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When Social Media Use for Formal Learning is Voluntary: A Study of Students' Use of Self-Regulated Learning Strategies[1]

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ABSTRACT

Background. With the availability of a wide array of social media platforms, it is not surprising that students use social media to support their formal learning in a voluntary manner. To achieve effective learning, it is important for students to employ self-regulated learning (SRL) strategies to manage their learning process. There has been limited work concerning the SRL strategies that students use in a voluntary context of learning with social media.

Objective. This study aims to uncover how students use SRL strategies when learning with social media in a voluntary context.

Results. Based on focus group discussions with 41 university students, this study uncovered two categories of SRL strategies: regulation of learning (i.e., goal setting, environment structuring, performance control, and self-evaluation), and regulation of social media use (i.e., information evaluation, support exchange, and distraction management). The findings have implications for students' effective learning with new technologies like social media in formal education and lifelong learning.

INTRODUCTION

Social media applications, such as Facebook, YouTube, Quora, and WhatsApp, have become ubiquitous to the younger generation and provide new channels of socializing, entertaining, and information seeking. To keep pace with technology advancement, educators in formal learning contexts, especially in the higher education sector, have tapped into the potential of social media to enhance teaching effectiveness and to encourage active learning (Manca & Ranieri, 2016). Social media have certain advantages over traditional classroom learning and institution-based learning management systems in terms of extending communication and connections outside the classroom and enhancing personal and collaborative learning (Dabbagh & Kitsantas, 2016). Moreover, as the younger generations generally have easy access to, and high familiarity with, social media, it is natural for students to voluntarily adopt

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social media for educational purposes (Giunchiglia, Zeni, Gobbi, Bignotti & Bison, 2018). Voluntary use of social media for formal learning refers to a learning context in which social media use for course learning is determined by the students themselves. That is, social media use is neither assessment-driven, nor a requirement of the course design or a mandate from the instructor (Greenhow & Lewin, 2016; Wu & Lederer, 2009). In the voluntary context, students are free to use any social media tools in a personalized way for the purpose of complementing their formal learning. Research suggests that learning activities in the voluntary context can increase students' learning motivation and engagement (Greenhow & Lewin, 2016; Manca & Ranieri, 2016). Using social media voluntarily for learning is also deemed as a conducive context for students to practice how to gain knowledge and solve problems with available information technologies (Väljataga, Pata & Tammets, 2011).

Yet, even with the availability of various social media and students' willingness to learn, it remains questionable if students can manage their learning well in a context with high autonomy (Giunchiglia, Zeni, Gobbi, Bignotti & Bison, 2018; Matzat & Vrieling, 2016). This concern is especially salient in the voluntary context, where individual students are fully responsible for their social media selection and use, and their learning activities. Students who are unable to manage their learning and social media use may easily get distracted by social and entertaining activities, and even quit learning, resulting in decreased learning motivation and dissatisfaction with the learning experience (Wu, 2015). To manage high autonomy in a learning context, education scholars have stressed that learners must be capable of using self-regulated learning strategies to achieve desirable learning outcomes (Schunk & Zimmerman, 1997; Zhou, Lee & Sin, 2017).

SRL strategies refer to deliberate actions that individuals employ to direct, monitor, and regulate learning to achieve their goals (Zimmerman & Pons, 1986; Zimmerman, 1989). Using SRL strategies can help students achieve effective learning through aiding cognition, controlling effort and time, and directing learning actions (Pressley & McCormick, 1995). That is, SRL strategies are used to assist learners in acquiring and retaining knowledge in a structured and methodological way (Zimmerman, 1989). Prior research on online course learning has reported that students' engagement in using SRL strategies could lead to positive educational outcomes such as higher course grades (e.g., Barnard, Lan & Paton, 2010; Broadbent & Poon, 2015), greater satisfaction with online learning experience (e.g., Artino, 2007), and continuous enrolment in other online courses (e.g., Puzziferro, 2008). In those studies, while students had more autonomy than classroom learning, without the presence of an instructor or other learners, the use of an online learning system was mandatory and learning activities were instructor-led. Instead, students in the voluntary context have relatively more autonomy and less or no guidance from the teacher regarding what to learn through social media, as well as how to appropriately choose and use various social media for learning. Thus, using SRL strategies is a critical component of effective learning with social media in the voluntary context.

