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Exploring Reasons for Use or Non-Use of Academic Social Network Services among Taiwanese Fishery Scientists

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【Abstract】

This research adopts a qualitative approach to explore the use or non-use of academic social network services at the Taiwan Fisheries Research Institute (TFRI). The first stage collected basic descriptive statistical data by using ISI/Thompson Reuters to systematically identify scientists from this population (TFRI scientists) who published at least one paper during 2012-2014. This resulted in 61 Taiwanese fishery scientists to be included in the study. The first stage found that only

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11 of 61 TFRI scientists (18.0%) have profiles in social network sites. The second stage used semi-structured interviews with 21 scientists comprising two groups (users=11, non-users=10) from the stratified sample of 61 survey respondents in the first stage. The result of the second stage identified factors that influence scientists' use or non-use of academic social networks.

【Keywords】

Academic social networks; Fishery scientists; Scholarly communication

INTRODUCTION

Academic social networking sites have become prominent in the last decade (Boyd & Ellison, 2008; Espinoza Vasquez & Caicedo Bastidas, 2015). They have become central to the Internet, and several sites have been created geared specifically toward scientists. These sites increasingly offer a new arena for scholars and scientists to connect and collaborate with one another (Nentwich & König, 2014).

Life scientists, and in particular, fishery scientists, may benefit from using social networks to disseminate scholarly information. The "*Yearbook of Science and Technology Taiwan*" (http://yearbook.stpi.org.tw) identifies the fishery field as a life science, and states that due to the technologies emerging from their R&D in the last 50 years, Taiwanese fishery scientists have contributed significantly to the field (Hsu, Chen, Lin, Tseng, & Chen, 2012).

Research has shown that scientists in Asia, including scientists in Taiwan, are "isolated," implying low social interaction among colleagues and professional contacts (Aquisap et al., 1996). Thus, scientists in Taiwan perceive or learn little about new research through personal social networks and information exchange (Liao, 2002).

This study focuses on the use of social networks by scientists associated with The Taiwan Fisheries Research Institute (TFRI) (http://www.tfrin.gov.tw). Founded in 1929, the Institute consists of four research divisions, including six research centers with four research vessels, with a focus on fish capturing, aquaculture, and seafood processing (Hsu et al., 2012).

The use of academic social networking sites in scholarly communication is a topic of investigation (Shehata, Ellis, & Foster, 2015). He and Jeng (2016) identified several benefits for scientists using academic social network, including gaining visibility, resources, and endorsements, but also admit that these benefits are not widely recognized by academia. Our research questions are designed to assess the social web presence and impact thereof for scientists working at the Taiwan Fisheries Research Institute. Sonnewald's (2007) work on scientific collaboration highlights importance of collaboration. The findings of the present work may be of interest to fishery scientists, librarians, bibliometricians, and researchers interested in scholarly communication.

Scholarly communication and the exchange of information are crucial to the existence of societies, as well as for organizations and social groups, such as invisible colleges, though collaboration and information-sharing (Luo, 2006; Parsram, 2008; Parsram & McConney, 2011). These types of information exchange related to scientists are used to build common ground and collaboration readiness (Maglaughlin & Sonnenwald, 2005). Thus far, the scope and impact of fisheries research results has been scarce.

This study adopts a qualitative approach to explore the academic social network services use at Taiwan Fisheries Research Institute. This research began by using content analysis to identify the extent of adoption and the demographic characteristics of users and non-users. Semi-structured interview was conducted to examine factors that influence scientists' using academic social network.

The paper presents material and findings that answer the following research questions:

(1) What percentage of Taiwan Fisheries Research Institute (TFRI) scientists have a profile in Google Scholar, Microsoft Academic Search, Mendeley, Academia, ResearchGate, LinkedIn, or any content in SlideShare?
(2) What are their reasons for using or not using a social networking site service?

LITERATURE REVIEW

Oh & Jeng (2011) defined academic social networking services as "online services (e.g. online platforms and /or software) that focus on supporting online research oriented activities, as well as building social networks for scholars." Current academic social network sites include Academia.edu (http://academia.edu/), ResearchGate (http://www.researchgate.net), Mendeley (http://www.mendeley.com/) and Zotero (http://www.zotero.org/).

