

Students' Experience of Empowerment from Multiple Scaffolders in PBL on Facebook

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ABSTRACT

Scholars propose that students should be empowered when using social media in problem-based learning (PBL) as it is expected to provide positive learning experiences. Nonetheless, even though the use of social media has been described as empowering in PBL, not much research has measured students' experiences of the empowerment offered by multiple scaffolders through social media. In this study, 84 final-year undergraduate management students from a private university in Malaysia participated in a simultaneous within-subject experimental design to solve a business decision-making problem on Facebook. For eight weeks, multiple scaffolders, including an instructor, two business experts, and three to four peers, were present in each closed Facebook group. The students then answered a questionnaire following the PBL activity. Anchored on the Structural Empowerment (SE) Theory, this study evaluated the students' perceptions of the SE provided by these scaffolders. Subsequently, the relationships among the scaffolders were measured. The results were analysed descriptively and inferentially. Overall, the students reported positive learning experiences but perceived that the instructor and peers provided more SE than the business experts. However, the business experts' comments on the students' work and discussion points accelerated their problem-solving tasks. Furthermore, the SE provided by peers, instructors, and business experts correlated significantly, suggesting each scaffolder relied on each other when scaffolding. The findings indicate that all scaffolders, including

the more experienced ones, should depend on the SE provided by other scaffolders to enable students to complete the complex business problem-solving tasks in PBL.

Keywords: Management education, problem-based learning (PBL), scaffolding, social media, structural empowerment

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INTRODUCTION

As a result of the precarious economic conditions and uncertainty in global business operations brought on by the Covid-19 pandemic, problem-solving skills have become one of the most prominent employability skills sought after by employers (World Economic Forum, 2020). Notably, the rising importance of problem-solving skills necessitates that business and management students be equipped with these skills before starting their careers. However, it has been reported in several studies that business managers perceive relevant work-readiness skills such as problem-solving among new management graduates are not in tandem with the managers' expectations where many have described the graduates as severely lacking in these skills (Bist et al., 2020; Hossain et al., 2020). Meanwhile, business managers in Malaysia described the quality of problem-solving skills among the local management graduates as deteriorating and showing no sign of improvement (Saibon & Kamis, 2019; Tanius et al., 2019). Moreover, management graduates in Malaysia have been found to make up the highest number of unemployed graduates than those in other fields of study to add to the predicament (Ministry of Higher Education, 2020; Saibon & Kamis, 2019).

Scholars believe problem-based learning (PBL) is a remedy to improve the lack of problem-solving skills and competency among management graduates (Zabit et al., 2017). PBL is an instructional method that aims to promote students'

learning via authentic and ill-structured problems, which act as the central focus of learning (Glazewski & Hmelo-Silver, 2019; Seibert et al., 2021). However, learning in a PBL setting may be difficult for some management students new to PBL since business problems taken from real-life business contexts are usually ill-structured. Moreover, ill-structured problems are often ambiguous and are of multidisciplinary knowledge domains (Kim et al., 2018; Moallem et al., 2019). Additionally, the steps to reach a solution are not straightforward, and the requirements to solve the problem are sometimes vague (Tawfik et al., 2018). Therefore, if the students do not receive enough assistance, they may disengage from the problem-solving tasks (García-Merino et al., 2020). In this respect, scaffolding is expected to help novice students perform unfamiliar tasks such as solving an ill-structured problem.

Scaffolding is a form of assistance delivered to novice students by a more experienced and skilful individual, such as an experienced peer or instructor, to enable the novice students to master the tasks that are otherwise impossible for them to complete on their own. Scaffolding helps simplify tasks according to the students' mastery levels, maintain the students' interests and pinpoint the critical aspects of learning (Wood et al., 1976). Students would also benefit from the interactions with the more experienced individuals during the scaffolding session, as the interactions would help support sense-making, comprehension monitoring, and claims verification (Savery, 2019).

With the proliferation of social media platforms, more experienced scaffolders such as business professionals who are not always readily available in the classroom could complement the skills of other scaffolders such as peers and instructors. Having these experts participate in a PBL activity with the students and instructor could expand the students' learning experience as they would be provided additional scaffolding in their learning. The use of experts outside the classroom for PBL through social media is common among medical students and healthcare practitioners during an internship or clinical attachment where applications such as Telegram, WeChat, and WhatsApp are used (see Dorwal et al., 2016; Raisolsadat et al., 2020; Zeng et al., 2016). Despite the widespread use of social media in PBL, not many studies have reported the use of social media in management education for scaffolding in PBL compared to other fields of study such as sciences (e.g., Bruna et al., 2019; Sunar & Shaari, 2017) and computer courses (Loannou et al., 2016). Moreover, there is a dearth of studies examining the inclusion of other scaffolders apart from peers and instructors in PBL delivered on social media. It has resulted in a limited understanding of having multiple scaffolders, particularly ones from outside the classroom (e.g., business experts), contributing to the management and experiences of student learning in PBL on social media.

The availability of online technology and its richness of resources are beneficial for scaffolding students in PBL. Nonetheless, students should be empowered to learn new

skills effectively (Mohamad, 2013; Wachira et al., 2019) and improve engagement in PBL activities (Choon et al., 2008). Moreover, despite students often describing their experience in PBL as empowering (e.g., English & Kitsantas, 2019; Hallinger et al., 2019), available studies do not validate these findings empirically, and very few studies have attempted to validate the extent to which PBL when used in combination with social media and scaffolding truly provide an empowering experience for the students. Therefore, it is expected that leveraging multiple scaffolders on social media would allow each scaffolder to harness and contribute their unique capabilities when assisting the students in the problem-solving activities.

This study proposed applying the Structural Empowerment (SE) Theory to provide a theoretical explanation of how a student might be empowered on social media through multiple scaffolders in a PBL activity. The notion behind this theory is that granting individuals access to the SE elements of access to critical resources, information, opportunity to learn for personal development, and the availability of support through feedback and guidance would help to empower the individuals and accelerate the completion of the tasks given to them (Laschinger et al., 2002). It is worth noting that granting SE to students resembles the concept of scaffolding (Bradbury-Jones et al., 2010), whereby the scaffolder is more experienced and has better access to SE elements according to their positions and specialty in accessing those elements. For instance, instructors could

provide students with learning resources and procedural guidelines to progress on track. Meanwhile, peers provide emotional support and encouragement, and business experts offer learning opportunities to acquire practical skills from the industry. The unique combinations of the SE elements granted to students via multiple scaffolders in PBL activities on social media would allow each scaffolder to complement the scaffolding limitations. These unique combinations of scaffolding would indirectly help students complete the problem-solving tasks effectively and successfully.

