Knowledge Management & E-Learning, Vol.14, No.2. Jun 2022

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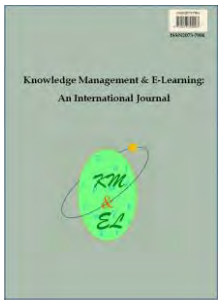
Paulina Pui Yun Wong
Gary Wai Chung Wong
Lingnan University, Hong Kong
Umawathy Techanamurthy
Ministry of Higher Education, Malaysia
Wan Syukriah Binti Mohamad
Selayang Community College: Batu Caves, Selangor, Malaysia
Aderina Febriana
Universitas Prasetiya Mulya, Indonesia
James Chit Ming Chong
Lingnan University, Hong Kong



Knowledge Management & E-Learning: An International Journal (KM&EL)
ISSN 2073-7904

Recommended citation:
Wong, P. P. Y., Wong, G. W. C., Techanamurthy, U., Mohamad, W. S. B., Febriana, A., & Chong, J. C. M. (2022). Using social mobile learning to stimulate idea generation for collective intelligence among higher education students. *Knowledge Management & E-Learning, 14*(2), 150–169. https://doi.org/10.34105/j.kmel.2022.14.009

Knowledge Management & E-Learning, 14(2), 150–169

Using social mobile learning to stimulate idea generation for collective intelligence among higher education students

Paulina Pui Yun Wong*

Science Unit
Lingnan University, Hong Kong
E-mail: paulinawong@ln.edu.hk

Gary Wai Chung Wong

Department of Economics
Lingnan University, Hong Kong
E-mail: wongwc@ln.edu.hk

Umawathy Techanamurthy

Department of Polytechnic and Community College Education
Ministry of Higher Education, Malaysia
E-mail: umawathy.t@mohe.gov.my

Wan Syukriah Binti Mohamad*

General Studies Unit
Selayang Community College: Batu Caves, Selangor, Malaysia
E-mail: syukriah@kkselayang.edu.my

Aderina Febriana

Faculty of Business and Economics
Universitas Prasetiya Mulya, Indonesia
E-mail: Aderina.Febriana@lecturer.pmsbe.ac.id

James Chit Ming Chong

Learning Innovation, Teaching and Learning Centre
Lingnan University, Hong Kong
E-mail: jameschong@ln.edu.hk

*Corresponding author

Abstract: The importance of social networks has increased in recent decades, yet the use of social learning in higher education is nascent. Little is known how to foster high levels of social learning discourse among students in higher education classrooms. To address this gap, the present study analyses the use of a mobile application (Soqqle) for sharing student-generated content and peer-

to-peer communication. Students from Hong Kong, Malaysia, and Indonesia uploaded videos linked to assessments and received feedback from their instructors and peers through social engagement features (e.g., comments, likes). The majority of students reported that the social learning experience promoted idea generation, increased creativity, and improved attention. These results indicate that integrating online platforms and mobile applications can promote social learning. The findings have important implications for educational practice because many educational institutions have adopted online learning due to the COVID-19 pandemic.

Keywords: Social mobile learning; Collective intelligence; Peer-to-peer learning; 21st-century learning; Idea generation

Biographical notes: Paulina PY WONG is currently an Assistant Professor in the Science Unit at Lingnan University. Besides research on ecoological and practical applications of Geographical Information Systems (GIS), she researches on new pedagogical methods in education for sustainability. She has published on topics like social learning and game-based learning.

Prof. Gary Wong is Assistant Professor of the Department of Economics at Lingnan University. His current research focuses are on the housing economics, Hong Kong economy and economics education.

Umawathy Techanamurthy, PhD is a Senior Assistant Director in the Instructional and Digital Learning Division, Department of Polytechnic and Community College Education (DPCCE), Ministry of Higher Education of Malaysia (MOHE). Her interests are instructional design, pedagogies for Technical and Vocational Education (TVET), flipped classroom, design and developmental research (DDR) and mobile learning.

Wan Syukriah binti Mohamad is an English lecturer at Selayang Community College. She has been actively involved in various education service activities and her research fields are related to digital literacy, mobile technology, instructional communication and also a member of the Malaysian English Language Teaching Association (MELTA). She has great interests to examine the world of human communication issues regarding their relationship in it.

Aderina Febriana is a Lecturer at Universitas Prasetiya Mulya. Her current research focuses on teaching english as a foreign language and education technology.

James Chong is the Manager and Strategic Lead of Learning Innovation, Teaching and Learning Centre in Lingnan University. He is actively involved in various educational technology initiatives to enhance teaching efficiencies of educators.

1. Introduction

According to OECD (2019), the 21st-century education involves the development of skills like creative thinking and critical thinking. This is to better prepare students for active citizenship and to take care of their learning. Luna-Nemecio et al. (2020) further describe the need for more community-based interactions to develop solutions for age-old societal issues. The social interactions involved in these discussions can also help students to build contextual information, diverse perspectives to help develop higher-

order thinking. The need for providing global context is crucial for innovation, which heavily depends on the drawing of knowledge and ideas, especially in the digital sharing economy (OECD, 2015; Robinson et al., 2017). Given the rapid technological advances that occurred in recent decades, peer interactions are increasingly taking place online via various social media platforms. It is worthwhile exploring whether the use of such social media platforms can encourage creative and critical thinking, necessary to foster innovation. OECD (2019) describes the need for collaboration with others to create value, often requiring agility and adaptability to try out new ideas. Collective agency is also described as individual 'agents' who share a shared responsibility, sense of belonging, identity, purpose, and achievement. This is supported by the concept of collective intelligence as a group of 'agents' collaborate as a single unit to make decisions to solve problems (Pratt, 2019). In this context, similar collective behaviour in a social network setting to solve problems may be difficult to do in a face-to-face setting but may be achievable online. For example, having students take part in an online open call for problem-solving can encourage crowdsourcing (Brabham, 2013) as they build on each other's ideas to develop new concepts.