Bullinger, Hallerstede, Renken, Soeldner, & Moeslein (2010) conducted in-depth interviews with the founders of ten social research network sites, including Academia.edu, Mendeley, and ResearchGate, to develop a taxonomy for social research networking service (SRNS). Bullinger et al. (2010) classified SRNS into four categories: research directory sites, research awareness sites, research management sites, and research collaborations sites. The study concludes that SRNS could change scientists in four ways: "construct and maintain their public or semi-private profile within a bounded system (identity and network management), identify other scientists with whom they share a connection and communicate (communication), share information with other scientists (information management) and collaborate (collaboration)" (Bullinger et al., 2010, p.8). Kelly & Delasalle (2012) studied the presence of 20 UK universities on Academia.edu, LinkedIn, Scientists ID and Google Scholar, and found presence in academic social networks enhances academic visibility. Mahajan, Singh, & Kumar (2013) noted that scientists should start using academic social sites to gain professional information relevant to them. It was suggested that they use certain social sites such as academia.edu, Mendeley, ResearchGate.net, Zotero, etc. to increase academic visibility. Nández & Borrego (2013) studied Spanish scholars at Catalan universities who used Academia.edu. The three main reasons for using Academia.edu were similar to the use of ResearchGate: to get in touch with other scientists (67%), to disseminate research output (61%), and to follow the activities of other scientists (59%). It is evident that above studies have shown benefits to using academic social networks.

The literature also offers insight into the awareness of academic

social networks. Van Noorden (2014) collected and analyzed data from questionnaires sent via email to approximately 3,500 scientists from 95 different countries. The result from the survey concluded that Google Scholar was known by over 70% of the respondents. ResearchGate was also certainly well-known, with more than 88% of scientists and engineers reporting that they were aware of it. Academia.edu was less well-known than ResearchGate. The survey also revealed that under half of the respondents said they visited an academic social network site regularly. These sites allow members to create profile pages, share papers, track views and downloads and discuss research (Van Norden, 2014; Ward, Bejarano, & Dudás, 2015). It is clear that at minimum there is an awareness of academics social networks among many scientists.

Despite there being benefits to use and awareness of academic social networks in the scholarly community, actual use is relatively low. The UK Research Information Network Report (2010) conducted a survey of 1,308 UK academics and found that fewer than 15% of respondents used social network regularly, and only a small group, around 5% of respondents published their outputs and works in progress. It revealed that 76% believed it was likely that new media formats and types of online publication would become more important in the next five years. The main barrier was the lack of clarity over potential benefits. In contrast to expectations, the costs of adoption have been found not to be trivial, and without clear and quick benefits scientists preferred to stick with the services they already knew and trusted. There were also a second set of barriers around perceptions of quality and trust (Procter et al., 2010). Mas-Bleda, Thelwall, Kousha, & Aguillo (2014) studied the use of academic social network sites among 1,517 highly cited European scientists who had profiles in Google Scholar, Microsoft Academic Search, Mendeley, Academia.edu, LinkedIn, or any content in SlideShare, and found that very few had profiles in major social network sites (e.g., a quarter had LinkedIn profiles and even fewer had Academia profiles). Jordan (2014) used social network analysis (SNA) to explore network structure in Academia.edu, Mendeley and Zotero, three academic social sites. The survey revealed a contradiction between academics' use of the sites and their position within the networks. Junior academics were the most active users.

In contrast to many studies finding low use of academic social networks, some studies have found there to be higher use. Another study conducted at the University of Michigan (Barteau, Hoffman, Maynard, Miller, & Scavia, 2014) found that over 80% of the University of Michigan faculty members surveyed were either using, considering using, or might use LinkedIn or other professional networking sites. Elsayed (2016) examined Arab scientists' perspectives on the use of academic social network sites. The study revealed that most scientists were members of more than one academic social network sites, but ResearchGate was found to be the most commonly used. Thelwall & Kousha (2016) also found that a majority of the research scholars used specialized academic social sites for their research. The body of literature studying the extent of use of academics social networks among scientists suggests that these networks may be underused given the benefits.

