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Published in:
Journal of King Saud University - Computer and Information Sciences

DOI:
10.1016/j.jksuci.2020.12.007

E-pub ahead of print: 01/01/2021

Citation for published version (APA):

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Integrating social media as cooperative learning tool in higher education classrooms: An empirical study

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Article info

Article history:
Received 30 August 2020
Revised 10 December 2020
Accepted 13 December 2020
Available online xxxx

Keywords:
Social media
Higher education
Cooperative learning
Integration framework
LinkedIn

Abstract

Recently, Social Media (SM)'s adoption as educational instruments in Higher Education (HE) has been gaining popularity among researchers and practitioners. Nonetheless it has been adopted to support various learning approaches such as Cooperative Learning (CL). Despite the growing research in this field, few studies have proposed a comprehensive SM integration framework as well as empirical studies to evaluate its effectiveness. This paper examines how SM is being used as a pedagogical tool in HE and identifies major factors that drives SM's inclusion in HE classrooms. In addition, the paper investigates the effectiveness of a previously proposed integration framework which was developed to promote CL using a popular SM platform, LinkedIn. A survey was administered to collect data from students in different subjects at a university in Australia. Structural Equation Modelling (SEM) was adopted for data analysis using IBM’s SPSS26 and AMOS26. One of the notable results of this study is the significant positive relation found between the use of the adopted integration framework and CL, SM challenges’ mitigation, students’ intention to use SM and their learning process. The findings of this study have important implications for practice and pave the way for future empirical studies.

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1. Introduction

Currently, there is a growing number of researches that address the influence of Social Media (SM) on universities (Greenhow et al., 2020; Manca, 2020; Pimmer and Rambe, 2018). The opportunities offered by SM in education are not limited to boosting interactions between students and instructors but also extend to support evidence-based learning such as Cooperative Learning (CL) (Zheng et al., 2015). Despite the growing use of SM platforms such as Facebook, LinkedIn, etc., in Higher Education (HE) as learning tools, the adoption of SM as formal Teaching and Learning (T&L) tools by educators remains quite limited and subject to myriads of restrictions, as well as lacking standard integration models and frameworks (Chawinga, 2017).

It is important to understand how SM is being used in educational settings in order to effectively integrate it in HE classrooms (Al-Rahmi et al., 2018). Accordingly, examining current relevant researches is necessary to synthesize the knowledge generated in this field as well as to identify major factors that drives SM’s inclusion in HE classrooms. Though, many studies such as (Aborujilah et al., 2017; Neier and Zayer, 2015) have been limited to self-reported isolated studies that examine the perceptions and views of students on SM in education. Hence, recent researchers such as (Rahman et al., 2020; Stathopoulou et al., 2019) suggested the need for further experiment-based studies to investigate the various factors that impact SM’s integration in HE. Hamadi et al. (2020)'s research is among the very few studies which provide a comprehensive SM integration framework in HE (Fig. 1). Nonetheless, empirical studies which examine SM’s adoption based on a pre-developed integration framework such as Hamadi et al. (2020)'s framework are very limited. This research examines the adoption of SM in HE’s classrooms as CL tools following a pre-developed integration framework (Fig. 1) using LinkedIn in a designated Information Technology course at an Australian university. Accordingly, it examines five identified factors as follows: SM challenges, students’ intention to use SM, SM integration guide or “instructions” (Hamadi et al.,2020’s framework), students’ learning process and cooperative learning.
Hamadi et al. (2020)'s framework shown in Fig. 1 is a novel framework which was developed in a recent study through an integrative review of current available SM adoption models in HE (Hamadi et al. 2020). The framework was developed to enhance the students' learning process through incorporating CL principles in the form of SM activities. The adopted framework is explained further in section 2.2.

The paper answers the following research questions:

- (RQ1) How is SM being used as a pedagogical tool in HE? What are the major factors that drives SM's inclusion in HE classrooms?
- (RQ2) Can the adopted integration framework ensure an effective implementation of a SM platform “LinkedIn” as a CL tool?

1.1. Contribution to research

The authors were motivated to conduct this research based on three major factors. First, to fulfill the gap in current literature by examining the implementation of SM in HE's classrooms following a pre-developed integration framework. Second, to investigate (at a granular level) five identified factors that drives SM’s adoption in HE. Third, it builds on the findings of previous research by the authors to validate the previously developed SM framework (Fig. 1). Hence, the main contribution of this paper is “the proposed hypothetical model” as shown in Fig. 2. In addition, this study contributes to the current understanding of how SM is being used as part of CL initiatives in HE. Accordingly, the paper sets out new grounds for SM’s effective integration in HE.

Fig. 1. The adopted SM integration framework (Hamadi et al., 2020).