However, empirical evidence (Harmon & Tomolonis, 2019; Karpinski et.al, 2013) showed how some use of social media technology may give negative effects on student engagement and learning outcomes. In some cases, students highlighted that they disliked the use of social networks in education (Lima et al., 2020), or have low participation due to a lack of purpose (Akcaoglu & Lee, 2018). This is especially true if the technology is used as a form of a discussion forum (Harmon & Tomolonis, 2019). According to Kew and Tasir (2021), low cognitive engagement levels were seen as students posted content on e-learning discussions forums. It is recommended that alternative formats, or methods like scaffolding, could help boost metacognition, self-efficacy and learning performance. Considering the popularity of social media like Facebook and Instagram, it is important to understand how online platforms can promote social learning (in particular for video-based content) to stimulate collective intelligence. It is also important to explore how this method can be implemented at scale. This is the aim of the present study, as a part of which social mobile learning patterns at three educational institutions in Asia (in Hong Kong, Malaysia, and Indonesia) were analysed and compared.

2. Learning in the 21st century

Most educational systems across the world are rooted in traditional teaching and learning methods. They should be adapted to the 21st-century workplace demands as well as diverse learning styles. Osman and Marimuthu (2010) and Ramirez (2020) argued that the focus of modern education should be on critical thinking, communicative skills, and the ability to modify one's thinking process. According to Dekker (2020), students report that group work and discussion-based pedagogy is effective in encouraging critical thinking. Students need to engage with peers to obtain different perspectives of others to encourage diversity. The author further articulates those discussions should focus more on differences in social, cultural, political, and economic diversity. Understanding the role of social networks for discourse is significant as peer interactions are increasingly taking place via platforms like Facebook and Instagram. Similar interactions may help to increase critical thinking if observation, reflection, and reasoning activities are incorporated (Zhang & Chen, 2020). This is particularly important as learner preferences are crucial in adopting e-learning. For example, despite being mandated to, vocational school learners were not inclined to engage with e-learning materials before coming to class (Im, 2021). A more engaging and popular method for access content, such as social

media may help. For example, an increase in student motivation and creativity was reported in another study that used social networks for learning (Al-Rahmi & Zeki, 2016). While the study reported that students felt that social networks were useful, it is not always the case as some students do not feel a need to participate due to a lack of purpose (Akcaoglu & Lee, 2018; Lima et al., 2020). A potential solution was suggested by Teo (2019) who recommended the adoption of dialogic pedagogy. In this pedagogy, learners are encouraged to question the ideas and opinions of others. The author recommends community-based learning based on reasoning and knowledge. Discussions should be both respectful and grounded while being used to scaffold learning. However, examples of the use of communication technology like social networks to promote dialogue in the context of education are lacking. Although done online, social networks are still subject to social learning theory (Bandura, 1963), where a person's behaviour is shaped by the social environment, directed by reinforcement or rewards. This theory is further described as collective efficacy where individual contributions may enhance collective outcomes. A study on collective efficacy with social networks (Liao et al., 2015) highlighted the need for the usage of the technology to have some form of playfulness, besides the perception of usefulness. Further, if the technology supports mobile learning, it will also help in learning outcomes. According to Reed et al. (2010) and Jung et al. (2002), being placed within larger social communities of practice can change a person's understanding of concepts due to interactions with others, which enhances student satisfaction and achievement.

The type of media format used for presenting content may also help to encourage social interactions. A popular type of format used in social networks is the video format. Studies have shown that videos, often produced with audio, can provide realistic experiences that can help better capture student attention (Alemdag & Cagiltay, 2018). One study showed that using videos prior to class, also known as flipped classrooms, can help to foster knowledge. This was suggested to be due to additional pre-class preparations and can lead to increased learning satisfaction (Akbarialiabad et al., 2021). According to Fjørtoft (2020), such multimodal learning experiences can increase student engagement and stimulate creativity. The use of digital story-telling videos has also been shown to encourage co-creation and increase student self-awareness through reflection (Schmoelz, 2018). However, there is little evidence or knowledge of the use of videos in a social network for knowledge co-creation in an educational context. For example, a study by Wang et al. (2021) of language learning applications showed that despite evidence pointing to effectiveness of using video, it is the least used amongst other multimodal methods. Understanding student responses on the purpose and utility of recording videos in a social network for learning is important. Further, the process in which educators can review the videos and provide feedback is also critical.

To anticipate the potential purpose and utility of videos in a social network to students, it is worth considering beneficial learning outcomes (e.g., metacognition, collaboration, etc.) that could be achieved with social learning. According to Kang et al. (2015), social learning can promote creativity, which is a necessary precondition for the development of collective intelligence. They further opined that user-generated content can be particularly valuable in this context, as it promotes informal interactive learning. In education, this can be achieved through interaction among students, and between students and teachers, while making use of external resources (Bonabeau, 2009) like the internet or textbooks. These external resources can help to make decisions in a collective environment (McHugh et al., 2016). Bonabeau (2009) also purported that collective intelligence enhances the decision-making process owing to the diverse viewpoints that emerge from group discussions. According to Kittur et al. (2009), this is particularly the

case if the participants are consciously engaged in the group activity. Importantly, this process is bidirectional. As individuals draw upon collective knowledge to enhance their skills, they further benefit from the collective efforts which give rise to a knowledge-building cycle. Another recent example of collective learning being done was reported by Medero and Albaladejo (2020) through collaborative content creation through a Wiki. Besides participation, results show an increase in critical reasoning and self-learning of students as they observed the contribution of others. This study thus uses the concept of observational learning (Bandura, 1963) as students learn by observing the videos of others in a collectively shared environment (social network). Thus, this study aims to review the benefits of watching video content of others as students' complete assessments.