Those scientists who are using academic social networks have expressed concerns, barriers, or challenges to their use. Madhusudhan (2012) conducted a survey of 160 academics in an Indian university in Delhi and found that 54% had ResearchGate profiles compared with 51% for Academia and 39% for LinkedIn. This study also mentioned that although academic social network sites had many resources and services, privacy and cyber-bullying were topmost concerns while using these sites. The results showed that a majority of respondents used the sites for friendly communication over a period of six months to a year. And few respondents expressed that visiting social sites was a waste of time. Wilkinson & Wietkamp (2013) surveyed scientists and found that 47% made contact with other scientists as a result of their social network use. The main barrier for academics regarding social network use was the lack of time (Ecklund, James, & Lincoln 2012; McClain & Neeley 2014). Most recently, Persson & Svennignsson (2016) investigated the scientists' use of social media at Sweden Linkoping University (LiU). They found many LiU scientists were unwilling to start using social media. They conducted a qualitative approach and interviewed eight scientists at LiU who used social media for professional purposes. The most common purpose was to keep up with their field by following other scientists and finding articles. The LiU scientists' usage of social media

were not essential; however, a few numbers saw potential. Nonetheless, the result revealed that social media was seen as: time consuming, too difficult to learn, having irrelevant audience, being for private rather than professional life, and having too short a message length. Based on this, they recommended that academic libraries can support scientists to find appropriate collaborations partners at the university, to connect professional knowledge among faculty and establish a communication strategy in social media (Persson & Svennignsson, 2016).

As it can be seen, much work has been done on scientists' use of academic social networks. They have been shown to be beneficial to scientists and studies that scientists are aware of the existence of academic social networks, although there have been perceived negative issues in widespread adoption of the platforms. However, the role of Taiwanese scientists in social media and its impact on their careers have not been fully explored. He and Jeng (2016, p.71) stated, "…not all activities related to online scholarly collaboration are supported. It is therefore interesting to see how activities related to such factors can be implemented and supported in the future academic social web." The current study analyzes interview data from Taiwanese fishery scientists to understand how they use social media or why they do not.

METHODOLOGY

This study was carried out in two stages. The first stage examined the academic social network profiles of the fishery scientists of the Taiwan Fisheries Research Institute (TFRI). The second stage conducted semi-structured interviews to understand the reason why they use or do not use academic social network.

Stage One: Data collection

Selection of academic social network sites

Based on the literature, this study focuses on eight academic social networks that have been investigated by others, but the present work examines the use of the following sites by Taiwanese scientists: Google Scholar, Microsoft Academic Search, Mendeley, Academia.edu, ResearchGate, LinkedIn, Zotero and SlideShare.

Data collection

In order to determine the study population, the scientists working at the Taiwan Fisheries Research Institute was firstly identified using the research staff directory. Second, scientists from this population who published at least one paper during 2012-2014 were systematically using ISI/Thompson Reuters. This resulted in 61 Taiwanese fishery scientists to be included in the study. Demographic data regarding the gender, level of education, and academic position were collected of those included in the study. Third, participants' usage of the selected social network sites (see Table 1) were collected during a period between August and September 2015 by two graduate research assistants, one of whom used to work in TFRI. Both held qualifications in library and information science and were familiar with the social media websites.

The study examines eight social network sites. Each of the eight social network sites was manually searched for each of the 61 scientists (subjects) in this study; however, scientists' names have been removed in the final presentation of findings. Sample rows of the data collection are shown in Table 1.

Table 1.
Data collection table

Subject	Websites							
	Google Scholar	MAS	Mendeley	Academia.edu	Research Gate	LinkedIn	Zotero	Slide-share
22	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23	n/a	n/a	n/a	Total views 24; followers 2	Publications 8; views 733	n/a	n/a	n/a
24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25	n/a	n/a	n/a	n/a	publications 10; views 1k	n/a	n/a	n/a
26	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Stage Two: Semi-structured interviews

TFRI scientists (n=61) had a very low presence in social network sites, and while some scientists have two or more accounts in academic social networks, in total only 11 scientists had a presence in social network sites. The second stage conducted semi-structured interviews (face-to-face and by telephone) with a stratified sample of the 61 survey respondents from Stage One, who were grouped into "users" and "non-users." In total, 21 scientists (users=11, non-users=10) were included in Stage Two in order to understand the reason why Taiwanese fishery scientists use or do not use the academic social network sites. All eleven of the users were interviewed. Ten non-users were randomly selected from the study population of the remaining 50 subjects. A descriptive summary of Stage Two is illustrated as Table 2.