Despite a large volume of research on using SRL strategies, there has been limited work concerning the voluntary context of using social media for formal learning. Much of the prior research on using SRL strategies has dealt with online learning, in which an institutionalized adoption of a learning technology or social media is a mandate from the course instructors and a requirement for the course (Greenhow & Lewin, 2016; Jalali, Sherbino, Frank & Sutherland, 2015). Further, research on social media learning has examined the use of SRL strategies by students in the formal education context (Zhou, Lee & Sin, 2017), but not specifically in the voluntary context. The voluntary context needs research attention, given that SRL has been highlighted as a critical lifelong learning skill when

students move beyond structured academic environments (Dabbagh & Kitsantas, 2012; Kind & Evans, 2015). In a fast-changing learning environment with rapid and constant emergence of new technologies and new knowledge, it is important for students to have the ability to employ SRL strategies when engaging in learning with technologies, which is a key skill for successful lifelong learning (Väljataga, Pata & Tammets, 2011). Specifically, helping students develop a repertoire of SRL strategies for learning and using social media is important because SRL strategies enable learners to successfully learn in online environments.

Thus, this study investigated how students use SRL strategies when learning with social media in a voluntary context. Specifically, this study attempted to answer the following research question: *What are the SRL strategies that students use when using social media voluntarily for formal learning?*

LITERATURE REVIEW

Voluntary Use of Social Media for Formal learning

Given that social media enables easy access to a large volume of knowledge and connections with knowledgeable users, educators have begun to integrate social media tools to enrich teaching and learning experiences in formal education. For example, studies have suggested how instructors could use social media such as Facebook and wikis to facilitate collaborative learning among students (Franklin & Thankachan, 2013), and how YouTube could be an effective tool to support classroom teaching with videos (Jaffar, 2012). Some research also discussed the pedagogical affordances that social media can support and that foster self-regulated learning in a synergistic and interdependent way (Dabbagh & Kitsantas, 2012).

While prior studies of social media use for formal learning mainly focused on the context in which social media use is mandatory in a course, recent research has highlighted that students also tend to use various social media as a complement for formal learning in a voluntary manner. It is common for students to voluntarily select and use available social media for course-related activities, such as communicating with peer students on collaborative projects (Manca & Ranieri, 2016), engaging in active searching for useful content that can supplement learning in the classroom (Kind & Evans, 2015), and even incidentally getting inspiration on course-related topics from other online users (Greenhow & Lewin, 2016). In this vein, different from a mandatory-use context in which social media use is externally directed or required (e.g., by the course instructor), social media use in the voluntary context is internally initiated by the students themselves (Wu & Lederer, 2009).

The high availability, accessibility, and usability of social media have made it natural for students' voluntary integration of social media in their formal learning (Giunchiglia, Zeni, Gobbi, Bignotti & Bison, 2018). At the same time, there are concerns regarding how students manage their learning through social media in the voluntary context, in which there is no guidance from the course instructor regarding what to learn through social media, as well as how to appropriately choose and use various social media for learning. To maintain effective learning with social media in a voluntary context, students need to engage in SRL strategies to cope with challenges or problems in the process of learning with social media (Dabbagh & Kitsantas, 2012).

Using Self-Regulated Learning Strategies

Self-regulated learning (SRL) is "an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition,

motivation, and behavior, guided and constrained by their goals and the contextual features in the environment" (Pintrich, 2000, p. 453). The central idea underlying SRL is the use of appropriate strategies to maintain an active learning process. The role of using SRL strategies in students' success in academic learning has long been stressed in educational research. Earlier studies in the traditional academic context have identified a consistent positive relationship between the use of SRL strategies and academic achievement (e.g., Zimmerman & Pons, 1986; Zimmerman, 1989). Later studies related to online course learning, in which the use of an online learning system was mandatory, have also revealed that students' use of SRL strategies had a positive influence on their academic achievement (e.g., Barnard, Lan & Paton, 2010; Broadbent & Poon, 2015) and furthermore predicted satisfaction in their learning experience and continued intention to enroll in future online courses (Artino, 2007). Thus, students' use of SRL strategies can be considered an important indicator of effective learning both offline and online.

