit knowledge sharing among physicians. Twenty-four physicians participated in semi-structured interviews. He found that the use of social media can facilitate tacit knowledge sharing in 21 different ways.

Other previously referenced studies investigated the factors that affect the use of social media to share knowledge (e.g. Cheung et al., 2013, Cho et al., 2010, Kwahk and Park, 2016). In all of these studies, self-efficacy was one of the most significant factors. Although they looked at the importance of self-efficacy in social media for knowledge sharing, there is no known study that has attempted to investigate the sources of self-efficacy of people who use social media to share knowledge.

2.3. *Researchers’ Use of Social Media*

In this study, the term ‘researchers’ refers to those who conduct research and explore a new knowledge contribution (Nassuora and Hasan, 2010). A researcher could be a student, an academic, or anyone else who has an ability and an interest in research.

Researchers play a key role in producing and disseminating knowledge. They are the best example of those who practice sharing knowledge with others (Jolaei et al., 2014). Therefore, it is useful to explore how researchers implement knowledge sharing with others and what channels they use.

Veletsianos (2016) identified the main practices for researchers’ use of social media. For example, researchers use Twitter to enhance their knowledge and skills in some fields by requesting resources or explanations about ideas that could be used in their research or lecturing.

One of the most important motivations for researchers to use social media is publication. Researchers want to increase their citation frequency, to increase their visibility in their research area and discipline, and to disseminate their research to people outside their field. They employ social media tools to accomplish these. Also, social media has expanded the range of publication reach: it addresses the requirements of higher education systems which require academics to demonstrate the impact of their publications and their relationships by leading people towards their work through blog posts, tweets, and so on (Carrigan, 2016).

Academic social media channels such as Academia.edu and ResearchGate can play vital roles for allowing researchers to archive and categorise their papers in specific ways to make them available to others who share the same interest in these papers (Carrigan, 2016). Researchers may use social media to request and obtain scholarly articles or papers which they cannot access otherwise (Veletsianos, 2016). They can seek research assistance from their networks by posting a request. Veletsianos (2016) has argued that researchers use social media to share their experiences with others in their networks. Social media can be used effectively to announce new publications, and to share the links to these publications (Carrigan, 2016).

The use of social media is of interest to many researchers in educational institutions. Hamid et al. (2009) reviewed of studies in this area. Many of the studies “focused on content generation, and less being understood about how social media may be used in sharing, interacting and collaboratively socialising” (Hamid et al., 2009).

On social media, people from various disciplines such as science, engineering, and law interact to exchange knowledge, inspire ideas, build new friendships, and share news (Veletsianos, 2017). Moreover, researchers communicate to develop new theories and learning models, distribute their final results, discuss scientific problems, and receive criticism and feedback (Jabr, 2011). However, the use of social media as a tool for sharing knowledge may need researchers to possess self-efficacy to be able to do so, as previously mentioned.

Some researchers have examined how personal self-efficacy influences the use of social media for knowledge sharing. For example, Oh and Syn (2015) investigated the motivations of users for sharing their own expertise and experiences with others. They identified ten factors that influence knowledge sharing via social media, and concluded that use is likely motivated by self-efficacy and vice versa. Cho and his colleagues (2010) explored how and why people participate in collaborative knowledge building practices in the context of Wikipedia, and they found that self-efficacy has a significant association with the behavioural intention to share knowledge on Wikipedia. Papadopoulos et al. (2013) found that self-efficacy has a positive effect on the intention of knowledge sharing among employees via weblogs.

Despite the importance of self-efficacy in the use of social media, previous research has not paid attention to the *sources* of self-efficacy and their impact on researchers in the use of social media for knowledge sharing. Therefore, this study aimed to investigate the sources of self-efficacy that researchers rely on to use social media for knowledge sharing, and to explore how these sources impact this use.