However, previous PBL and SE studies did not deal with students' engagement from the perspective of multiple scaffolders on social media. Kek and Huijser (2017) suggested that validating the effectiveness of social media in PBL on students' learning experiences is crucial. For this reason, scrutiny of students' perceptions of their experiences after receiving SE from multiple scaffolders in PBL on social media is worthwhile.

LITERATURE REVIEW

The Structural Empowerment Theory and its Relevance in PBL

Laschinger et al. (2001) popularised the Structural Empowerment (SE) Theory by advancing the work of Kanter (1977). The SE theory assumes that a proper empowerment structure of resources, information, opportunity, and support should be granted to people to achieve the intended goals and task completions. Seibert et al. (2021) pointed out that millennials are

prone to giving up when facing challenges in PBL activities, such as when dealing with a problem that the students are not familiar with, finding resources and paths to reaching the solutions as well, maintaining their interests to complete the problem-solving tasks. It is thus inferred that offering SE elements to students could help alleviate students' learning issues in PBL.

The first SE element is access to resources which refers to the ability to obtain the required materials or rewards to meet the objectives of a task (Abdullah & Neo, 2019; Laschinger et al., 2001). Resources in social media and the Internet are generally available, for example, by offering academic network services and hyperlinks that can support students' discussions and thus help them reach their goals and development (Ryberg, 2019). However, past studies that applied the SE theory have shown that different settings warrant different forms of resources for students. For example, in PBL, Siu et al. (2005) noted that resources are vital for nursing students who have sufficient time to accomplish their learning objectives and direct access to a library. Similarly, in Ledwell's (2006) study, nursing students described access to resources as getting term papers done and flexible time that helped the students succeed in the online distance education programmes they were enrolled in. These findings suggest that providing relevant resources allows students to meet their learning needs.

Meanwhile, access to information includes the ability for the students to obtain the necessary feedback on their progress and information that is directly needed to

solve the problems on hand (Abdullah & Neo, 2019). However, students may feel lost when identifying relevant information from numerous online resources available (Morgan et al., 2008), and because of this, Ryberg (2019) suggested that students should be empowered when placing them on social media for PBL.

Access to opportunity denotes the ability of an individual to get access to skills and knowledge that strengthen their opportunities for professional growth, improved status, and recognition (Laschinger et al., 2001). Students receive access to knowledge and skills from various sources on online-mediated platforms. Moallem et al. (2019) asserted that these opportunities are particularly enhanced when receiving empowerment from experts in online communities, such as business experts.

Lastly, access to support refers to an individual's ability to receive constructive feedback and moral encouragement on a person's achievement or activities (Moore, 2018). Scaffolding from peers and instructors helps students better address their needs, such as responding to questions more dynamically through interactions on social media (Shin et al., 2020). Therefore, the instructor must ensure constant support is available as this would encourage and enable students to persevere and continue with the PBL activities. Business experts could also provide the necessary empowerment by ensuring the relevancy of the PBL curriculum is in line with actual business needs (Asik-Dizdar, 2015). Moreover, support from experts could help

to guide students in deciphering information by emulating expert reasoning as closely as possible (Barrows, 1986).

The SE theory has been extensively applied in nursing education, and various positive learning outcomes have been reported, including improved assertiveness behaviour (Gamal et al., 2020), critical thinking (Moore, 2018), nursing competency (Liao & Liu, 2016), and reflective thinking (Lethbridge et al., 2011). Additionally, the theory has also been applied extensively in various organisational settings (e.g., Abel et al., 2020; Singh & Sarker, 2019; Ta'an et al., 2021). Literature has also documented various people providing SE simultaneously. For example, Lee and Kim (2020) reported a combination of multisource feedback from different people such as customers, supervisors, subordinates, and peers, allowing the manufacturing employees to reflect on their development and enhance their performance. Meanwhile, Siu et al. (2005) reported that nursing students feel empowered through SE elements provided in a PBL environment compared to a conventional lecture classroom environment, where the empowerment was attributed to the students' engagement in the PBL activities, which peers and health care professionals supported. In another study, Ledwell et al. (2006) revealed that students in an online distance education programme feel empowered by the SE provided by their instructors and co-workers.

Similarly, it is presumed that SE could be provided by more than a single provider of empowerment in PBL using

multiple scaffolders such as instructors, peers, and business experts on social media. Moreover, multiple scaffolders have been found to provide students with different levels of empowerment and experiences. However, previous studies on SE empirically established this assumption were rarely documented or examined the role of multiple agents of empowerment or the contributions of multiple scaffolders in providing SE for students' learning in PBL.

Learning Experiences in PBL Through Social Media

The widespread use of social media platforms has captivated PBL scholars to research the effects of scaffolding on social media and its influence on students' learning experiences. These extant studies mainly reported that students positively perceived their PBL experience on social media. However, these perceptions varied according to the types of social media users. For example, social media messaging or instant messaging is very popular in the medical and science education fields for scaffolding students in PBL; examples include the use of WeChat (e.g., Zhang et al., 2019; Zeng et al., 2016), Telegram (Raisolsadat et al., 2020), and WhatsApp (e.g., Grover et al., 2020; Pimmer et al., 2018). For example, the students in Raiman et al. (2017) viewed WhatsApp in PBL as a medium that could "flatten the hierarchy" in clinical placement. Additionally, the students reported that they could easily communicate with various scaffolders such as peers and clinical consultants and obtain

an instant notification and impromptu learning resources such as patient data.

Meanwhile, students regarded Facebook as bringing benefits, to name a few, that could improve information organisation skills among computer studies students (Loannou et al., 2016) and applying knowledge to real-life situations among health and nutrition students (Bruna et al., 2019). In contrast, the use of Twitter in PBL was seen as cumbersome because of word character limits that hindered complex argument composition, resulting in the students frequently experiencing miscommunication (Kaminishi et al., 2013).

Ledbetter and Finn (2013) cautioned that even though millennials are generally immersed in social media, scholars should refrain from assuming that they are well-versed in using social media technology for formal learning such as PBL. Instead, they must be empowered on social media when these platforms are engaged in formal learning (Wachira et al., 2019). Nonetheless, thus far, little attention has been paid to students' perceptions of their experiences when receiving SE from multiple scaffolders on social media in PBL. When dealing with multiple scaffolders in PBL, it is expected that students could elicit a varying degree of empowerment experiences, and these experiences possibly correlate to one another. Therefore, this study aimed to achieve the following research objectives:

1. To evaluate the students' perceptions of their experiences with multiple scaffolders (peers, an instructor, and business experts) who granted SE to the students on social media in PBL.