Signs that social media platforms such as Facebook and Quora promote collective intelligence can be readily found in the content shared and consumed by their users. Thus, it is important to examine whether a social network used for video-based tasks can lead to collective knowledge building, promote student engagement, knowledge building, and active learning (Chen et al., 2010; Fewkes & McCabe, 2012; Kuh & Hu, 2001; Jung et al., 2002). It is essential to understand how a digital educational platform can yield all the benefits of popular social media while learning about its associated drawbacks. This has motivated the present study, whose goal is to determine how students engage in video-based learning activities in a social network designed to promote collective intelligence in higher education.

3. Method

3.1. Study design

To identify the interpersonal factors that promote collective intelligence in the context of higher education, a case study approach was adopted whereby students were recruited from colleges and universities in Hong Kong, Malaysia, and Indonesia to increase the validity and reliability of the study findings. These three study settings were chosen due to differing student demographics while ensuring all participants were familiar with advanced communication technologies and were capable of completing the assignments using the mobile social learning platform Soqqle (https://soqqle.com).

Moreover, as the study was conducted during the COVID-19 pandemic, all participating institutions relied on online learning as the primary method of instruction. As indicated by Chaturvedi et al. (2020), Setiawan and Taiman (2020), and Oyedotun (2020), distance learning has had a detrimental effect on student motivation and satisfaction with education due to limited interactions with teachers and peers, making this investigation highly relevant.

3.2. Asynchronous social learning assignments

To support the learning activity, this study uses the RASE learning design framework (Churchill et al., 2016) for mobile learning environments. In terms of activity, three groups of lecturers (college and university level) participated in this study, requesting students to complete video assignments over a semester. As the aim of the present study was to design an online learning environment that can cultivate knowledge co-creation, each of the three groups was given a broadly-defined task to encourage creativity in individual submissions. For example, Malaysian students were required to describe their ideas and opinions about products that they use daily. As their peers started sharing their

examples, it was expected that this information would be used by those still working on their assignments to improve upon their submissions. As a result, a positive learning environment would emerge, allowing students to spontaneously build upon each other's ideas and co-create new results.

To help in activity design, the Principled Use of Video (PUV) Framework was used (Kang & van Es, 2018). According to PUV, the six criteria involved in designing activities with videos involve i) defining goals, ii) setting specific objectives, iii) selecting clips, iv) designing a task, v) selecting a tool, and vi) facilitating the conversation. The details of each criterion are defined in Table 1. A key goal of the activity is to create a shared vision for learners, in which diverse learners can learn more from each other by considering different points of view with varying contexts.

Table 1
Principled use of video (PUV) framework for activities for three groups

Criteria	Group one	Group two	Group three
Defining goals	Provide a shared vision of climate change and waste management for 35 university participants	Provide shared vision for workplace communication for 154 vocational school participants	Provide shared vision for IELTS English learning for 167 university participants
Specific objectives	Participants can view content from peers to gather new ideas for waste reduction as part of the assessment activity	Participants can view content from peers to gather new ideas for speaking content as well as expected speaking skill requirements	Participants can view content from peers to gather new ideas for speaking content as well as expected speaking skill requirements
Selecting clips	Video clips will be made available to the class for browsing on a mobile application	Video clips will be made available to the class for browsing on a mobile application	Video clips will be made available to the class for browsing on a mobile application
Designing a task and selecting a tool	Monitor and audit waste generation every week for 3 weeks. Students are encouraged to provide video annotations and summaries to help make video watching easier	Create 3 videos for presenting ideas, opinions, and situations across a semester (3 months).	Create 3 videos for presenting ideas, opinions, and situations across a semester (3 months).
Facilitating conversation	Comments were encouraged on posts to create opportunities for co-creation of methods to reduce waste	For language learning, the aim of engagement in this study is observational learning and thus no specific instructions were given for peer to peer comments	For language learning, the aim of engagement in this study is observational learning and thus no specific instructions were given for peer to peer comments

The resource, support, and evaluation of the RASE framework will be described in this section. The resource made available for students to complete the activities was a mobile application, Soqqle. Soqqle is a purpose-built educational technology that is designed like a social media application. Students can upload videos and view the content

of peers as they do so. The application also allows actions like comments and likes (👍), commonly seen in other social media applications. The application was chosen due to its familiarity with social media applications where the probability of students watching the content of peers is higher. Further, Soqqle also provides a web-based dashboard where videos were consolidated and private feedback could be given to participants. Finally, Soqqle is also a private application, where the administrators had to create a passcode on the application for participants to unlock to access the system. The content posted by peers on Soqqle is also expected to play a role in providing support for participants as they prepare and complete their video activities. Finally, content is evaluated through the video artifacts produced by participants, which provide evidence of the learning output of the participants.

3.3. Data collection

At the end of the semester during which they worked on their video-based assignments, participating students were invited to take part in three-member focus group discussions. Zoom was used for this purpose, as it is a popular video-conferencing application that allows sessions to be recorded.

In total, 24 students (6 from group one, 12 from group two, and 6 from group three) participated in focus group discussions. Students were advised that the sessions were recorded for further analyses. For group one, all sessions were conducted in English, whereas in those held with groups two and three a mixture of English and Bahasa Indonesian was used. All sessions were subsequently transcribed (and translated where applicable) and the content was coded by two independent raters (that were informed of the study aims) to identify common patterns while making sure that satisfactory Inter-Rater Rating (IRR) was attained.