Table 2.
Descriptive summary of Stage Two participants

TFRI respondents		Users (N=11)	Non-users (N=10)
Date		March to June, 2016	
Time		45 minutes in average	
Number	Female	2	4
	Male	9	6
Education	PhD/ Doctoral Degree	8	4
	Master degree	3	6

The interviews were conducted during the 16-week period between March and June 2016. They were captured on audiotape and later transcribed. The interview protocol was first developed in Chinese, and then translated into English, using a direct translation method. The interview data were analyzed by highlighting themes occurring directly from the texts of the transcripts. The result of this analysis identified several factors affecting the use or non-use of academic social networks.

Semi-structured interview questions:

Q1. What research project are you currently working on?
Q2. Could you please describe your general research interests?
Q3. Are you currently a member of any professional society?
Q4. How many academic conferences do you generally attend per year?
Q5. How do you build and keep the relationship with others?
Q6. Do you use any academic social network websites?
Q7. What is your major purpose for either using or not using an academic social network?

RESULTS

Profile of the academic social networking site users

TFRI scientists (n=61) had a very low presence in social network sites, with only 11 scientists using social network sites (See Figure 1). There are no scientists using Mendeley, Zotero, or SlideShare. One scientist has a profile on Google scholar; two scientists on MAS; two scientists on Academia.edu; nine scientists on ResearchGate; and two scientists on LinkedIn. Table 3 offers the scientists' academic social network presence broken down by demographics.

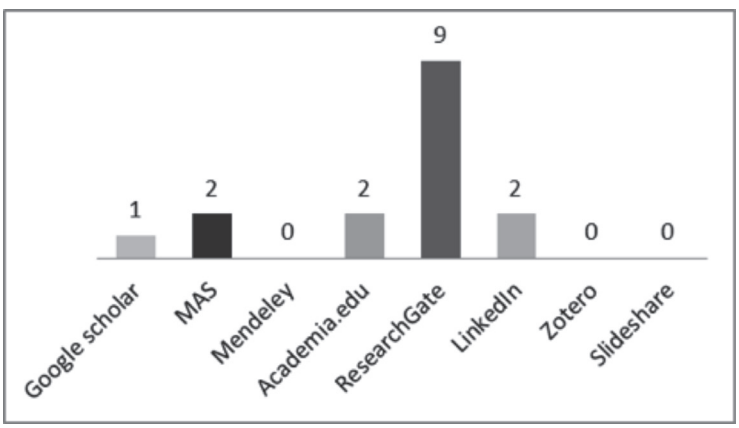

Figure 1. Usage data: TFRI scientists' in social sites (n=61)

Table 3.
TFRI scientists' presence in social sites by demographics: Raw counts and percentages

Social website	Gender/ Percentage		Education/ Percentage		Position/ Percentage				Total (n=61)
	Female (n=16)	Male (n=45)	PhD/ Doctoral Degree (n=31)	Master Degree (n=30)	Research Fellow (n=22)	Associate Research Fellow (n=13)	Assistant Research Fellow (n=12)	Staff (n=14)	
Google Scholar	(1) 2.2%	(1) 3.2%		(1) 4.5%				(1) 1.6%	
MAS	(2) 4.4%	(2) 6.5%		(1) 4.5%			(1) 7.1%	(2) 3.3%	
Mendeley									0
Academia.edu	(1) 6.2%	(1) 2.2%	(2) 3.2%	(1) 3.3%		(2) 15.4%			(2) 3.3%
Research Gate	(1) 6.2%	(8) 7.8%	(7) 22.6%	(2) 6.7%	(5) 22.7%	(3) 23.1%		(1) 7.1%	(9) 14.7%
LinkedIn		(2) 4.4%	(2) 6.5%		(1) 4.5%	(1) 7.7%			(2) 3.3%
Zotero									0
Slideshare									0

It is readily apparent that not many Taiwanese fishery scientists are using academic social networks. Among the eight social networks investigated, ResearchGate is the most commonly used by the subjects in the present study.