2. To examine the relationship of SE among the different scaffolders on social media.

METHODS

Research Participants

This study received ethical research approval from the Research Ethical Committee of Multimedia University (EA2002021). All participants were provided written consent to participate, ensuring that their privacy and confidentiality would be respected and protected. There is a lack of research on scaffolding students using multiple scaffolders, particularly on social media across PBL studies. In this study, 84 Bachelor of Business Administration final year management students who were engaged in a global management course in a private higher education institution in Malaysia were selected as participants in a three-year experiment that involved a total of 23 groups with nine groups formed in 2016, eight groups formed in 2017, and six groups in 2018. Group arrangement using a different cohort of students is common in PBL studies (e.g., Bruna et al., 2019; Loannou et al., 2016). All groups received similar conditions, with each closed Facebook group having three to four students (who acted as peers), one instructor, and two business experts. This arrangement followed the recommendation of Creswell and Creswell (2018), who suggested it to control internal validity from group cross-contamination due to interaction among groups.

The students were given two weeks to search for two business experts that matched their assigned decision-making business problem during the initial stage. In ensuring the selected business experts were credible enough to scaffold the students, the researcher defined the experts' qualifications as follows: holding a managerial position for at least ten years or more, having an active Facebook account, and agreeing to scaffold the students on Facebook at least twice a week. All groups secured the experts from different industries such as banking, telecommunications, and the airline industry. The students searched the experts through sites such as LinkedIn and Google Scholar or by using their networks such as relatives, their parents' acquaintances, as well as former internship supervisors in the company where the students had their internship during their diploma. The mixture of strategies that the students employed in getting the business experts helped them secure the business experts for their group within the scheduled duration.

The Context

In the study, Facebook was utilised since Facebook is commonly used in PBL for various reasons, including supporting social coordination by having spaces for feedback collection and lengthier group discussions than other social media platforms such as Twitter and Instagram (Ryberg, 2019). In addition, Savin-Baden (2020) argued that Facebook is ideal as a mentorship platform for PBL. Although Facebook features have

been updated over the years, the essential functions such as posting, liking, and editing comments, uploading files, pinning the post, and tagging people are relatively stable. They have been available from 2012 until the present. Although more sophisticated functions such as an online marketplace or live video streaming were only made available after 2016 and 2018, respectively, these functions were not utilised in the context of this study. It should be noted that all participants of this study, including the students, the instructor, and the business experts, reported having at least one Facebook account and at least two years of experience in using Facebook, and this implied that all the participants were well-versed with the basic features of Facebook.

In each Facebook group, a shared Google drive that accommodated the necessary materials to support the problem-solving activities, such as the activities timeline, reading materials, and a Google document (to document all problem-solving stages), were pinned on top of the Facebook page. All participants would notice the Google document immediately when entering the Facebook group. Meanwhile, the business experts and the instructor would monitor the students' work on the Google document on average once or twice a week and respond to the students' inquiries when the students tagged the experts and instructors on Facebook. This tagging function on Facebook was apt as students could receive timely feedback before progressing to the next problem-solving step.

Real-world business problems in online newspapers were selected for the PBL

activities in this study. A PBL instructional design expert and a subject-matter expert who teaches the Global Management course vetted the business problems to ensure each group was given a problem with a similar level of difficulty and knowledge domain. The newspaper was selected as the source of the business problems for the PBL activities in this study, following previous PBL researchers who advocated for and practised using newspapers as it provides an authentic problem that could train students to approximate the reasoning process of experts and prepare the management students to see the relevance of the process for their future professional careers (Hung et al., 2019).

Experimental Procedures

In this study, the student participants took part in a simultaneous within-subject experimental design (WSED) in a PBL teaching approach to solve a business decision-making problem for eight weeks. Simultaneous WSED is a form of within-subject experiment design that allows researchers to identify the subtle effects of two or more interventions and determine which intervention works best on the outcome (Creswell, 2014). The primary benefit of using simultaneous WSED is that it prevents the participants from being fatigued by repeating the experimental process, especially when certain conditions need to co-exist together rather than separately (Knijnenburg & Willemsen, 2015). In addition, the use of simultaneous WSED in this study was considered appropriate since

three different scaffolders were investigated, eventually allowing for these scaffolders to be assessed simultaneously.

Hmelo et al. (2019) advised that a briefing session be conducted as students are usually overwhelmed with the in-depth requirement of PBL. As an initial preparation strategy to avoid a chaotic start and ensure the students in this study had a clear direction about the learning goals and requirements, briefing sessions on the requirements and expectations of the problem-solving activities were conducted during the face-to-face classes. Meanwhile, the instructor contacted the business experts personally via email or by messaging the experts on Facebook messenger to brief them on the required expectations and their roles in scaffolding the students. All participants were provided with a description of the scaffolding methods in their respective Facebook groups via a Google shared drive.

To optimally and systematically guide the Facebook discussions, all participants used Ge and Land's (2003) problem-solving stages, which involved identifying the problem, analysing the problem's components, identifying possible solutions, and justifying the selected solution. These problem-solving stages were embedded in Rienties et al.'s (2012) Optima 7 Jump (e-learning) protocol recommended as a guide for online problem-solving discussions, particularly for business education. Steps 1 and 2 in this study began with the participants clarifying difficult terms and brainstorming to identify the

main issue and its components. In Step 3, Ge and Land's problem-solving stages were employed to gear the participants towards solving the learning issues. Various scaffolding techniques could be observed compared to the other steps in the problem-solving stages. The instructor and business experts of all groups gave hints and probing questions more frequently. The latter technique allowed the scaffolders to identify the students' current abilities. Occasionally, the business experts showed work examples by sharing their knowledge and work experiences. At the same time, the students felt inclined to ask questions as they needed to clarify the learning issues with the instructor. They sought help from both the business experts and instructors, particularly directing them to materials that could be used. Although the students shared resources in a limited manner, they encouraged their peers to complete the problem-solving tasks, helped to clear misunderstandings, and shared learning concerns. In Steps 4 and 5, the participants discussed possible solutions and worked toward reaching a consensus on the most viable solution to the problem. In Step 6, the participants examined whether the requirements of the issues and problem-solving stages had been fulfilled. Finally, in Step 7, a group leader or the instructor summarised the pertinent points of each of the stages the groups underwent.

Across all the seven steps, the scaffolding methods shared with the students included but were not limited to providing hints on the possible solutions, probing questions to promote reflective thinking on the current

progress, providing encouragement to maintain interest and boost morale as well as granting feedback to check the accuracy of the students' work (Ertmer & Koehler, 2015). These scaffolding methods mimic the SE element of support and opportunity to learn. Meanwhile, the participants also provided SE elements of resources and information by sharing online newspapers and blueprints.