3.4. Focus group discussions

When designing the questions for focus group discussions, the researchers were guided by three factors posited by Yeop et al. (2019) that influence behavioural intention and use behaviour in the context of blended learning: (1) Use Expectancy − Perception of the benefits that can be derived from using the learning approach to attain learning goals; (2) Social Influences − Peers' willingness to adopt the learning approach; and (3) Facilitating Conditions − The perceived quality of the technical resources used to implement the learning approach. As outlined in Table 2, relevant guiding questions were used in the focus group discussions.

Table 2
Focus group discussion topics

Studied Factors	Use Expectancy	Social Influence	Facilitating Conditions
Interpersonal	Do you get new ideas or knowledge from others?	Do you give or get feedback from friends?	What do you think of the asynchronous nature of Soqqle?
	Does peer content affect your content creation?	How do you feel when you get comments?	
Supporting Technological Factors	Is it easier to create videos than to complete traditional classroom assignments?		What is your process in creating videos?

3.5. Data coding

All focus group discussion transcripts were coded by two independent raters, who reviewed participant statements and identified the most frequently mentioned terms. Once an acceptable IRR was achieved, they proceeded to identify participant quotes in support of the key themes that emerged from their analyses.

4. Results

The key themes that relate to stimulating collective intelligence that emerged from the focus group discussions were (1) Idea Generation − whether participants exchanged ideas with each other before generating their content; (2) Enjoyment − whether participants had fun or experienced happiness while working on their assignments, and (3) Experience − whether participants felt that they gained new skills as a result of working on the task. These themes are supported by the findings reported in pertinent literature on collective intelligence where new knowledge is purported to be generated as a result of interactions with others (Bonabeau, 2009).

4.1. Improving the process of self and peer evaluation

Participants concurred that the ability to review the content submitted by their peers was helpful, as it allowed them to develop their submissions. In their view, this was the main benefit of Soqqle, as it allows the exchange of ideas, and thus ultimately improves the group output. For example, one of the activities involved students in group one capturing an audit of their waste (Fig. 1), allowing the entire group to adopt novel recycling strategies. Group two and three completed activities that required videos that have more presentation components. These include activities (Fig. 2) like favourite holidays, an explanation of processes (like wearing a shawl or making bread butter pudding), as well as describing objects that are often used at home.

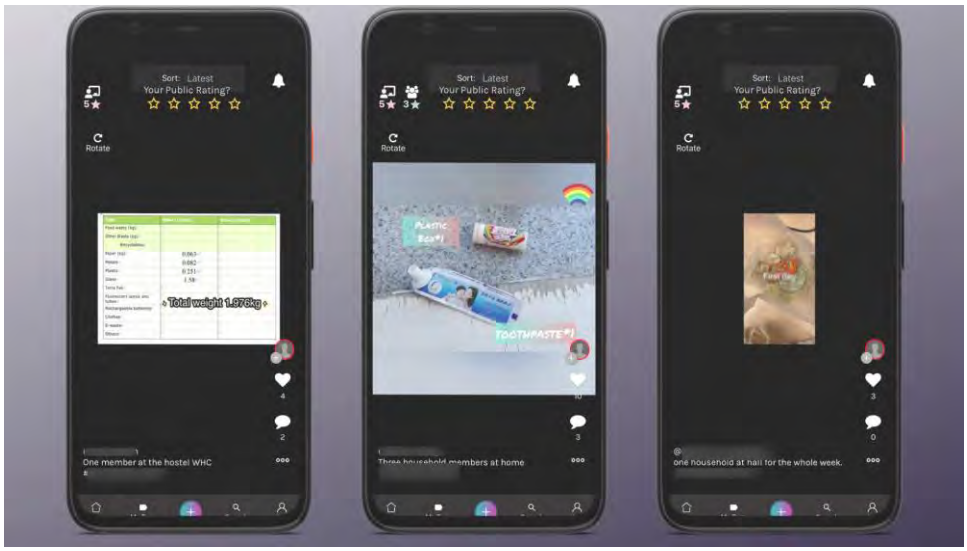


Fig. 1. Examples of videos uploaded into the Soqqle app showing recycling activities

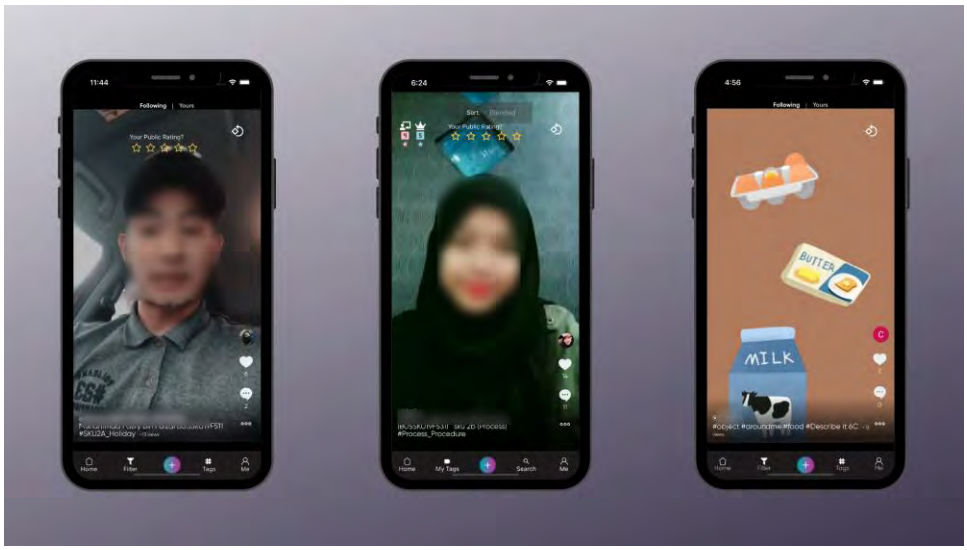


Fig. 2. Examples of videos uploaded into the Soqqle app showing communication topics