3. Methodology

This paper is the first part of a sequential mixed methods study (Creswell, 2014, Creswell and Clark, 2011). The use of social media for knowledge sharing is quite new, so exploratory work is needed (Panahi et al., 2016b). Exploring self-efficacy and the sources can best be accomplished through in-depth discussion with researchers.

Based on the importance of universities for producing and sharing knowledge (Armstrong and Franklin, 2008), the researchers selected a university, in particular the University of Strathclyde in Glasgow, Scotland, as the setting. University of Strathclyde is the third largest university in Scotland (Darby, 2017). The university has four faculties: Science, Engineering, Humanities & Social Sciences, and Business. Academic social media use is not as widespread as it could be at the university, despite institutional efforts toward encouraging its use for sharing research outputs and academic accomplishments (G. Macgregor, personal communication, August 2017). The researchers recruited participants by posting flyers around the university. *The participation criteria used to select participants sampling in this study were academics, researchers, and PhD students at the University of Strathclyde who use social media for sharing and discussing professional knowledge and outputs.*

3.1. Data Collection

The data were collected through semi-structured interviews with 30 participants from University of Strathclyde. All four faculties were represented. Convenience sampling, a non-probability and non-random sampling strategy (Etikan et al., 2016), was used in this study. The researchers located participants based on their availability to participate and the ease of communication between the researchers and participants (Etikan et al., 2016) due to proximity. The sample for this study included six academic staff, one research assistant, and 23 PhD students.

The interview guide was designed after reviewing the literature on the use of social media for knowledge sharing, and was based on the theoretical lens of social cognitive theory (Bandura, 1986, 1989), which encompasses self-efficacy. The researchers discussed the interview guide with an academic colleague, revised it accordingly. The final interview guide can be found in Appendix A. They then sought ethical approval, which was *granted from the University of Strathclyde's Departmental Ethics Committee in Computer and Information Sciences.*

In the interview, participants were first introduced to the nature and purpose of the study, and informed consent was obtained. The interviewer commenced by requesting standard demographics. Then, the researcher asked open-ended questions in relation to their self-efficacy sources in the use of social media platforms and the impact of these sources for knowledge sharing. The interviewer never used the unfamiliar term "self-efficacy" or its related sources. Instead, the interviewer used familiar phrases such as "confidence in your ability," "positive and negative experience," "emotion," "encouragement," and "observation of others". Each interview was conducted at a time and place convenient for the participant. The average interview time was about 30 minutes. All interviews were audio recorded after taking permission from the participants. All recordings were transcribed and then entered into NVivo 11 for analysis.

3.2. Data analysis

The researchers analysed the transcripts with directed content analysis. "Content analysis is the intellectual process of categorizing qualitative textual data into clusters of similar entities, or conceptual categories, to identify consistent patterns and relationships between variables or themes" (Julien, 2008). These themes might be identified a priori; thus, the researcher seeks evidence from participants' expressions relating to these themes, or may emerge from the analysis of the transcripts. There are three approaches to content analysis: conventional, directed, and summative (Hsieh and Shannon, 2005). Since the researchers in this study attempted to extend the theoretical framework of self-efficacy and its sources by Bandura (1977), they used directed content analysis, which is the appropriate approach to validate or extend a conceptual theory or theoretical framework (Hsieh and Shannon, 2005).

According to Elo and Kyngäs (2008), content analysis has three stages: preparation, organisation, and reporting. The preparation starts with selecting the unit of analysis which can be a word or a theme. In the organising stage, the researcher creates categories and codes, and then grouped these codes under the suitable category. In the final stage, the researcher reports the analysing process and the results through categories, models, a conceptual system or a map

A professional transcription service transcribed all 30 audio recordings. The researchers read the transcripts and listened to the audio recordings for interviews at the same time to verify the accuracy of the transcripts. In the next stage, researchers derive the codes from theory or relevant research findings (Hsieh and Shannon, 2005). In this study, the codes were derived from the four sources of self-efficacy (Bandura, 1977). The researchers categorised the data under these sources. The researchers used rich and detailed descriptions to convey the findings in order to make them more realistic (Creswell, 2014).