Post Experiment Questionnaire Survey

All 84 students participated in a post-experience questionnaire survey to solicit their experiences at the end of the experiment. The survey questions were adapted from the Conditions for Work Effectiveness Questionnaire-II (CWEQ-II) (Laschinger et al., 2001). Section A of the questionnaire comprised questions on the students' demographic profiles, assessing the students' level of familiarity and purpose of using Facebook. Meanwhile, Section B assessed the level of structural empowerment the students received from the scaffolders to evaluate the SE elements based on a 5-point Likert scale. The questionnaire items are presented in Table 1. For ease of reference, the structural empowerment provided by peers, the structural empowerment provided by the instructor, and the structural empowerment provided by business experts are henceforth referred to by the abbreviations of SE peers, SE instructor, and SE business experts, respectively. Subsequently, the Statistical Package for the Social Sciences (SPSS) for Windows Version 25.0 software was used to

analyse the descriptive findings and Pearson correlation analysis to answer Research Objectives 1 and 2.

The mean was used to fulfil Research Objective 1, to evaluate students' perceptions of the SE elements granted by SE peers, SE instructors, and SE business experts. Meanwhile, to support the mean analysis findings, Section C of the questionnaire measured the students' overall experience of the problem-solving activities on Facebook. A semantic differential scale of seven points was used, with one being the lowest end reflecting negative experience and seven being the highest reflecting positive experience about their PBL experiences. The learning experiences were described using adjectives such as "dissatisfying ... satisfying" and "uninspiring ...inspiring," placed at both extreme ends of the scale. This scale was adopted by Abdullah et al. (2015) and Musa et al. (2011).

Meanwhile, to answer Research Objective 2, the Pearson correlation analysis was performed to determine the correlation among SE peers, SE instructors, and SE business experts based on the data from Section B of the survey questionnaire.

RESULTS AND DISCUSSION

In terms of Facebook familiarity, all the students in this study had at least one active Facebook account with more than two years of experience in using Facebook. Most of the students (89.3%) used Facebook for socialising. In comparison, 59% used Facebook to communicate with friends, and 33.3% used Facebook to communicate

Table 1
The Pearson's correlation coefficient, mean and standard deviation (SD) of SE provided by peers, instructor, and business experts

Items	Scaffolders			SE Peers			SE Instructor			SE Business experts		
	r	Mean	SD	CA	r	Mean	SD	CA	r	Mean	SD	CA
How much is support for each of these activities is available from these people?												
1. Specific information about the things you do well.	0.53**	3.86	0.85	0.67	0.05**	4.42	0.68	0.50	0.69**	3.49	1.04	0.83
2. Specific comments about things you could improve.	0.48**				0.28**							
3. Helpful hints or problem-solving advice.	0.64**				0.67**				0.79**			
How many opportunities for each of these activities are available to these people?												
1. Tasks that use all of your skills and knowledge.	0.68**				0.68**				0.85**			
2. Chance to learn new skills.	0.59**	3.88	0.86	0.78	0.70**	4.27	0.79	0.83	0.80**	3.40	1.12	0.88
3. Challenging work.	0.57**				0.68**				0.79**			
How much information for each of these activities is available from these people?												
1. The values of the assignment.	0.73**				0.72**				0.80**			
2. The goals of the assignment.	0.71**	3.91	0.83	0.79	0.64**	4.40	0.68	0.58	0.78**	3.45	1.09	0.88
3. The current state of your work.	0.59**				0.61**				0.78**			
How many resources for each of these activities is available to these people?												
1. Time available to do the necessary report.	0.64**				0.67**				0.78**			
2. Time available to accomplish task requirements.	0.74**	3.89	0.78	0.78	0.68**	4.34	0.72	0.80	0.85**	3.39	1.11	0.88
3. Acquiring temporary help when needed.	0.70**				0.63**				0.77**			
Average		3.87	0.86	0.76		4.4	0.72	0.68		3.4	1.09	0.71

Note. Critical Value for Pearson's correlation coefficient is 0.28 when the degrees of freedom (df) is equal to minus 2 from the number of total subjects (which was 84 students) with df = 82 (N= 84-2) sig. at 0.01. The results showed that all items surpassed the value of 0.28.

and discuss academic and assignment progress with their respective instructors. The students in this study were familiar with using Facebook for formal and informal learning.

The next step was to assess students' perception of SE. Initial screening showed normal data with skewness and kurtosis values within the acceptable range of ± 2 ; thus, no univariate normality issue was detected for all the items. Next, the internal consistency validity was measured to ensure that the items did not correlate by chance, using correlation coefficient (*r*) (Oktavia et al., 2018). The results are presented in Tables 1 and 2. Using the critical values for Pearson's Correlation Coefficient Table, at a *p*-value of 0.01 (two-tailed) and the degrees of freedom equal to the number of subjects minus two, i.e., 82 ($N = 84 - 2$), the critical value was calculated at 0.28. As a result, all the datasets in this study obtained a correlation coefficient *r* surpassing 0.28 for all, with values ranging from 0.65–0.76 for all learning experience items and 0.28–0.85 for all SE items. Finally, using the cut-off

values proposed by Hinton, McMurray, and Brownlow (2014), all data was deemed reliable, with Cronbach Alpha values ranging from 0.51 to 0.90, indicating that the items had moderate to high reliability in both learning experience items and SE items.

Critical Value for Pearson's correlation coefficient is 0.28 when the degrees of freedom (*df*) is equal to minus 2 from the number of total subjects (which was 84 students) with $df = 82$ ($N = 84 - 2$) sig. at 0.01. The results showed that all items surpassed the value of 0.28.

Concerning Research Objective 1, based on the measurement of the students' perceptions of SE provided by the different scaffolders, SE Instructor recorded the highest total mean score (mean values ranging from 4.27 to 4.42), followed by SE peers (mean values close to 4.00 for all SE items) and SE business experts (mean values ranging from 3.39 to 3.49). Among all the SE items, students appreciated information from the instructor and their peers and rated support and information as the most

Table 2
Summary of the students' learning experience

Items	Mean	Std. Deviation	CA	r
Dissatisfying - Satisfying	4.86	1.12		0.76**
Boring - Interesting	4.77	1.26		0.74**
Unpleasant - Pleasant	4.81	1.21		0.75**
Not Challenging - Challenging	6.13	1.12		0.66**
Unmemorable - Memorable	5.42	1.28	0.87	0.69**
Undemanding - Demanding	5.48	1.12		0.64**
Intellectually Unstimulating - Intellectually stimulating	5.61	1.21		0.76**
Uninspiring - Inspiring	5.61	1.33		0.73**
Average	5.33	1.2		

Notes. CA = Cronbach Alpha

important source of empowerment from all the scaffolders. One possible explanation for a moderate perception of scaffolding for all SE items of business experts could be due to the limited participation of the business experts on Facebook as a result of their busy work schedules and work demands. Ideally, the business experts should scaffold the students twice a week. However, the experts scaffolded the students mostly once a week. Despite this limitation, the business experts did review the students' work and commented on the discussion posts on Facebook and Google documents every week. Although the experts were presumed to be busy scaffolding the students frequently, it is believed that if the students were to put in more effort in discussing on Facebook, it might entice the industry experts to participate more frequently in scaffolding the students on Facebook. Furthermore, the students shared a joint agreement that s from all scaffolders was viewed as indispensable. This finding is congruent with Shin et al.'s (2020) view that extending assistance and social support when students utilise technological tools would greatly help students. Social support should be given during the early stages of the PBL to allow students to make full use of and engage in the online PBL (Savin-Baden & Bhakta, 2019).