Modern social media users often rely on videos to convey their ideas to wider audiences, as such content does not rely on language. The same strategy can thus be adapted for video-based learning, as interactive media are suitable for learning that uses observations - such as interpreting social interactions through visual observation. (Anderson & Davidson, 2019). A recent neuroscience theoretical study (Ramsey et al., 2021) have also suggested that visual observations can create an internal reward mechanism that uses the knowledge gained from others, which explains why watching content from peers can help develop one's ideas.

4.2. Task design for co-creation

A critical characteristic of a well-designed learning environment that stimulates collective intelligence is students' ability to co-create content with the help of peers. In the present study, this aspect was promoted by encouraging students to watch and comment on others' submissions. Moreover, as the teachers deliberately provided only a brief initial instruction for each task, students were motivated to seek external sources, such as peer assistance and feedback or simple observations. This collaborative aspect of the assignments may have enhanced their learning potential, as traditionally students are assessed individually using quizzes on certain topics without the opportunity to seek help from others.

This interactive learning mode is also likely to encourage students to be more independent in their schoolwork. For example, based on the limited information provided at the start of the assignment, students had to develop their working plans and think carefully and critically about all aspects of their project. As they progressed with their work, being able to see the submissions of their peers helped them improve upon their designs, thus enhancing study efficiency. This, however, may have increased the overall time required to complete the project, as students also needed to engage in social exchanges to send and receive feedback. This interactive aspect of online learning was highlighted by Cook et al. (2010) who found that time dedicated to learning positively correlates with learning outcomes. Thus, even if feedback increases the overall time taken

to complete the assignment, it is an essential part of the learning process that contributes to better learning outcomes. Similar sentiments were shared by our study participants, as indicated by the excerpts below:

> *[Unlike] learning through PowerPoint slides and books, videos show real-life examples, making the learning process more enjoyable. I just think it with my own eyes, and also just listening to their examples and illustrations broaden my horizons.* (Y from group one)

> *These videos just help me to enrich my learning, I think, like when I look at the textbooks, and I just see different contents, but without examples, and because of that, sometimes I will find it hard to just grasp what's the meaning behind it . . . but with [peer to peer] videos, you'll get to know about the real-life example of what it is. . . .* (J from group one)

> *Because I saw their videos, I got some ideas for making my video.* (H from group two)

> *It's also interesting to see other friends' videos and we can also learn from them, from their pronunciation, grammar, and how they talk. so we can learn when we want it. if in real life we only can see once and we can't repeat it again and again.* (W from group three)

4.3. Peer review comments for idea co-creation

Study participants also concurred that comments from their peers (Fig. 3) were very useful, as they allowed them to improve upon their content.

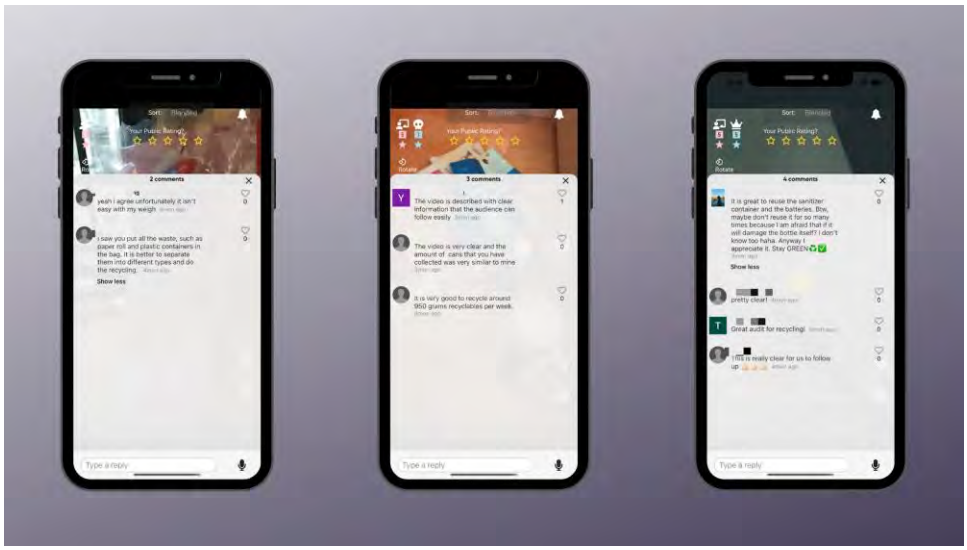


Fig. 3. Examples of comments students provided to their peers

The value of feedback from peers as a tool for self-reflection was highlighted by Liu and Carless (2006), as students are equal-status learners with similar learning challenges that can explore criteria and standards quickly together. Topping (2009) similarly noted that peer assessment helps students to identify their strengths and weaknesses, based on which they can plan their learning and develop a strategy for

attaining the personal and professional skills they are lacking. This is also reflected in the views shared by our participants, as indicated below:

> *When I receive comments and reflect on myself about the content I have created, and consider whether I can do it better, whether I can make it richer. I will look at my presentation skills. In my first video, for example, I focused on whether I stuttered too much, whether I presented smoothly, or whether I spoke too little.* (Y from group one)