In the literature on online course learning, SRL strategies, in terms of goal setting, environment structuring, time management, help seeking, task strategies, and self-evaluation, were found to be important strategies that students should adopt to achieve online learning success (Barnard, Lan & Paton, 2010; Broadbent & Poon, 2015). Research on social media use in education has discussed how instructors can use social media to support students' engagement in SRL strategies. For example, SRL strategies, such as goal setting, time management, and self-evaluation, can be supported by the use of blogs and wikis, whereas social networking sites can enhance the use of help-seeking and self-evaluation strategies (Kitsantas, 2013). A recent study investigated how students self-regulated their learning when using social media for course study in school. While the use of social media was not limited to the voluntary context, it uncovered the prevalent use of four SRL strategies—goal setting, environment structuring, performance control, and self-evaluation (Zhou, Lee & Sin, 2017). These SRL strategies have also been observed in the context of mandatory online course learning (e.g., Song, Kalet & Plass, 2011) and Web-based job training (e.g., Wan, Compeau & Haggerty, 2012). However, it is unclear whether these SRL strategies were also used by students in the voluntary context, where the students are responsible for initiating and regulating their learning through social media use. Thus, this study proposes the first specific research question within the voluntary context:

RQ 1: Do students engage in SRL strategies, in terms of goal setting, environment structuring, performance control, and self-evaluation, in the context of voluntary use of social media for formal learning?

Even if these SRL strategies are used by students in the voluntary context of learning with social media, the SRL strategies examined in prior research were mainly derived from the literature on online learning in mandatory context (e.g., Barnard, Lan & Paton, 2010; Dabbagh & Kitsantas, 2012). That is, these strategies were used mainly to regulate a learning process with structured guidance provided by course instructors. This is different from the voluntary context, where learning activities and social media use are not guided by course instructors. With less instruction and guidance from instructors, students need to cope with new challenges in social media such as unguaranteed quality of learning resources, uncertainty of the availability of learning support, and distractions from online social activities that are not related to learning (Greenhow & Lewin, 2016; Quan-Haase, 2010; Wu, 2015). Thus, it calls into question whether self-regulated students may also engage in other SRL strategies to manage the tensions when learning with social media in the voluntary

Table 1. Demographic characteristics of the focus group participants (*N* = 41)

Group	1	2	3	4	5	6	Total	
Number of participants	7	8	5	6	8	7	41	100%
Gender								
Women	1	2	2	4	2	3	14	34%
Men	6	6	3	2	6	4	27	66%
Educational Level								
Postgraduate	5	4	3	1	2	6	21	51%
Undergraduate	2	4	2	5	6	1	20	49%
Educational Background								
Humanities and Arts	0	0	0	1	0	0	1	2%
Natural Science	0	1	1	1	1	0	4	10%
Social Science	0	3	0	2	0	1	6	15%
Engineering	7	4	4	2	7	6	30	73%

context. Hence, the second specific research question is proposed:

> *RQ2: Do students engage in other SRL strategies, in addition to goal setting, environment structuring, performance control, and self-evaluation, in the context of voluntary use of social media for formal learning and, if so, what are these strategies?*

METHOD

To explore the SRL strategies used by students in the context of voluntary use of social media for formal learning, focus groups were used to empirically investigate the research questions. The interactive dynamic of the focus group allows participants to share and compare their experiences, which can help surface multiple layers of interpretation of the use of social media for formal learning and multiplicity of learning experiences (Morgan, 1997).

Focus Group Participants

Participants were recruited based on convenience and purposive sampling, which is typically used in qualitative research to find participants who are proficient and well informed with the phenomenon of interest (Etikan, Musa & Alkassim, 2016). Potential participants of this study were screened on the requirement that they must be university students aged 18-years and above and must have the experience of using social media for coursework in their schools, regardless of whether the use of social media was mandatory or voluntary. Participants were recruited through email invitations and campus advertisement in a large university in Singapore. After qualification screening, 41 students joined this study and were randomly assigned to six focus group sessions, ranging from 5 to 8 participants each. Table 1 shows the number of participants and the demographic information in each group.