In supporting the results of the mean analysis, which is presented in Table 2, the students also described their scaffolding experiences with their peers, business experts, and instructor as "hard fun". The students described their experience in

dealing with the problem-solving tasks as challenging and demanding; however, they perceived they still gained substantial benefit from the intellectual stimulation and satisfying, pleasant, and inspiring experience gained from the scaffolding provided by the scaffolders. These findings are consistent with Loannou et al. (2016) and Barrett's (2005) study. They reported that students' experience in PBL, which is embedded with integrative learning elements, is challenging but engaging and empowering at the same time.

A Pearson correlation analysis was performed to answer Research Objective 2. The results revealed that all scaffolders showed a statistically significant correlation. Munro (2005) provided the interpretation of the results of r values as follows: $r = 0 - 0.25$ (very low correlation), $r = 0.26 - 0.49$ (low correlation) $r = 0.5 - 0.69$ (moderate correlation), $r = 0.7-0.89$ (strong correlation) and $r=0.9-1.0$ (very strong correlation). Table 3 shows that at a significance level of $p<0.01$, SE peers correlated moderately with SE instructors but had a low correlation with SE business experts. SE instructors also showed a low correlation with SE business experts. As students may experience various difficulties in PBL, they need reinforcement through different sources of scaffolding because of the differing motivation, interests, levels of knowledge, and learning skills among students (Huang et al., 2019). This study found that different scaffolders correlated with each other, implying that SE items are dependent on other scaffolders and must be

Table 3
Pearson correlation analysis results of SE of the scaffolders

	SE Instructor	SE Peers	SE Business Experts
SE Instructor	1	.519**	.358**
SE Peers	.519**	1	.341**
SE Business Experts	.358**	.341**	1

Note: * $p < 0.01$, $N = 84$ for all analyses

provided simultaneously. Some possible explanations for such a finding are provided below.

SE Instructor

The finding showed that SE instructors correlated with SE business experts. The results are consistent with Jamiat's (2018) finding that instructors like students sometimes need guidance in validating their thinking processes. Carvalho (2016) opined that since business problems are usually complex and interdisciplinary, a few dialogues with the experts could help alleviate the messiness of learning or teaching issues. Instructors may sometimes rely on the information from experts and then interpret and convey the information in a way that students may easily comprehend (Holton & Clarke, 2006) so that it is aligned with the student's cognitive readiness (Hung, 2019).

SE Peers

This study showed that the availability of SE in the form of support and resources from the instructor was perceived as more important than the ones from peers. Instructors play a more dynamic role in providing SE in the form of cognitive

support, such as removing any unfamiliarity that students may need to deal with in PBL (Hung, 2019), providing access to resources that are difficult for students to obtain on their own as well as modelling and tracking students' performance throughout the learning process (Magana, 2014). SE peers and SE instructors demonstrated a moderately significant correlation based on the findings. Therefore, it could be inferred that the students relied on the immediate people in their learning contexts, such as the instructor and their peers, to provide information about the problem or assist them in the meaning-making process.

SE Business Experts

The use of experts is beneficial in management decision-making because they have a sound and straightforward approach to assessing the appropriateness of a solution and in defining and reviewing the most critical evaluations of a problem, such as key complexities and risks that could affect the solutions (Parnell et al., 2011). These allow the experts to see the big picture of a problem when providing support to students (Kek & Huijser, 2017) and the instructors' teaching practices and development (Nelson et al., 2020). However, a closer inspection

of the correlation analysis showed that there are also possibilities that the experts require scaffolding from others too. Lee et al. (2019) argued that experts rely on prior experience to propose solutions rather than deliberating a more viable option. Boshuizen et al. (2020) asserted that even if the experts are required to solve a problem in a similar domain, task requirement, and knowledge, the experts may not automatically excel and may still require training. Thus, to decipher the unfamiliar problem and its requirement, the business experts in this study may rely on information provided by the students or instructor to allow knowledge to be organised before presenting them to both the students and instructor.

CONCLUSION

This study investigated management students' experiences of empowerment with multiple scaffolders on Facebook to solve a business decision-making problem. The students perceived the instructor as providing more SE than the other scaffolders. In addition, the students were seen to be more comfortable asking questions and gaining feedback from those they are familiar, including peers who are known to be able to offer "emotional learning" in the form of moral support, advice, and encouragement (Savin-Baden, 2020) and from instructors who can facilitate the interaction among students (Cho & Cho, 2014). However, the roles of business experts are still vital and should not be undermined. The presence of business experts allows students to

engage in purposeful thinking relevant to the problem and makes the thought process more visible (Kumar & Kogut, 2006). In this study, the business experts provided the impetus for the students to accelerate their PBL progress.

The correlation results showed that using multiple scaffolders in a business problem-solving activity is required to allow each scaffolder to scaffold each other reciprocally. The knowledge available on a virtual platform is not a mere accumulation of information. Still, it needs to be co-constructed with others, especially when dealing with the complexity of business management problems and their fragility in knowledge development and structure (Boshuizen et al., 2020). These complexities require a meaning-making process involving the engagement of different sources of scaffolding to help students benefit from the varying degrees of maturity, experiences, and expertise that each scaffolder has.

Nevertheless, students need to sustain their self-regulation skills when dealing with problem-solving activities in PBL. It is emphasised by Ge et al. (2016), who argued that for students to gain the utmost benefit from diverse scaffolders' participation on Facebook, they need to sustain their self-regulation skills in dealing with problem-solving activities in PBL. The skills include actively planning, monitoring, and controlling their motivation and cognition (Alt et al., 2020). Moreover, as problem-solving is a goal-oriented activity, students need these self-regulation skills.

Limitations of the Study and Suggestions for Future Research

In this study, the students reported positive learning experiences, and this suggests that online-mediated platforms such as Facebook are viable solutions for HEIs to foster student-industry engagement to improve students' work readiness skills such as problem-solving. The results of this study offer insights to the beneficiaries of this study, such as management educators and PBL researchers, where the findings can be used to identify better the appropriateness of implementing PBL through social media by incorporating multiple scaffolders. Nevertheless, the findings of this study should be evaluated with caution and may only be generalised to research that shares a similar research context, for example, those that examine Facebook use and Google document for PBL in management courses at a private university. The lack of a control group and the small sample size limit one from making broad generalisations. Nevertheless, future research could further investigate the extent to which the business experts, in general, are willing to offer their scaffolding on social media. This study showed significant correlations among SE provided by the scaffolders. The SE provided by peers, the instructor, and the business experts correlated significantly, suggesting each scaffolder relied on each other when scaffolding. The researchers projected that a mediation role could influence the interactions between the business experts, peers, and instructors in

the scaffolding provided, and this could be examined in future studies.