In order to check the consistency of the coding, the researchers read the transcripts and listened to the audio recordings for interviews at the same time to verify the transcripts' accuracy. They also read and reflected on the transcripts several times after coding to make sure that codes had not shifted in meaning or definition during the process (Gibbs, 2008). Finally, they asked a senior colleague who was not familiar with the study to provide an objective assessment of the study, such as the relationship between the research questions and the data, the level of analysis, and the interpretation (Creswell, 2014).

4. Findings

Based on the analysis, each source has an impact on the use of social media for knowledge sharing. These four sources and their impact are discussed in this section to answer the research questions.

RQ1: What sources of self-efficacy do researchers rely on in the use of social media for knowledge sharing?

1
2
3 Researchers relied on all four sources. Each source with supporting quotations from the
4 participants are presented in the following four sub-sections.

5
6 *Personal mastery experiences*

7 The participants agreed on the importance of skills and abilities that are built from the practices and
8 experiences in the use of social media for knowledge sharing over time. This as a source might lead
9 to increased confidence. Most of the participants stated that they are confident about their abilities to
10 use social media for knowledge sharing:

11
12 *I'm more confident and more used to tweeting things, retweeting things, embedding links,*
13 *embedding pictures into the tweets that I share as well. I'm more confident in how to find people*
14 *and adding people to follow. (5)*

15
16
17 *I am very confident about my ability. I am an effective communicator and I think I have keenly*
18 *developed online personality. (9)*

19
20 In contrast, some researchers did not have confidence in their ability to use social media to share
21 knowledge. This is due to their lack of practice and experience in the use of social media for
22 knowledge sharing:

23
24 *I think overall, I have got basic skills. I'm not an advanced user. For instance, on ResearchGate, I*
25 *have not explored all options that it gives to the user. (2)*

26
27
28 *I think basic, basic skills at the moment. But I have a plan to develop my skills in the future. (7)*

29
30 As demonstrated in the previous examples, researchers are more confident if they have abilities and
31 skills in this area. However, these abilities and skills may depend on the platform(s) used:

32
33 *I am a very confident Twitter user. I use it a lot, and I have it on my phone, and I also have it on my*
34 *tablet, and I have it on my laptop. So, I am very confident at using that one. (11)*

35
36 *I am not very good with Twitter. I do not write well in short pieces, I tend to be a little bit more*
37 *verbose. In terms of Facebook, I feel very confident about it, just because there are less*
38 *restrictions. I feel like I can easily share things. (14)*

39
40 These two examples show how researchers' perceived abilities in using particular platforms can be
41 constructed from practice and experience. Moreover, these abilities might be built over the period of
42 time that researchers have spent using them:

43
44
45 *For my experience, it is probably being almost ten years since I have been familiar with Twitter.*
46 *(11)*

47
48 *Well, I would have used it for four or five years now. I have used it as a master student, then as a*
49 *professional. (Participant no. 4)*

50
51 These researchers rely on their personal mastery experiences in the use of social media for
52 knowledge sharing. For them, at least, personal mastery experiences are an important source of self-
53 efficacy.

54
55
56 *Vicarious experience*

Vicarious experience is another source that researchers can rely on to use social media for knowledge sharing. This source occurs by observing and others who use it:

I have seen many people use social media to share and exchange files through WhatsApp, through TeamViewer. The files include reports and tutorial. Seeing others use social media for sharing knowledge influence me to use it. So, I imitate others to achieve what I want. (1)

I think it was mostly by observing how it worked for people who are more successful than me, who had more experience in using social media. (2)

When imitating successful colleagues, they make an attempt to be effective users:

I have seen some colleagues use it very effectively and I have tried it a bit with it, so I have used Twitter to do that. (8)

I have seen number of my colleagues use ResearchGate and I realised that they use it quite a lot to share their researches that makes me copy them and use it much more.....I have seen more close friends in research use Facebook just for very formal chat and looking for documents which again makes me more likely to do the same but in much more informal. (13)

According to these two examples, it can be argued that seeing the colleagues' use of social media for knowledge sharing can lead researchers to imitate them and use it. However, researchers need to look for colleagues who use it *effectively* and *successfully*. Two participants in this study shared stories of imitating their colleagues which led them to use it as well.