Data Collection

The six focus groups were conducted following the same procedures as follows. In particular, each session was moderated by an experienced moderator and a research assistant. Informed consent was obtained from all participants at the beginning of each session. Prior to the session, the moderator explained to the students the differences between mandatory use of social media and voluntary use of social media for formal learning. Later, participants who had the experience of voluntarily using social media for formal learning were asked to share their experiences of using strategies to manage learning with social media. Those participants who did not have the experience of voluntarily using social media for formal learning were asked to think about useful strategies to manage learning with social media. Each focus group session took about 90 to 120 minutes. The audio recordings of all focus groups were fully transcribed; the transcripts were used for subsequent analyses.

Data Analysis

MAXQDA, a qualitative data analysis software, was used for data analysis. The first author, who was trained in qualitative research methods, conducted a close and iterative reading of each transcript carefully, highlighting all participants' utterances that appeared to describe learning strategies in the voluntary context. These highlighted texts were deemed as relevant data for the following two-phase data analysis. The basic unit of analysis was an uninterrupted utterance of one participant, which was a natural segmentation of the recorded group discussion (Hirokawa, 1988). Content analysis, which is a technique for analyzing qualitative data (Krippendorff, 2004), was used to analyze the text in the transcripts. The coding proceeded through two phases informed by Hsieh and Shannon's research (Hsieh & Shannon, 2015). The first phase of data analysis was conducted using a directed content analysis approach in which prior research was reviewed by the researcher (i.e., first author of this paper) and a list of variables was identified as the initial coding scheme; the second data analysis phase used a conventional content analysis where new codes may emerge inductively from data and some codes were combined during this process. Thus, a combination of deductive and inductive approaches can lead to a comprehensive understanding of the phenomenon under investigation (Campbell, Quincy, Osserman & Pedersen, 2013; Lee, Osop, Goh & Kelni, 2017).

Directed Content Analysis. The first phase of directed content analysis focused on using predetermined codes to characterize the SRL strategies, which were goal setting, environment structuring, performance control, and self-evaluation. These SRL strategies were derived from prior studies of self-regulated learning in the social media learning context (Zhou, Lee & Sin, 2017). The initial coding scheme is summarized in Table 2.

Conventional Content Analysis. The second data analysis phase of conventional content analysis sought to capture new occurrences of a phenomenon beyond the limit of the predetermined coding scheme (Lee, Osop, Goh & Kelni, 2017). This phase followed a two-step inductive analysis process. First, data that could not be coded into one of the codes in phase 1, i.e., data in "other strategies", were reexamined to identify new strategies. In particular, three new strategies were identified from the data, which provide insights on new SRL strategies. These three new strategies were: information evaluation, support exchange, and distraction management. Next, the first author of this paper examined the data for each SRL strategy to determine whether all SRL strategies identified could be grouped into a few

Table 2. Initial coding scheme and definitions of predetermined codes of SRL strategies

SRL Strategy	Definition
Goal setting	Making decisions on specific learning objectives.
Environment structuring	Using strategies to seek suitable environments that are conducive to learning.
Performance control	Using strategies, including task strategies, time management, and help seeking, during the actual learning process to regulate performance.
Self-evaluation	Assessing learning outcomes according to a standard or a goal.
Other strategies	Strategies that students used to manage learning with social media other than the four described above.

Table 3. Final coding scheme of SRL strategies

SRL strategy	Description
Regulation of learning	**Strategies that are used to manage the learning process.**
Goal setting	Remarks indicating awareness of the goal of learning with social media in the voluntary context.
Environment structuring	Remarks suggesting behaviors of making the physical environment conducive to learning.
Performance control	Remarks describing behaviors of maintaining good performance in the learning process, such as time management and effective learning strategies.
Self-evaluation	Remarks indicating the review or reflection on what have learned.
Regulation of social media use	**Strategies that are used to manage social media usage.**
Information evaluation	Remarks describing behaviors of checking the credibility of information in social media.
Support exchange	Remarks describing seeking and getting support in social media to solve problems related to learning.
Distraction management	Remarks describing behaviors of making the social media environment less distracting.

broad categories. Consequently, two main meaningful categories of codes were identified based on the focus of the strategies of self-regulation. In particular, those strategies that were related to managing the learning process, in terms of goal setting, environment structuring, performance control, and self-evaluation, were grouped as regulation of learning. The newly identified strategies were more related to managing information flow and communication activities in social media, such as information evaluation, support exchange, and distraction management. Taken together, the predetermined strategies from the initial coding scheme could be grouped as a category of strategies as "regulation of learning", while new strategies emerging from the data were grouped as a cluster of "regulation of social media use". The final codes of SRL strategies and descriptions are listed in Table 3.