> *I received comments about the quality of sound in my video. Mostly my peers commented in a good way, helping me to present the task better, but some were a little bit negative.* (U from group two)

> *In the traditional classroom there would be no one to do the debriefing sessions with me, . . . but by looking at others' videos, I can improve my own.* (J from group one)

> *Because my English isn't really good, I have to practice more than other ppl, practice the pronunciation, take a lot of videos, and review [if my] videos [contains] any grammar or pronunciation error.* (A from group three)

As suggested by van Zundert et al. (2010) peer review serves as a learning tool, as it helps students better understand the assignment evaluation criteria, while also allowing them to judge their work against their peers' submissions. A similar perspective was shared by Freeman (1995), who opined that peer assessment helps students focus on the quality of their performance. However, several Malaysian participants chose not to provide feedback as they were worried that they might embarrass themselves. Thus, it is important to investigate personal factors that affect willingness to voice one's opinions in group settings.

Nonetheless, the majority of participants felt that Soqqle promoted peer engagement, as the ability to receive likes and comments improved interaction, making the learning experience more productive and enjoyable. This view aligns with the findings reported by other authors who focused on the benefits and drawbacks of Instagram (Irwandani & Juariyah, 2016), YouTube (Yusi Kamhar & Lestari, 2019), and Facebook (Selwyn, 2009) as a learning tool. Their results confirmed that likes and comments can liven up the lesson, as they encourage interaction and information sharing. A more enjoyable sharing experience encourages openness, thereby facilitating idea exchange. Similar views were shared by other participants, as indicated below:

> *Better interaction between me and the other classmates. And by commenting on the video, I can share my opinions . . . which I thought was quite a great experience for me to learn from the video.* (J from group one)

> *I think the difference is, although we have face-to-face class, we did not have very much interaction except with our professor. Even when we have a group discussion, we only have the interaction for maybe five minutes. But in the video, we can have comments and we need to watch others' work to provide [feedback]. I think this is more interesting instead of just having a group discussion.* (T from group one)

In sum, although peer-to-peer interaction can be incorporated into traditional in-person classroom instruction, technology makes this process more spontaneous and thus more effective. As classroom learning was not possible during the COVID-19 pandemic, the use of asynchronous videos was particularly important, as it also provided greater

flexibility and autonomy in scheduling learning, allowing participants to learn at their own pace.

Beyond peer comments, participants were able to receive feedback from their teachers, who used a consolidated web analytics dashboard to view and comment on all submitted videos (Fig. 4). In this scenario, teachers played the role of a content curator to ensure that the submissions corresponded to the assignment aims.

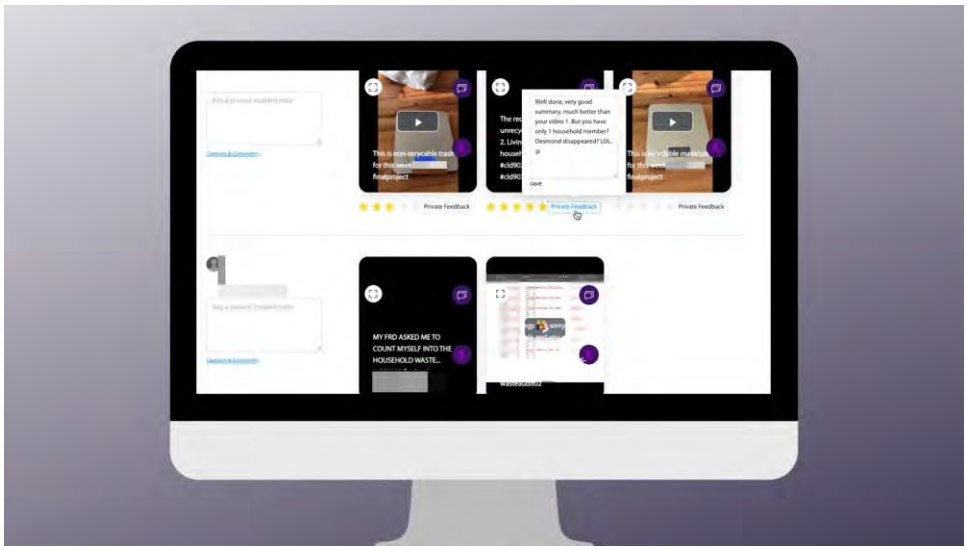


Fig. 4. Platform used by teachers to view and comment on student videos

4.4. Impact of Soqqle on individual creativity

Several participants felt that Soqqle increased their creativity because they were highly engaged and were comfortable with performing the task asynchronously, as they could review and revise their content before submission. As mobile devices are suitable for educational activities that require social interactions, incorporating them into education can deepen the learning of contexts such as relationships, roles, and culture (Vallejo-Correa et al., 2021). The use of such devices have also been shown to enhance academic learning outcomes (Chen et al., 2021), as explained by our participants:

> *I think for me, it improved because in the classroom as you said, we just shared our ideas . . . However, online, I can watch anytime I'm free and . . . will pay more [attention] on it. . . . to others' work.* (C from group one)

> *I am shy because I am not good at any subject so I just have no confidence. But when recording video, the audience is only me, so I feel more relaxed and comfortable.* (A from group two)

The social interactions that occur while participants completed the tasks on Soqqle can lead to increased creativity, self-expression, and self-confidence (Robson et al., 2015; Kahn et al., 1990; Steen-Utheim & Wittek, 2017). Alshahrani et al. (2017) further ascribe these benefits to the users' ability to quickly find pertinent information, thus becoming more self-reliant. This is particularly the case in peer-group settings, where participants may develop diverse perspectives on the same topic through

spontaneous interactions, thereby increasing collective intelligence, as explained by one of the participants:

> *I actually kind of like the concept of social learning Because it allows everyone to work hard, and . . . enhance your creativity depending on your assignments. So social learning [involves] working with others in a group, and depending on each other I think that is one of the best ways to . . . enhance your creativity level.* (J from group one)

> *I think that in this situation using video to learn is good because we cannot attend face-to-face lessons. Also, learning from the textbook is too rigid and is inflexible as you are only reading it, but you cannot [relate] to real life. For example, sometimes you may encounter theories or difficult knowing that you cannot imagine.* (J from group one)

5. Discussion

Based on the results reported in the preceding section, we posit that social learning platforms such as Soqqle may help promote collective intelligence, as they facilitate interactions that encourage idea generation and enhance creativity (Fig. 5). In particular, as participants can passively observe others' submissions as well as provide comments, this learning model is suited even for more reticent individuals that may initially feel shy to share their views openly. As our findings have demonstrated, the majority of our study participants became more confident as the semester progressed and started to exchange ideas more actively, and they attributed this improvement to the social learning platform. We argue that, as this process continues, collective intelligence starts to emerge, as the participating users learn from other group members (Kang et al., 2015). This process is consistent with results reported by Medero and Albaladejo (2020), while conducted through a student-generated video format. We have also observed that, as students started to upload their content in greater numbers, a form of consensus is built, as they learnt from each other and their submissions started to progress in the same direction. This process was also guided by teachers through feedback.

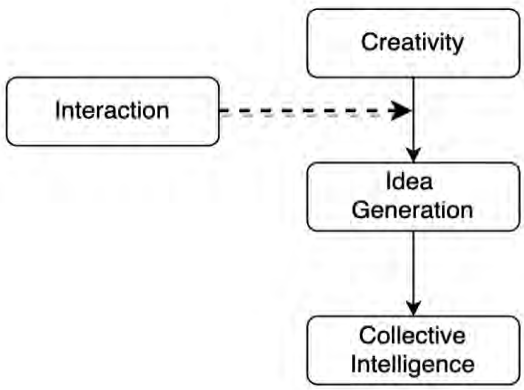


Fig. 5. Relationship among creativity, idea generation, and collective intelligence

We provide a comparison of findings and notes around the engagements achieved in this study in Table 3. The types of ideas that were exchanged during this study suggest that ideas exchanged during video-based learning can fit uniquely different scenarios. For example, as groups two and three focused on presentation skills, students were able to obtain ideas around presentation delivery styles, and structure. Group one, on the other hand, was based on tasks to solve specific curriculum challenges like reducing waste. This suggests that observational learning with video-based learning can be applied in numerous types of topics. Thus, in future studies, other subjects like sports or science may apply video-based learning to benefit from idea exchanges through observation.

Table 3
Comparative summary of findings for group one, group two, and group three

Category	Group one	Group two	Group three
Activities	Video tasks for waste reduction audit in Hong Kong	Speaking tasks for workplace communication in Malaysia	Speaking tasks for language learning (IELTS) in Indonesia
Resource	Students uploaded videos on a mobile application, Soqqle	Students uploaded videos on a mobile application, Soqqle	Students uploaded videos on a mobile application, Soqqle
Support	Students will watch waste reduction videos from classmates to get more ideas and compare them against their efforts	Students will watch language-speaking videos from peers to get more ideas about the speaking task requirements and compare them against their speaking skills	Students will watch language-speaking videos from peers to get more ideas about the speaking task requirements and compare them against their speaking skills
Evaluation	Besides watching the videos of others, students will add comments to each other's posts to review and give feedback.	Students will watch the content from peers to get examples of how to complete the speaking task, therefore helping to set goals	Students will watch the content from peers to get examples of how to complete the speaking task, therefore helping to set goals
Findings	Students liked watching peer videos due to sharing of content ideas. Comments can help to give new ideas to expand the content.	Students liked watching peer videos as it helped students expose themselves to different presentation techniques and styles. Students also get exposed to new ideas through observation to help expand on their content.	Students liked watching peer videos as it helped students expose themselves to different presentation techniques and styles.
Engagement notes	The teacher provided a template that students can use to provide peer feedback and new ideas.	Students were shy to add comments as they were afraid to embarrass themselves	The topic was not suitable for peers to give feedback related to speaking as they are unlikely to feel like they are in a position of authority in the space

There are additional considerations worth considering when implementing an online social video-based learning environment. According to the participants' feedback, the benefits of using this learning method were linked to observing the content of peers while developing their content. After watching a few videos, participants were better able to understand the learning goals and expectations. This manner of learning is linked to participants reinforcing their ideas and perceptions based on the content posted by others. In this process, receiving feedback is critical as it can help motivate participation in the activity and support self-efficacy, especially if delivered through dialogic methods (van der Kleij, 2019). However, the author reports a similar concern faced by our study, in which teachers experience time constraints in providing quality feedback. If teachers do not have sufficient time to review content and give feedback, students may feel discouraged to contribute content in the first place. While Soqqle provides an online dashboard that helps to consolidate all content in one place, including comments, teachers still have to spend a considerable amount of time reviewing them. To evaluate this drawback, it is important to understand the differences in time spent on the existing method against the new video-based method. For example, in the case where the existing process was delivered through the paper format, the video method may be more engaging for teachers to watch (Alemdag & Cagiltay, 2018) and give quality feedback. In other cases, like language learning, the physical limitations of a contemporary face-to-face classroom lesson made it impossible to deliver personalized feedback due to class time constraints. Therefore, the results of this study might be helpful for the opportunities of using videos in language learning as suggested by Wang et al. (2021). The use of recorded videos can give an option for teachers to provide individualized feedback, but at the expense of spending time to provide them. Secondly, the privacy provided by the platform is also important. Providing a safe learning environment can help encourage participation and motivation (Kim et al., 2020). In our examples, participants reported that they felt comfortable, and more relaxed practicing at home behind their cameras while recording their outputs as Soqqle is private and code protected. Thus, participants can also participate in the activity without fear of being judged by strangers. It should also be noted that the feedback from participants, particularly in group two, could be useful to encourage adoption of e-learning for vocational school learners. While learner preferences were suggested as a barrier by Im (2021), the benefits of collective learning, and psychological safety of a private social media application reported in this study might help to encourage usage.