I have seen, I saw for example in terms of Twitter, my colleague runs number of conferences and share their posters, their papers, their posts up on Twitter, and he is getting a huge of amount of traffics and lot of likes around of the conference. From the point of view, my colleague and I got together and designed Twitter photo competition for CDT students to share these sorts of things they are doing. So, we have end up with 300,000 views, we have quite good impact. So, definitely, by seeing that, I have changed practicing from that, I try to use other platforms looking for what other people doing. By seeing these impact, it positively influences me. (12)

When I have started as a PhD student, I have never followed other researchers because I was not in a research environment previously. But when I started working here I started following other researchers see what they are doing and then from following them I see they start tweeting what they are up to in research life. I did not really use LinkedIn too much, but I have used LinkedIn since I have come here and seen some people post in LinkedIn as well. Probably that has influenced me using social media by seeing how they use it. (17)

Based on the analysis and quotations such as these, vicarious experience is considered to be an important source of self-efficacy in this study.

Verbal persuasion

The third source of self-efficacy is verbal persuasion, which is encouragement and support researchers received from others. This encouragement and support can be from individuals (e.g. colleagues) and/or institutions (e.g. universities). Encouragement for researchers to use social media for knowledge sharing has been divided into individual and institutional encouragement.

Individual encouragement. Researchers may receive encouragement from colleagues to use social media to share experience, ideas, and knowledge, and to show their research to others:

Numerous colleagues, whether they are members of the professorial staff or other researchers, whether post-doctoral or doctoral level, have said "You simply have to. If you have research it must be on Twitter because you are your research, your research is you. You must be over-identified with the practice. You must be over-identified with your work, which means you must use social media as your public". (9)

Researchers can rely on collegial encouragement to enhance their use of social media. Furthermore, academic supervisors may play a key role in encouraging their students to use it:

Last year during my master's degree, a course organiser was emphasising us and said "Okay, this is very important. Be visible, use it (LinkedIn). Get some valuable connections so then you can cooperate with people". (2)

My PhD supervisor is on Twitter a fair amount. She tweets a lot ... She said at one point, "Oh, you should really get more active". (14)

Institutional encouragement. Institutions (e.g. universities) may encourage their staff to use social media for competitive advantage. For example, social media can enable their research to have a larger social impact that cannot be obtained as well in traditional ways:

I think institutions and departments have become increasingly aware of the power of social media to reach people. Thinking about your impact and how far your work can go... So, we were encouraged to use it. (5)

I think it is good from the point of view of the university having a social reach that it might not have had before. So, it would be interesting to see if the university does continue to encourage us to use it. I think they probably will, and that will certainly encourage me to keep doing it. I am not sure I could use it much more than I do at the moment. (11)

Furthermore, institutions may encourage their staff to use social media in order to attract attention to the institution's research:

If increasingly universities start looking at Altmetric as a way of measuring our value, then that would be an encouragement, I guess, to do more of it. ...I think they [the university] do see it as a good opportunity for dissemination. I think they see it as a good way of getting research out there. So, there is a growing encouragement in the university community to use it. (11)

Verbal persuasion is the third important source of self-efficacy in the use of social media for knowledge sharing in this study.