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REFERENCES

- Abdullah, A. H., & Neo, T. K. (2019). Modeling factors for industry experts' intention to participate in online scaffolding. *International Journal of Engineering & Technology*, 7(3.35), 118-191.
- Abdullah, A. H., Wasiuzzaman, S., & Musa, R. (2015). University quality and emotional attachment of undergraduate students in a private higher education in Malaysia: The mediating role of total experience. *International Journal of Social Economics*, 42(7), 644-665. <https://doi.org/10.1108/IJSE-03-2014-0050>
- Abel, S. E., Hall, M., Swartz, M. J., & Madigan, E. A. (2020). Empowerment of front-line leaders in online learning, certificate programme. *Journal of Nursing Management*, 28(2), 359-367. <https://doi.org/10.1111/jonm.12933>
- Alt, D., Alt, N., & Hadar-Frumer, M. (2020). Measuring Halliwick Foundation course students' perceptions of case-based learning, assessment and transfer of learning. *Learning Environments Research*, 23(1), 59-85. <https://doi.org/10.1007/s10984-019-09286-x>
- Asik-Dizdar, O. (2015). To be or not to be... a profession: Management education and its discontents. *Journal of Education for Business*, 90(8), 443-450. <https://doi.org/10.1080/08832323.2015.1087370>

- Barrett, T. (2005). Lecturers' experience as problem-based learners: Learning as hard fun. In T. Barrett, I. Mac Labhrainn, & H. Fallon (Eds.), *Handbook of Inquiry & Problem-based Learning*. CELT.
- Barrows, H. S. (1986). A taxonomy of problem-based learning methods. *Medical Education*, 20(6), 481-486. <https://doi.org/10.1111/j.1365-2923.1986.tb01386.x>
- Bist, S. S., Mehta, D., Mehta, D. H., & Meghrajani, D. (2020). Employers' perception regarding employability skills of management students undergoing internship. *International Journal of Work-Integrated Learning*, 21(2), 145-161.
- Boshuizen, H. P., Gruber, H., & Strasser, J. (2020). Knowledge restructuring through case processing: The key to generalise expertise development theory across domains? *Educational Research Review*, 29, 100310. <https://doi.org/10.1016/j.edurev.2020.100310>
- Bradbury-Jones, C., Irvine, F., & Sambrook, S. (2010). Empowerment of nursing students in clinical practice: spheres of influence. *Journal of Advanced Nursing*, 66(9), 2061-2070.
- Bruna, C. E., Valenzuela, N. A., Bruna, D. V., Lozano-Rodríguez, A., & Márquez, C. G. (2019). Learning metabolism by problem-based learning through the analysis of health or nutrition articles from the web in biochemistry. *Journal of Food Science Education*, 18(2), 37-44. <https://doi.org/10.1111/1541-4329.12156>
- Carvalho, A. (2016). The impact of PBL on transferable skills development in management education. *Innovations in Education and Teaching International*, 53(1), 35-47. <https://doi.org/10.1080/14703297.2015.1020327>
- Cho, M. H., & Cho, Y. (2014). Instructor scaffolding for interaction and students' academic engagement in online learning: Mediating role of perceived online class goal structures. *The Internet and Higher Education*, 21, 25-30. <https://doi.org/10.1016/j.iheduc.2013.10.008>
- Creswell, J. W. (2014). *A concise introduction to mixed methods research*. SAGE publications.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.
- Dorwal, P., Sachdev, R., Gautam, D., Jain, D., Sharma, P., Tiwari, A. K., & Raina, V. (2016). Role of WhatsApp messenger in the laboratory management system: A boon to communication. *Journal of Medical Systems*, 40(1), 1-5. <https://doi.org/10.1007/s10916-015-0384-2>
- English, M., & Kitsantas, A. (2019). PBL capstone experience in Conservation Biology: A self-regulated learning approach. In *The Wiley handbook of problem-based learning*. Wiley Blackwell. <https://doi.org/10.1002/9781119173243.ch22>
- Ertmer, P. A., & Koehler, A. A. (2015). Facilitated versus non-facilitated online case discussions: Comparing differences in problem space coverage. *Journal of Computing in Higher Education*, 27(2), 69-93. <https://doi.org/10.1007/s12528-015-9094-5>
- Gamal, M. A., Adam, S., & El Azim, H. A. (2020). Effect of application of Kanter's empowerment theory on nurse intern's assertiveness. *Egyptian Journal of Health Care*, 11(2), 113-127. <https://doi.org/10.21608/EJHC.2020.94348>
- García-Merino, J. D., Urionabarrenetxea, S., & Fernández-Sainz, A. (2020). Does PBL improve student performance in a multidimensional way? A proposal for a moderated mediation model. *Higher Education Research & Development*, 39(7), 1454-1473. <https://doi.org/10.1080/07294360.2020.1732878>
- Ge, X., & Land, S. M. (2003). Scaffolding students' problem-solving processes in an ill-structured task using question prompts and peer interactions. *Educational Technology Research and Development*, 51(1), 21-38. <https://doi.org/10.1007/BF02504515>