Analysis of factors affecting academic social network service use

The objectives of this research were to identify web presences and factors influencing social media services among fishery scientists in Taiwan. After the interviews were transcribed, the complete transcripts item numbers (for example, TFRI-1, TFRI-2; non-users are TFRI-N1, TFRI-N2) was assigned. Analysis of interview data was conducted to ascertain factors contributing to scientists' use or non-use. A sample of illustrative quotations can be found in Table 4, with the factors identified in the next sections.

Table 4.
Interview data

No	Quotations	Respondents
1	"In order to download free scientific papers, I maintain a ResearchGate account." (TFRI-2; 33 years old, assistant research fellow)	Users
2	"I have an account in ResearchGate. Although I didn't post any comments, it makes me feel not lonely as a researcher." (TFRI-4, 36 years old, assistant research fellow)	Users
3	"I forgot I have an account in ResearchGate. Google scholar is enough for me to access to free papers, and for most of Google scholar it is not necessary to login." (TFRI-9, 50 years old, PhD, research fellow)	Users
4	"I was invited by my co-author, but then I never logged in again. Actually I got my PhD from a Taiwanese university, and I really don't like to use online networks. Another reason is that I don't need to contact any international scholars." (TFRI-10, 49 years old, PhD, research fellow)	Users
5	"I was the P.I. of the project 'Digital Archives for the Inheritance of Kuroshio Fisheries' for six years, during which the local Kuroshio species were uploaded to the fish database of Taiwan. This website became very popular for fish identification and systematic fish studies, and it is still being updated with new species. We have a group in Research Gate." (TFRI-11, 47 years old, PhD, associate research fellow)	Users
6	"I passed the civil service examination in aquaculture technology two years ago. I am currently a member of the Fisheries Society of Taiwan. My research work is usually in the laboratory and aquaculture field. I may discuss my work with the senior researchers to obtain more information or advice." (TFRI-N1, 31 years old, master degree, assistant research fellow)	Non-users
7	"The best way of identifying a biological specimen or exchanging information is to do so in person. Sometimes I use the telephone or email to exchange information with others. I currently do not use any social media networking platforms at all. I am curious why people like to use social networks to share their life." (TFRI-N7, 40 years old, PhD, assistant research fellow)	Non-users
8	"I am old and ready to retire in a couple of years, so I am not interested in using social media." (TFRI-N8, 63 years old, PhD, research fellow)	Non-users

No	Quotations	Respondents
9	"For privacy concerns, I don't like to login to get free papers." (TFRI-N9, 37 years old, associated research fellow)	Non-users
10	"I am used to communicating with scholars or my colleagues face-to-face, and I don't want to waste my time to use social media, even for an academic purpose. And I think it's difficult for me to use English to communicate with someone else. If I have research problems, reading papers is the priority for me." (TFRI-N10, 40 years old, assistant research fellow)	Non-users

Factors contributing to using academic social networks

Among those scientists who are members of one or more academic social networks (N=11), the reasons for scientists to use social media include:

(1) to access free papers (n=9),
(2) to get ideas for new research (n=5),
(3) to spread ideas (n=4),
(4) to discover research of interest (n=4),
(5) to respond to an invitation by an advisor or co-author (n=3),
(6) to follow other scientists' activities (n=3),
(7) to engage in collaborative research activities (n=2)

Even among those who use academic social networks, three respondents mentioned using English writing is still a major barrier, so they just passively browse the information rather than actively discussing or leaving any messages to others. One user raised a privacy concern, and stated that free access to papers via Google Scholar negates the need to login to ResearchGate again. Another user indicated that the research cycle is dominated by the PhD thesis advisor, and although now a PhD and English writing is not a problem, most of the users are more professional. The user reported never receiving any feedback, although he monitored the conversations in the past, he hasn't logged-in in two years. Even among users of academic social networks, face-to-face conservation is seen as not being replaceable. Another respondent mentioned it is not necessary to contact any international scholars. Although some scientists are members of academic social networks, grouped together as users, they report numerous negative aspects related to the use thereof.

Factors contributing to not using academic social networks

Among scientists who are not members of an academic social network (N=10), factors influencing scientists not to use social media include:

(1) a preference for face-to-face communication (n=10),

(2) use is time consuming (n=8),

(3) simply do not like using online social networks (n=4),

(4) a preference for traditional scholarly publishing (n=3),

(5) difficulty in communicating in English (n=3),

(6) it is too much trouble to login (n=3),

(7) privacy concerns (n=2),

(8) too old to learn new technology (n=1).