Emotional arousal

The fourth source of self-efficacy is emotional arousal. According to the participants' responses, emotional arousal may be positive or negative, enjoyable or terrifying. Positive emotional arousal can enhance use:

I think my experience so far has been positive... It will make me use it more. If my experience continues to be positive, if I continue to engage with people within my field, and if I also see better impact for my work, why not use it more? (22)

The positive side actually influenced me a lot more to strive and be more active. It influenced me to write more papers, and work harder to get my research out, and to see what is going on in the world after my update. If someone can come up and tell me, "This work has already been done, but this work, your approach may be really new to this work. So, keep going." Sometimes, the influences like people's question. People's questions are more influential. ... People don't understand what I am doing, but their simple question has a lot more meaningful sense. (25)

As illustrated in the above examples, positive emotion may be shaped from positive experiences or feedback that leads researchers to use it.

In contrast, negative emotion may prevent researchers from using it. This may be formed from negative experience or feedback that leads researchers to not use it, which in turn decreases self-efficacy:

I think if I had severely negative feedback or a negative experience it would push me off the platform. (12)

I suppose, yes, if I had more negative experiences it might put me off using it. If somebody was putting negative comments about what I had written, and it wasn't constructive, it might be a bit disheartening. (27)

In these two examples, negative emotion may affect researchers' use to the point of not wanting to use the tools. However, negatives can be turned into positives if taken as lessons to be learned in the future:

Sometimes I cannot answer the questions, it may be that it is a negative thing for my work, but I take my negatives in a positive way. It's easy for me to conquer my adversity, over something which I don't know. It's all a part of the learning process. Then I can say, "Okay. I haven't done this work so far, but I will try my level best to include this in my research. If it makes more sense. In explaining my results better". (25)

Enjoyment was a positive form of emotional arousal discussed:

I enjoy using social media for that purpose, because of the knowledge sharing. I benefited from that platform, so it always encourages me to use social media. (1)

Another emotional factor is anxiety. This anxiety does not necessarily occur from the use of social media, but it may occur specifically from knowledge sharing via social media:

Honestly, sometimes when I want to ask a question, I am afraid when I mention the full details about my experiments, maybe sometimes I feel that I can't trust anybody too much, when I put everything online. But sometimes, when I ask for specific information about my question, it's okay. (7)

As illustrated in the above discussion, emotional arousal is considered a fourth source of self-efficacy.

To summarise the findings for RQ1, the participants in this study relied heavily on these four sources of self-efficacy that were proposed by Bandura (1977) in their use of social media for knowledge sharing.

RQ2: How do these sources impact the use of social media for knowledge sharing?

As seen previously, personal mastery experience is an important source, but *how* does it impact use? The majority of the participants in this study believed that if they have more abilities and skills in the domain of social media use, they will feel encouraged to use it:

It makes me keener to use it. (27)

That would of course let me use it a lot. (28)

In contrast, low confidence in its use can lead to less use:

If I was not confident about my ability, I would not use it. Or I would be very wary of using it. I would use it much less. I think it is important to be confident. (18)

The impact of vicarious experience is based on effectively imitating role models:

I suppose if I have seen somebody who has tweeted a paper and this paper has got more attractions on it, get a lot of likes and retweets that has a positive influence, because it shows that people engage with that media. So if I have seen people use social media and get that sort of data that will be a kind of positive force, and I will be more likely to use it. (5)

Definitely, if I have seen someone use social media for sharing the knowledge and they are succeeded, that will influence me to use it as well and my work can reach those people that I have never had it before. (3)

Based on this, researchers may want to look for role models on their chosen platform(s). However, in some cases, observing or seeing others does not have any influence on the researchers' use, possibly because they have relied on other sources:

I have seen a lot of researchers in my research area but this did not influence me. I used it with my research community. (4)

Verbal persuasion appears as encouragement and support from either individuals or institutions:

It might encourage me to use it potentially more than I am already using it. (12)

I would just be more likely to use it. I would say I would probably increase my use as a result of them being positive about it so. (17)

It actually made me think about it a bit more and use it more frequently. (19)

In relation to emotional arousal, participants identified both positives such as enjoyment and negatives such as anxiety:

Positive side:

Positive experience is going to make me use it more. It's going to make me think to use it more, engage on it more. (18)

The positive side, actually influenced me a lot more to strive and be more active. It influenced me to write more papers, and work harder to get my research out, and to see what is going on in the world after my update. (25)

Negative side:

I think if I had severely negative feedback or a negative experience it would push me off the platform. (12)

I suppose, yes, if I had more negative experiences it might put me off using it. If somebody was putting negative comments about what I had written, and it wasn't constructive, it might be a bit disheartening. (27)

Within this study, the sources had a mostly positive impact on use, except for some aspects of emotional arousal.