Reliability. To avoid personal bias and ensure the reliability of the coding, another coder was recruited and trained on the final coding scheme created in the MAXQDA software after the two-phase content analysis. A Cohen's Kappa, used to measure reliability in social science (Zhao, Liu & Deng, 2013), was calculated to determine the extent to which the first coder (i.e., the first author of this paper) and the second coder were in agreement. The final Cohen's Kappa was 0.82, indicating very acceptable agreement (Neuendorf, 2002).

RESULTS AND DISCUSSION

From the analysis of the focus group discussion, two meaningful categories of strategies were identified: regulation of learning, and regulation of social media use. These can be considered two dimensions of self-regulation regarding learning with social media in the voluntary context. The findings are elaborated as below.

Regulation of Learning

Regulation of learning is about using strategies to manage the learning process, which includes setting goals at the beginning of learning, structuring the learning environment, controlling performance, and evaluating learning outcomes. These strategies were SRL strategies that have been widely discussed in the traditional classroom and online course learning settings (e.g., Winters, Greene & Costich, 2008; Zimmerman, 1989), and were also observed in the context of general use of social media for formal learning (Zhou, Lee & Sin, 2017). This study further validates the use of these SRL strategies in the voluntary context of learning with social media.

Goal setting. The analysis suggests that students engaged in setting their own learning goals when using social media voluntarily to supplement their course study, which was mostly driven by the lack of clarification from formal teaching. A female student participant from Focus Group 1 described the goal of solving problems from tutorials:

> *I use it to mostly search questions that I don't understand or I don't know how to answer from tutorial, or some concepts that I don't understand. I use it mostly for quantum mechanics and algorithm and computing courses.*

The goal of learning in social media was also sometimes related to students' eagerness to extend knowledge and dig deeper from what was learned in formal classes. For example, a male student participant from Focus Group 5 talked about how his goal of learning from YouTube was to relate concepts discussed in class to real-world application:

> *As many of them used YouTube as one common thing, so during my undergraduate, our curriculum was mostly broad-based rather than learning one subject. So we took a lot of common courses like some mathematical courses etc., but for the core courses we have like very limited subjects. That is how the curriculum was for the undergraduates. So I am about to take an exam for the masters. So the syllabus there is much wider in terms of subjects and so for my learning, apart from doing my undergraduate, I do watch a lot of YouTube videos where it will quickly help me brush up those topics for exam. As for most of the difficult things that are difficult to visualize for example refining the vertical columns for defining everything into separate parts so how does it work sometimes it can show how different parts can be separated so to visualize those things it helps.*

Environment structuring. A physical learning environment with fewer distractions is important for learning productivity. To complete a learning task without interruption, students discussed their effort to find a quiet space to learn with social media. For example, "NTU has a lot of places, so we can go anywhere for study. I don't think it very difficult to find a secluded place.", a male student participant from Group 1 mentioned. It also appeared that when structuring a learning environment, while some students preferred to study separately, they would still connect with peer learners via social media. As a female student participant from Focus Group 3 mentioned:

> *It's hard to make everyone meet and discuss, and many of us prefer to study at home when there is no class. But we can still discuss our group assignment through WhatsApp and Skype.*

Performance control. To maintain active engagement in learning towards learning goals, students enacted strategies to regulate their learning performance. In the context of voluntarily using social media for course study, students expressed their feelings of autonomy and engagement in taking control of their learning process. A female student participant from Focus Group 3 mentioned about balancing time spent on learning and social activities:

> *Actually for me it's more of time management. So if you set yourself, just for example this time I want to study then at that time you just find yourself a place where no one else is there and then just turn off everything, like your Facebook or whatever, and just study. For me it's more of like time management. When it's your social time, of course you have to hangout, I mean like don't multitask, like study and hang out at the same time. It's just your time management.*

To maintain active engagement in learning, students chose learning materials in social media that were more interesting and easier to comprehend. As a male student participant from Focus Group 3 described:

> *I feel that the quality of the video itself also matters. Like for example, if the quality is very bad, you will feel very bored just to finish even like one minute of the video. But if like 'One Minute Physics', it's very interesting and then the content is very good. So even though it's like four minutes, you also will spend time to watch.*

Self-evaluation. To make sure the learning goals were achieved, students evaluated what they had done and whether further study was needed. As a female student participant from Focus Group 5 talked about her strategy of self-evaluation before an exam:

> *I think it depends on what time you are using… so you can use Facebook and you can ask your doubts ten days before exam but when the exams approach and you just want to concentrate...so you don't need any more information...you already have all the information. You just need to go through it again or something like that. So that's when you stop any more information coming your way and go through what you already have.*

In this case, this student had some new doubts on her learning, but she chose to review the resources she already had instead of reaching out for more information. One male student participant from Focus Group 5 also mentioned about engaging in self-evaluation of his learning by looking back to notes he took when learning from a video:

> *I'm watching a video I write down the notes and later on I can refer to the notes instead of the video itself. So then it also solves the problem of a one hour or two-hour-long video I can select the things I want to remember and write them down and later on I can refer from <my> own notebook. Those are my notes so they are credible and reliable.*

Regulation of Social Media Use

Scholarly attention in prior research has focused on the regulation of learning. That is due presumably to the fact that prior online learning research (e.g., Kuo, Walker, Belland & Schroder, 2013) mainly investigated the use of learning technologies that were specifically designed and used for formal educational purposes. Thus the students' use of technology for learning was structurally directed by the course design. However, students in the voluntary context have more autonomy and control over their learning process, as well as social media use, such as selection and use of social media platforms, instruments, materials, and online human resources. While students engaged in the strategies to regulate their learning process, they also strategically used social media to deal with learning tensions in the social media (e.g., the differentiation of useful information and misinformation), as well as tensions with learning in the voluntary context (e.g., the blurred boundary between learning activities and social activities in social media). In this vein, this study contends that the new category of SRL strategies, i.e., strategies related to the regulation of social media use, are also important in the voluntary context. These strategies were also observed in prior studies about the mandatory use of social media for learning (Wu, 2015), health information seeking (Wan, Compeau & Haggerty, 2012), and news sharing (Lee & Ma, 2012). It is possible that because social media are not specifically designed for educational purposes, students need to strategically regulate the use of social media so that it can be more conducive to learning. The strategies related to the regulation of social media use include information evaluation, support exchange, and distraction management.

*Information evaluation.*When learning with social media in the voluntary context, the learning content was not directly provided by the course instructors. Thus, the evaluation of what was credible information to learn relied on the students themselves. A male student participant from Focus Group 1 talked about the need for credible resources:

> *But suppose I have a time constraint and I have to finish the course now within just three months, I don't have really that much of time I have some more work, project and three other courses to do, but then I would be more inclined towards taking the best credible source and finishing off.*

Regarding this, it was found that students evaluated the credibility of information and sources on social media with relevant heuristic cues. For example, a female student participant from Focus Group 4 said:

> *I think user profile is practically helpful because I think for these Q&A sites, credibility will be important to the users. To the people who are seeking answers. So if the person answers you is from that particular profession, or has a lot of experience, or is a very high VIP user or something, then you will take his answer better.*

Support exchange. In terms of solving problems related to learning, students reported that social media could be effective channels for solution-seekers to post problems and helpful users to offer support. One main support students needed in social media was information

support that could help answer a learning problem. A male student participant from Focus Group 3 described the use of ResearchGate and Quora to ask questions:

> *Other classmates or other experts as well like if we have...well either it can be for your classmates or if you have like... ResearchGate wherein you just put in your doubt and then experts from those fields feed in on Quora... we use Quora to put out peer questions and people would reply to them, so you might be having some understanding of the thing but then those views clear it more.*

In addition to the exchange of informational support on problem-solving, there was also exchange of emotional support such as encouragement and inspiring words in social media. This might be because social media by nature was more related to social activities. A male student participant from Focus Group 6 mentioned about encouragement from peers in WhatsApp, "*Especially when you will do the presentation, other group members just send supporting words.*" In this case, although learning with social media voluntarily was mostly independent, the immediacy and interactivity afforded by social media broke the limitation of time and space for social interaction, thus making students feel less lonely and helpless when facing learning problems (Ahern, Feller, & Nagle, 2016).