- Ge, X., Law, V., & Huang, K. (2016). Detangling the interrelationships between self-regulation and ill-structured problem-solving in problem-based learning. *Interdisciplinary Journal of Problem-Based Learning*, 10(2), 11. <https://doi.org/10.7771/1541-5015.1622>
- Glazewski, K. D., & Hmelo-Silver, C. E. (2019). Scaffolding and supporting use of information for ambitious learning practices. *Information and Learning Sciences*, 120(1), 39-58. <https://doi.org/10.1108/ILS-08-2018-0087>
- Grover, S., Garg, B., & Sood, N. (2020). Introduction of case-based learning aided by WhatsApp messenger in pathology teaching for medical students. *Journal of Postgraduate Medicine*, 66(1), 17-22. https://doi.org/10.4103/jpgm.JPGM_2_19
- Gwee, M. C. E. (2008). Globalization of Problem-based Learning (PBL): Cross-cultural Implications. *The Kaohsiung Journal of Medical Sciences*, 24(3), S14-S22. [https://doi.org/10.1016/S1607-551X\(08\)70089-5](https://doi.org/10.1016/S1607-551X(08)70089-5)
- Hallinger, P., Lu, J., & Showanasai, P. (2019). Seeing and hearing is believing, but eating is knowing: A case study of implementing PBL in a Master of Educational Management Program. In *The Wiley handbook of problem-based learning*. Wiley Blackwell.
- Hinton, P., McMurray, I., & Brownlow, C. (2014). *SPSS explained*. Routledge.
- Holton, D., & Clarke, D. (2006). Scaffolding and metacognition. *International Journal of Mathematical Education in Science and Technology*, 37(2), 127-143. <https://doi.org/10.1080/00207390500285818>
- Hossain, M. M., Alam, M., Alamgir, M., & Salat, A. (2020). Factors affecting business graduates' employability—empirical evidence using partial least squares (PLS). *Education+ Training*, 62(3), 292-310. <https://doi.org/10.1108/ET-12-2018-0258>
- Huang, R., Spector, J. M., & Yang, J. (2019). Linking learning objectives, pedagogies, and technologies. In *Educational technology: A primer for the 21st century* (pp. 49-62), Springer Singapore. https://doi.org/10.1007/978-981-13-6643-7_3
- Hung, W., Moallem, M., & Dabbagh, N. (2019). Social foundations of problem-based learning. *The Wiley Handbook of problem-based learning* (pp. 51-79). Wiley Blackwell.
- Jamiat, N. (2018). The design of problem based learning and effects on college students' critical thinking: A preliminary review. In *Proceedings of the 2018 2nd International Conference on Education and E-Learning* (pp. 176-180). Association for Computing Machinery. <https://doi.org/10.1145/3291078.3291081>
- Kaminishi, H., Sakata, N., & Yamashita, M. (2013). A practice of PBL training “communications in disaster” for premedical students with Twitter. In *IEEE Region 10 Humanitarian Technology Conference* (pp. 100-105). IEEE. <https://doi.org/10.1109/R10-HTC.2013.6669022>
- Kanter, R. M. (1977). *Men and women of the corporation*. Basic Books.
- Kek, M. Y. C. A., & Huijser, H. (2017). Agile PBL and the next generation of learners. In *Problem-based learning into the future* (pp. 31-48). Springer.
- Kim, N. J., Belland, B. R., & Walker, A. E. (2018). Effectiveness of computer-based scaffolding in the context of problem-based learning for STEM education: Bayesian meta-analysis. *Educational Psychology Review*, 30(2), 397-429. <https://doi.org/10.1007/s10648-017-9419-1>
- Knijnenburg, B. P., & Willemsen, M. C. (2015). Evaluating recommender systems with user experiments. In *Recommender systems handbook* (pp. 309-352). Springer.
- Kumar, M., & Kogut, G. (2006). Students' perceptions of problem-based learning. *Teacher*

- Development*, 10(1), 105-116. <https://doi.org/10.1080/13664530600587295>
- Laschinger, H. K. S., Finegan, J., & Shamian, J. (2002). The impact of workplace empowerment, organizational trust on staff nurses' work satisfaction and organizational commitment. In *Advances in health care management*. Emerald Group Publishing Limited. [https://doi.org/10.1016/S1474-8231\(02\)03006-9](https://doi.org/10.1016/S1474-8231(02)03006-9)
- Laschinger, H. K. S., Finegan, J., Shamian, J., & Wilk, P. (2001). Impact of structural and psychological empowerment on job strain in nursing work settings: Expanding Kanter's model. *Journal of Nursing Administration*, 31(5), 260-272. <https://doi.org/10.1097/00005110-200105000-00006>
- Ledwell, E., Andrusyszyn, M. A., & Iwasiw, C. (2006). Nursing students' empowerment in distance education: Testing Kanter's Theory. *Journal of Distance Education*, 21(2), 78-95. <https://www.ijede.ca/index.php/jde/article/view/62>
- Lee, H. W., & Kim, E. (2020). Workforce diversity and firm performance: Relational coordination as a mediator and structural empowerment and multisource feedback as moderators. *Human Resource Management*, 59(1), 5-23. <https://doi.org/10.1002/hrm.21970>
- Lee, C. B., Leppink, J., & Hanham, J. (2019). On the design of instruction and assessment. In *Instructional design principles for high-stakes problem-solving environments* (pp. 135-153). Springer.
- Ledbetter, A. M., & Finn, A. N. (2013). Teacher technology policies and online communication apprehension as predictors of learner empowerment. *Communication Education*, 62(3), 301-317. <https://doi.org/10.1080/03634523.2013.794386>
- Lethbridge, K., Andrusyszyn, M. A., Iwasiw, C., Laschinger, H. K., & Fernando, R. (2011). Structural and psychological empowerment and reflective thinking: Is there a link? *Journal of Nursing Education*, 50(11), 636-645. <https://doi.org/10.3928/01484834-20110817-02>
- Liao, R. X., & Liu, Y. H. (2016). The impact of structural empowerment and psychological capital on competence among Chinese baccalaureate nursing students: A questionnaire survey. *Nurse Education Today*, 36, 31-36. <https://doi.org/10.1016/j.nedt.2015.07.003>
- Loannou, A., Vasiliou, C., & Zaphiris, P. (2016). Problem-based learning in multimodal learning environments: Learners' technology adoption experiences. *Journal of Educational Computing Research*, 54(7), 1022-1040. <https://doi.org/10.1177/0735633116636755>
- Magana, A. J. (2014). Learning strategies and multimedia techniques for scaffolding size and scale cognition. *Computers & Education*, 72, 367-377. <https://doi.org/10.1016/j.compedu.2013.11.012>
- Ministry of Higher Education. (2020). *Graduates tracer study 2020*. <https://www.mohe.gov.my/muat-turun/statistik/2020/498-statistik-pendidikan-tinggi-2020-09-bab-7-graduate-tracer-studies/file>
- Moallem, M. (2019). Effects of PBL on learning outcomes, knowledge acquisition, and higher-order thinking skills. In *The Wiley handbook of problem-based learning* (pp. 107-133). Wiley Blackwell.
- Moallem, M., Hung, W., & Dabbagh, N. (Eds.). (2019). *The Wiley handbook of problem-based learning*. Wiley Blackwell.
- Mohamad, N. A. (2013). Problem-based learning as a teaching tool in legal education: An Islamic perspective. In *PBL Across Cultures, The 4th International Research Symposium on Problem-Based Learning (IRSPBL)* (pp.410-415). Universiti Teknologi Malaysia. <https://core.ac.uk/download/pdf/60533221.pdf#page=418>