5. Discussion

Participants relied on the four sources to influence their use of social media for knowledge sharing. They may draw upon one source more than others. Based on these results, it seems possible that finding ways to increase self-efficacy through these sources could increase use in those that do not use it often.

Interview responses highlighted personal mastery experience as the most significant source, and those who have a wide range of mastery were more likely to use social media effectively, confidently, and frequently. This finding aligns with Bandura (1977) as well as Zeldin et al. (2008) and Hendricks (2016), which identified personal mastery experience as the most influential source. Indeed, personal mastery experience can influence other sources, because it must be developed before drawing on the others. Experience can be gained through practice, training, and mentoring.

Vicarious experience was another significant source. This finding is in line with Bandura (1977), Zeldin et al. (2008), Surland (2010), and Hendricks (2016) in their findings that observing and seeing others perform a task successfully may increase individuals' confidence in their ability to perform the same thing. As stated above, however, researchers may not benefit from vicarious experience in the use of social media for knowledge sharing, unless they have sufficient skills and abilities to use this tool. Chosen role models should be those who use social media actively and effectively.

The participants discussed verbal persuasion as another source. As Bandura (1977), Garlin and McGuiggan (2002), Zeldin et al. (2008), Surland (2010), and Hendricks (2016) noted, encouragement from others may motivate individuals to perform effectively. However, like vicarious experience, verbal persuasion should follow personal mastery.

Participants discussed the final source, emotional arousal, both positively and negatively. Positive emotion can motivate use, whereas negative feelings can prevent use. This source has positive and negative sides. This finding is in agreement with Bandura (1977), Garlin and McGuiggan (2002), and Hendricks (2016), in that positive or negative emotional arousal can leave individuals with a high or low perception, respectively, of the ability to persist in a task. This source can also influence other sources of self-efficacy. Researchers should try to keep in mind that others' negative reactions on social media is part and parcel of online discussion, and should not let it discourage them from further online interaction. Negative reactions should rather be viewed as learning experiences.

The Sources' Levels of Importance

This study extended the theoretical framework of Bandura (1977) by exploring the level of importance of self-efficacy sources. In this study, personal mastery experience is the most important source. The stronger the personal mastery, the more participants can draw on the other three sources. In contrast, researchers who lack personal mastery experience may not be able to improve their abilities through other sources.

Emotional arousal was the second most important source identified. Positive emotional arousal can encourage researchers who already have personal mastery experience to continue improving their ability to use social media. Researchers should try to learn from these emotions to develop their self-efficacy, assuming they have personal mastery experience. Negative emotions may prevent researchers from use.

Vicarious experience and verbal persuasion are somewhat less influential sources than the other two sources, but still important. Researchers may not benefit from them unless they have personal mastery experience and can effectively handle positive and negative emotional reactions.

This study's arrangement of the levels of source importance varies from Bandura (1997) and Loo and Choy (2013) which prioritised the sources as mastery experience first, vicarious experience second, social persuasion third, and emotional arousal last. Furthermore, this study differs from (Redmond, 2016) which found that emotional arousal is the least influential source.