Interpersonal interactions facilitated by social networks promote information and resource sharing, thus benefiting individual users as well as the collective. Chi and Wylie (2014) further argue that, if sustained for a sufficiently long time, such exchange of ideas between individuals tends to become more reciprocal. Leimeister (2010) was of the view that prolonged mutually beneficial engagement results in the emergence of collective intelligence. According to Ramanujam and Goodman (2011), group learning produces new knowledge, routines, and behaviours that are seen as group resources that can be shared by all its members. For this purpose, individuals often rely on their understanding of the topic to process information received from other group members. This is similar to the feedback our study participants provided to each other, allowing them to assist others in their projects as well as improve upon their work. We summarize this process in Fig. 6, which depicts a participant receiving new ideas (input) and processing the ideas to produce new output, which is subsequently used by others. This activity leads to internal benefits such as increased creativity and confidence. The facilitation of group learning with shared video content for assessments also extends on to how videos can be used in the flipped classroom format (Akbarialiabad et al., 2021). Specifically, it can lead to a collaborative type of flipped classroom method where participants exchange ideas and

co-create new knowledge prior to class discussions or assessment completion. One factor which Kew and Tasir (2021) noted as a problem in e-discussion forums was frequent copying of content, often superficially, from others. It can be argued that it is much harder to copy video content of others compared to text. It is also more likely that students will process video content more deeply due to its multi-modal nature.

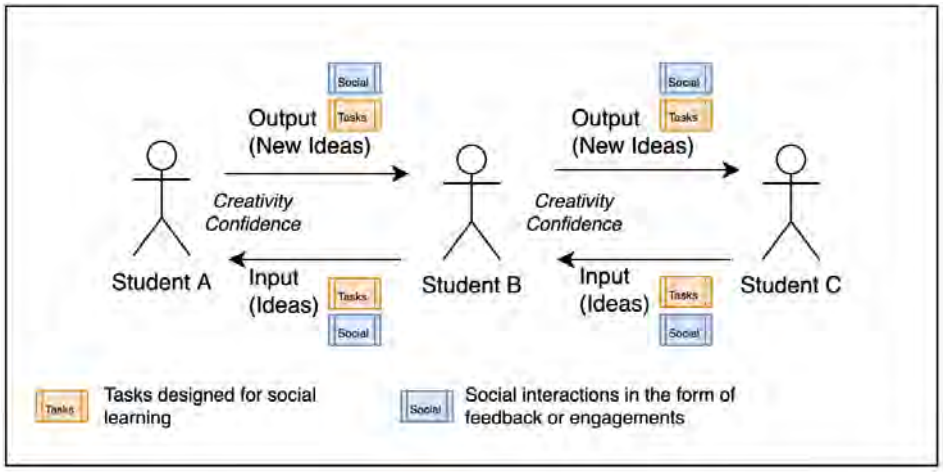


Fig. 6. The idea-generation process facilitated by Soqqle, enhancing creativity and confidence

When done at a scale, harnessing applications that promote the exchange of ideas can lead to crowdsourcing education. According to Brabham (2013), "Crowdsourcing is a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task." (p. 2). Despite the increasing availability of crowdsourced learning platforms such as Wikipedia, Quora, StackExchange, and Reddit, the potential of these tools to enable or impede student learning remains insufficiently explored. As crowdsourcing education is a relatively nascent phenomenon, it requires further research and development to establish the best mode to connect knowledge seekers with knowledge providers over the Internet. Authors of future studies should therefore also explore frameworks that can meet the needs of digital social learning environments.

6. Conclusion

In this work, we implemented a case study to identify the factors that might give rise to collective intelligence among students in an online learning platform. After using one such platform (Soqqle) to create and comment on each other's videos, students from three Asian higher education institutions reported high satisfaction with the learning process; the platform allowed them to generate ideas with ease and confidence, thus enhancing their creativity, motivation, and awareness. Educators may benefit from these findings and use similar approaches to stimulate effective discourse in their classrooms.

Author Statement

The authors declare that there is no conflict of interest.

Acknowledgements

This paper is supported and funded by the Blended Learning research grant from the Teaching and Learning Centre, Lingnan University, Hong Kong. We would also like to thank Farah Zahidah from KK Bukit Beruang, Malaysia, Daniel Shen from Soqqle for supporting the research, as well as all the participating students.

ORCID

Paulina Pui Yun Wong https://orcid.org/0000-0003-3804-3041

Gary Wai Chung Wong https://orcid.org/0000-0001-7410-971X

Umawathy Technamurthy https://orcid.org/0000-0003-1317-2920

Wan Syukriah Binti Mohahmad https://orcid.org/0000-0003-0821-7688

Aderina Febriana https://orcid.org/0000-0001-6405-7055

James Chit Ming Chong https://orcid.org/0000-0001-7268-7890

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