For example, one respondent mentioned his research topic is Ichthyology, and the best way to identify a biological specimen is face-to-face, so they seldom login to social media. Another respondent mentioned reading papers to solve a research problem is reliable, but it's not good to communicate with people in a virtual community. Regarding privacy, two respondents mentioned the desire to keep research highly confidential, such as research related to patents, therefore they won't leak their research details in any place, especially in an online environment because the information spreads very quickly.

DISCUSSION

Some fisheries management scholars highlight learning by doing and possessing knowledge in a tacit form as an important professional and social asset. This refers to knowledge which is informally bound together by shared expertise and a passion for connecting in a research network (Pálsson, 1995; Pálsson, 2000; Hoefnagel, Burnett, & Wilson, 2006). That could play a role as to why most of respondents mentioned social media cannot replace face-to-face conservation. Nonetheless, despite the fact that international studies have shown that academic social networks promoting research collaboration and emerging scholarly communication can be beneficial for scientists, our research has shown that the majority of Taiwanese fishery scientists still remain hesitant to use academic social networks, and identified numerous contributing factors. There has been a noteworthy increase in the number of academic social network sites variable popularity among scientist. The findings of this study align with those of

previous scientists indicating that ResearchGate is the dominant academic social network (Madhusudhan, 2012; Elsayed, 2016). Interestingly, based on findings derived from this study, male scientists are using more than half of the social networks studied, while female scientists are only using two out of the eight. Similarly, those with PhDs are far more represented in the social networks than those with only a master's degree. Quite surprisingly, a greater percentage of senior than junior scientists are opting to use social networks (See Table 3).

Our finding regarding senior scientists is in contrast to that of Jordan (2014). TFRI scientists had a very low overall presence in social sites. Some scientists are members of multiple academic social networks, but only 11 out of 61(18.0%) had a presence. Thelwall and Kousha (2015) found that Brazil, India, and some other countries seem to be disproportionately making use of academic social network sites, while academics in China, South Korea, and Russia may be missing opportunities to use social network sites to maximize the impact of their publications. Our study finds that Taiwanese fishery scientists may also be underutilizing academic social networks, and therefore potentially may not be obtaining the range of benefits offered by said networks.

CONCIUSION

Our study investigated a niche population and the results add support to the growing body of literature finding low use of academic social networks (Lupton, 2014; Mas-Bleda, 2014; Persson & Svenningsson, 2016).

This study has revealed the demographic profile of TFRI scientists in social network sites and factors affecting academic social network service use. This paper makes a contribution to understand TFRI fishery scientists' reasons for using or not using academic social networks. An understanding of the perceived pros and cons associated with academic social networks adds to the body of knowledge regarding these networks. Because the sample in this study was small, future research should employ a larger sample size and expand to an inter-organization scale in order to investigate the academic social networks behavior of different organizations. In addition, a comparative study could help to understand academic social network use among different disciplines.

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水產研究人員使用學術社群網站行爲之研究

Exploring Reasons for Use or Non-Use of Academic Social Network Services among Taiwanese Fishery Scientists

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【摘要】

科學家使用學術社群網站的行為，日益備受學術界的矚目，近年來也成為學術傳播重要的研究課題之一。本研究取徑於質性研究，運用 Web of science（WOS）引用文獻索引資料庫和半結構化訪談法，探討水產試驗所科學家使用學術社群網站的現況和影響原因。本研究分為兩個階段進行，第一階段是利用 WOS 資料庫系統識別研究對象，檢索在 2012 至 2014 年期間，至少有一篇論文被 WOS 收錄的水產試驗所科學家人數有 61 位，進而分析其使用學術社群網站的情形，調查發現在 61 位科學家中只有 11 個（18.0%）有使用學術社群網站的行為。據此在第二階段進行分層抽樣，於 2016 年 3 至 6 月間訪談 21 位科學家，分為使用者（11 位）和非使用者（10 位）兩組，研究結果說明影響科學家使用學術社群網站的最主要原因為取得免費全文，而不使用學術社群網站的最主要原因為習慣面對面的溝通。文末亦提出未來研究參考之建議。

【關鍵字】

學術社群網站；學術傳播；水產試驗所科學家