- Munro, B. H. (2005). *Statistical methods for health care research* (Vol. 1). Lippincott Williams & Wilkins.
- Moore, S. C. (2018). Exploring the relationship of structural empowerment and critical thinking in student nurses' learning environment. *Journal of Nursing and Health Care, 1*(1), 1-7.
- Morgan, M., Brickell, G., & Harper, B. (2008). Applying distributed cognition theory to the redesign of the 'copy and paste' function in order to promote appropriate learning outcomes. *Computers & Education, 50*(1), 125-147. <https://doi.org/10.1016/j.compedu.2006.04.006>
- Musa, R., Putit, L., & Yusof J. M. (2011). *Assessment and revitalization of UiTM's Malaysia corporate image: Repositioning strategy towards becoming a world-class university* (Unpublished technical report). Research Management Institute, Universiti Teknologi MARA.
- Nelson, R., Marone, V., Garcia, S. A., Yuen, T. T., Bonner, E. P., & Browning, J. (2020). Transformative practices in engineering education: The embedded expert model. *IEEE Transactions on Education, 64*(2), 187-194.
- Oktavia, R., Mentari, M., & Mulia, I. S. (2018). Assessing the validity and reliability of questionnaires on the implementation of Indonesian curriculum K-13 in STEM education. *Journal of Physics: Conference Series, 1088*(1), 012014. <https://doi.org/10.1088/1742-6596/1088/1/012014>
- Parnell, G. S., Driscoll, P. J., & Henderson, D. L. (2011). *Decision making in systems engineering and management* (2nd ed.). John Wiley & Sons.
- Pimmer, C., Brühlmann, F., Odetola, T. D., Dipeolu, O., Gröbriel, U., & Ajuwon, A. J. (2018). Instant messaging and nursing students' clinical learning experience. *Nurse Education Today, 64*, 119-124. <https://doi.org/10.1016/j.nedt.2018.01.034>
- Raiman, L., Antbring, R., & Mahmood, A. (2017). WhatsApp messenger as a tool to supplement medical education for medical students on clinical attachment. *BMC Medical Education, 17*(1), 1-9. <https://doi.org/10.1186/s12909-017-0855-x>
- Raisolsadat, M. A., Sanjar Moussavi, N., Farajpour, A., & Meshkinyazd, A. (2020). Investigating the effects of problem-based learning in a virtual group on collaborative learning, social presence and student satisfaction in surgery department. *Interdisciplinary Journal of Virtual Learning in Medical Sciences, 11*(2), 102-111. <https://doi.org/10.30476/ijvlms.2020.85422.1020>
- Rienties, B., Giesbers, B., Tempelaar, D., Lygo-Baker, S., Segers, M., & Gijsselaers, W. (2012). The role of scaffolding and motivation in CSCL. *Computers & Education, 59*(3), 893-906. <http://dx.doi.org/10.1016/j.compedu.2012.04.010>
- Ryberg, T. (2019). PBL and networked learning: Potentials and challenges in the age of mass collaboration and personalization. In *The Wiley handbook of problem-based learning*, (pp. 593-615). Wiley Blackwell.
- Saibon, R. A., & Kamis, A. (2019). employability skills in business management graduate and role of Malaysian vocational college. *International Journal of Academic Research in Business and Social Sciences, 9*(2), 1175-1192. <https://doi.org/10.6007/IJARBS/v9-i2/5674>
- Savery, J. R. (2019). Comparative pedagogical models of problem-based learning. *The Wiley Handbook of problem-based learning* (pp. 81-104). Wiley Blackwell.
- Savin-Baden, M. (2020). What is problem-based pedagogies? *Journal of Problem-Based Learning, 7*(1), 3-10. <https://doi.org/10.24313/jpbl.2020.00199>
- Savin-Baden, M., & Bhakta, R. (2019). Problem-based learning in digital spaces. In *The Wiley*

- handbook of problem-based learning* (pp. 645-666). Wiley Blackwell.
- Seibert, S. A. (2021). Problem-based learning: A strategy to foster generation Z's critical thinking and perseverance. *Teaching and Learning in Nursing, 16*(1), 85-88. <https://doi.org/10.1016/j.teln.2020.09.002>
- Shin, S., Brush, T. A., & Glazewski, K. D. (2020). Patterns of peer scaffolding in technology-enhanced inquiry classrooms: Application of social network analysis. *Educational Technology Research and Development, 68*, 2321-2350. <https://doi.org/10.1007/s11423-020-09779-0>
- Singh, M., & Sarkar, A. (2019). Role of psychological empowerment in the relationship between structural empowerment and innovative behavior. *Management Research Review, 42*(4), 521-538. <https://doi.org/10.1108/MRR-04-2018-0158>
- Siu, H. M., Laschinger, H. K. S., & Vingilis, E. (2005). The effect of problem-based learning on nursing students' perceptions of empowerment. *Journal of Nursing Education, 44*(10), 459-469. <https://doi.org/10.3928/01484834-20051001-04>
- Sunar, M. S. M., & Shaari, A. J. (2017). The effectiveness of the chemistry PBL method via Facebook on the soft skills of college students. *Asian Journal of Education and Training, 3*(2), 97-104. <https://doi.org/10.20448/journal.522.2017.32.97.104>
- Ta'an, W. A. F., Al-Hammouri, M. M., Aldalaykeh, M. K., Suliman, M. M., & Almutti, R. (2021). The role of structural empowerment in predicting computer use among Jordanian nurses: A cross-sectional study. *Journal of Nursing Management, 29*(4), 759-766. <https://doi.org/10.1111/jonm.13216>
- Tanius, E., Johari, H., Yulia, A., Siong, H. C., & Pazim, K. H. (2019). The employability skills performance of business graduates in Malaysia: Do employers, graduates and academicians speak the same language? *International Journal of Asian Social Science, 9*(1), 11-17. <https://doi.org/10.18488/journal.1.2019.91.11.17>
- Tawfik, A. A., Law, V., Ge, X., Xing, W., & Kim, K. (2018). The effect of sustained vs. faded scaffolding on students' argumentation in ill-structured problem-solving. *Computers in Human Behavior, 87*, 436-449. <https://doi.org/10.1108/MRR-04-2018-0158>
- Wachira, W., Ochieng, V., Muasya, G., Musyoka, W., Odek, A., & Sang, W. (2019). Social media, learner engagement, empowerment and academic performance among university students. *International Journal of Multidisciplinary and Current Research, 7*, 50-56. <https://doi.org/10.14741/ijmcr/v.7.1.11>
- Wood, D., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry, 17*(2), 89-100. <https://doi.org/10.1111/j.1469-7610.1976.tb00381.x>
- World Economic Forum. (2020). *The Future of Jobs Report 2020*. https://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf
- Zabit, M. N. M., Karagiannidou, E., & Zachariah, T. Z. (2017). Teaching business in Malaysia and the use of PBL to nurture students' critical thinking: A case study of Sultan Idris Education University. *Geografia-Malaysian Journal of Society and Space, 12*(6), 1-11.
- Zeng, F., Deng, G., Wang, Z., & Liu, L. (2016). WeChat: A new clinical teaching tool for problem-based learning. *International Journal of Medical Education, 7*, 119-121. <https://doi.org/10.5116/ijme.5708.e5c4>
- Zhang, W., Li, Z. R., & Li, Z. (2019). WeChat as a platform for problem-based learning in a dental practical clerkship: Feasibility study. *Journal of Medical Internet Research, 21*(3), e12127. <https://doi.org/10.2196/12127>