Distraction management. One significant problem that students had to deal with was to balance using media for social and learning purposes. For example, the unrelated notifications and recommendations in social media may distract students from learning. As a male student participant from Focus Group 5 described:

> *And just don't spend time on YouTube because I might end up looking at some other videos. They have the recommendation bar, which brings you down to different things that you don't want to see.*

Accordingly, they strategically use social media to cope with such interruptions, "So when I was watching the video, I just made it full screen. So I could be more focused," as mentioned by a male student participant from Focus Group 4. Another male student participant from Focus Group 5 also described the strategy to manage social interactions and system recommendations unrelated to learning.

> *For me, the advantage is obviously accessibility. A small way in which I try to overcome that distraction, which is the biggest problem for me, is to have a separate account. For Twitter, I have a personal account, and I have a professional account which I follow news or entertainment outlet which is relevant to me. Or for YouTube, I open incognito tab, so all my historical data, which are my interests, are not directed to me so everything is very default, so I can focus on things which are there in the first place. Like I want to focus on math and things like that.*

CONCLUSION

This exploratory study has uncovered the use of two different categories of SRL strategies when students voluntarily use social media for formal learning. The findings of this study have potential implications for research and practice.

For research in the field of SRL and social media use in education, this is the first study that explored the use of SRL strategies in the voluntary context of using social media for formal learning, to the best of our knowledge. In particular, two categories of SRL strategies were identified: regulation of learning, and regulation of social media use. The findings of the

two dimensions of SRL strategies used to manage learning with technologies have extended prior research that only examined SRL strategies related to regulation of learning (e.g., goal setting, environment structuring, performance control, and self-evaluation), which are common in the online course learning contexts (e.g., Artino, 2007; Barnard, Lan & Paton, 2010; You & Kang, 2014). The new strategies identified from this study include information evaluation, support exchange, and distraction management, which were also commonly used by students in the voluntary context of learning with social media. Future research could further explore the effects of using these strategies on a student's learning outcomes.

For students and educators, the findings of this study can be used as guidelines for learning with social media in the voluntary context. As suggested in the findings of this study and prior research (Manca, & Ranieri, 2016), students already know how to use social media and it is natural for them to use familiar tools to support their formal learning. However, students are navigating diverse learning resources from a wide array of social media platforms without much guidance and instruction from a specific instructor. To prepare students to become self-regulated learners, there is a need for students to gain knowledge of self-regulated learning, and have opportunities to practice the use of SRL strategies. For example, students should be able to differentiate falsehoods/misinformation from accurate information when seeking knowledge on social media, which is important for learning quality (Chen, Sin, Theng & Lee, 2015). For libraries in formal educational institutions, it is also suggested that training programs concerning social media use for learning should also incorporate SRL instruction, and guide students to manage their learning with social media effectively.

This study has some limitations, which suggest directions for future research. One limitation is the use of convenience sampling at a single university in Singapore. While the focus on a single research site can control for potential varieties in the educational policies in different schools and countries, such control of the research design may limit generalizability. Thus, future research can verify the SRL strategies at different educational institutions and different groups of students. Another limitation is that only inductive qualitative inquiry is employed in this study; hence, the extent to which SRL strategies are used by students is unexamined. Nevertheless, the qualitative research method, such as focus group discussions, can help gain breadth and depth of understanding about SRL behaviors (Morgan, 1997). Future research can build on the findings of this exploratory study to develop a more accurate measurement of SRL strategies and verify the measurement with a larger sample size.
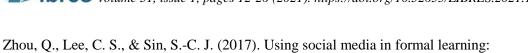
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