Implications

The present study leads to several implications. From a theoretical perspective, the study further develops the self-efficacy theoretical framework by identifying levels of importance of the sources as applied to a real-life online context. In a practical light, researchers who are looking to improve their social media use should be made aware of the four sources of self-efficacy and determine which ones they need to develop in order to increase their confidence. First of all, researchers need to practice using their chosen tools. They should seek out mentoring and training as needed. Universities can offer social media workshops and how-to sessions, peer support networks, and other support as appropriate. In the second stage of self-efficacy development, researchers must be aware of their positive and negative emotional responses to usage and responses from others. Obviously, building on positive experiences and learning from negative ones would be beneficial. Next, researchers should observe their colleagues and peers and try to emulate them. Universities could identify and involve experts to serve as role models. Finally, institutions can encourage staff to use it through tangible means such as recognition of good social media sharing practice in annual reviews and promotion cases. This could also lead colleagues to encourage each other as well. By following these four progressive stages, researchers may become more confident and effective social media users.

6. Conclusion

This study investigated the sources of self-efficacy that researchers rely on to use social media for knowledge sharing, and to explore how these sources impact use. In line with Bandura's classification of self-efficacy sources (Bandura, 1977), the researchers interviewed 30 participants about their sources for self-efficacy when using social media. Participants relied on all four sources, and they all had an impact on their use of social media for knowledge sharing. This impact ultimately leads to whether or not they will continue to use it. The findings provide an opportunity for researchers to better understand their self-efficacy and its sources and the impact of these sources on the use of social media for knowledge sharing.

This study makes key contributions to the study of the use of social media for knowledge sharing. First, this study investigated the importance of the sources of self-efficacy for researchers to use social media for knowledge sharing and the impact of these sources. These sources aligned with those presented in the theoretical framework of (Bandura, 1977), which is a new finding in this context. Second, this study articulates ways in which researchers may improve their self-efficacy in

the use of social media for knowledge sharing through developing their skills, observing and mimicking experienced users, finding encouragement from colleagues and institutions, and practicing emotional regulation. According to the findings of this study, it may be important for institutions to provide training, bring in social media experts, and provide encouragement as well as psychological preparation to their staff.

The sample was a limitation of this study. Based on convenience sampling, the participants self-selected. Due to non-response from senior researchers, the majority of participants in this study were PhD students, and this was beyond the authors' control. Because of the skewed sample, this study cannot make comparisons between the different levels of researchers.

Future work will involve the administration of an online quantitative survey that will be based on the findings from the interviews. The researchers aim to reach a larger, more diverse sample within the university population.

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Appendix A: Interview Questions

General Information

- 1- Can you tell me a little bit about your job in the university? What are you doing exactly?
- 2- How long have you been doing this job?
- 3- Do you use social media? (if answer yes, go to Q 4; else go to Q 16)
- 4- What social media platforms do you usually use?
- 5- Have you used these platforms or any of them for professional purpose in your job such as sharing experience with your colleagues? (If answer yes, go to Q 6, else go to Q 17).
- 6- Have you used these platforms or any of them to share your research outputs with your colleagues? Could you specify what you have shared?

Self-efficacy

- 7- How confident are you about your ability to use social media to share your expertise or research outputs with your colleagues?
- 8- How do you think this ability that you have can influence your use for social media to share your expertise or research outputs with your colleagues?
- 9- Could you tell me about your expertise in using social media to share your knowledge experience or research outputs with your colleagues?
- 10- Could you tell me a little bit about the experiences that you have in the use of social media to share your research outputs with your colleagues?
- 11- How do you think these experiences that you have can influence your use for social media to share your expertise or research outputs with your colleagues?
- 12- Have you been encouraged to use social media to share your expertise or research outputs with your colleagues? Who did encourage you?
- 13- How do you think these encouragements that you got can

	influence your use for social media to share your expertise or research outputs with your colleagues?
	14- Have you used social media to share your experience or research outputs because you have seen someone use it? Could you tell me about it?
	15- How do you think seeing others' use can influence your use for social media to share your expertise or research outputs with your colleagues?
Others	16- Why do you not use social media?
	17- Why do you not use social media for sharing your experience or research outputs?

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