Fig. 2. The Research Model with Hypothesis.
2. Literature review

2.1. SM's use in education

Implementing SM as a learning tool in educational settings is driven by the shift towards adopting learner-centred environments within universities (Liburd and Christensen, 2013). This approach is based on active learning where the instructor is a facilitator of the learning process rather than the disseminator of knowledge, where students interact and participate in the learning process (Freeman et al., 2014). Since SM in education would intrinsically promote active learning, researchers have applied respective theories as well as technology adoption theories as theoretical basis for its integration in HE classrooms (in the literature, “classrooms” often refers to “learning environments”). An extract of the major theories currently used by some researchers to investigate SM’s inclusion in HE, are outlined as follows, Uses and Gratifications Theory (UGT) (Ahern et al., 2016; Gruzd et al., 2018), Technology Acceptance Model (TAM) (Al-Rahmi et al., 2018; Alenazy et al., 2019) and Constructivist-based theories such as Online Collaborative Learning theory (OCL) and CL (Ansari and Khan, 2020; Harasim, 2012).

There is a growing number of studies that examines SM’s adoption in HE within various academic disciplines, such as literacy education (Blatter and Fiori, 2009), medical (Pander et al., 2012), marketing and social sciences disciplines (McCorkle and McCorkle, 2012; Tuten and Marks, 2012). Recently, (Rehm et al., 2019)’s extensive research provided an in-depth analysis of data on more than eighty thousand articles which identified various SM topic clusters within the educational sector. Nonetheless, SM’s use in HE was predominantly associated with promoting information sharing, enhancing interaction and engagement, boosting collaboration and cooperation (Brown et al., 2016; Greenhow and Brown, 2011; Gruzd et al., 2018). In medical education, SM is used as part of student-centred learning approaches i.e. flipped classrooms, cooperative and collaborative learning methodologies (Alenazy et al., 2019; Chugh and Ruhi, 2018; Dyson and Casey, 2016). However, none of the mentioned researches proposed nor validated a SM integration framework such as Fig. 1. Sceptics of SM in education have identified major challenges or “resistance” to its inclusion in academic disciplines as follows:

- Personal privacy: In many research, such as (Alkis et al., 2017; Au and Lam, 2015; Chugh and Ruhi, 2018), SM platforms “privacy” has been regarded as a critical concern not only for students and instructors using SM for educational purposes but also for its formal adoption by HE institutions (Chugh and Ruhi, 2018). Given the high standards of privacy within HE settings, the ubiquitous nature of SM can be a challenging feature (Davis III et al., 2012).

- Ambiguity concerns: which refer to a blur in SM’s use among education stakeholders (students and instructors). Rambe and Ng’ambi (2014) found that students had major concerns regarding the use of SM for educational purposes reporting a blur between academic and personal space on SM (Rambe and Ng’ambi, 2014). In 2012, Hrastinski and Aghaeae’s study found that the educational benefits to using SM were not apparent to many of the interviewed students (Hrastinski and Aghaeae, 2012). These studies, along with others such as (Smith, 2016), highlighted the student’s ambiguity regarding the use of SM as educational tools, especially in HE classrooms.

- Other researchers such as (Bahati, 2015; Harran and Olamijulo, 2014; Sobahli et al., 2016) identified “technical concerns” i.e. internet access, accessibility on various devices (mobile), data limitations issues and other related technical issues as critical barriers to SM’s inclusion in HE classrooms, especially in developing countries. However, since this research addresses the issue of implementing SM in a HE classroom within an Australian university, the adopted framework (Fig. 1) did not emphasize on mitigating this challenge as it considered its impact to be minor.

In addition, several researchers such as (Junco and Cotten, 2012; Paul et al., 2012; Rowan-Kenyon et al., 2016) reported that education stakeholders are concerned about the workload when SM is used in HE classrooms. To mitigate this challenge, researchers such as (Zheng et al., 2015) suggested that educators should follow well-designed instructions (a guide) to ensure the success of SM’s integration in HE. Accordingly, this research acknowledges the significance of this finding, hence, it adopts a SM integration guide (section 2.2) which was developed to provide education stakeholder with clear instructions to follow in order to alleviate this challenge.

In addition to the above described challenges or “barriers” to SM in education, a growing number of researches suggested that students’ intention to use SM is key factor leading to its adoption as it impacts the success of the SM adoption process (Balakrishnan, 2017; Ifinedo, 2017; Odewumi et al., 2018). Thus, educators should understand that promoting and improving students’ intention to use SM is key to its effective integration in HE classrooms. Current researchers such as (Al-Rahmi et al., 2018; Alenazy et al., 2019; Dumplin and Fernandez, 2017) focused on investigating the students’ intentions to use SM as a major factor for its adoption in HE.

SM’s inclusion in HE’s classrooms is driven by aims to enhance the students’ learning process, especially by promoting specific pedagogical approaches such as CL. Many current researches indicate a connection between SM’s integration in education and students’ learning process (Gam et al., 2015; Tartari, 2015). To understand and evaluate the impact of the integration process on the students’ learning process, educators can resort to various approaches such as seeking constructive feedback and reflections from students throughout the process, or at the conclusion of the integration process. Recent research on the students’ learning process suggested different tools, methods and approaches to assess and evaluate this process, most notable is Biggs et al. (2001)’s revised two-factor study process questionnaire.

Accordingly, this paper identifies five major factors which drive SM’s integration in HE classrooms. These factors are integrating SM based on an appropriate pedagogy approach, addressing SM’s challenges in education, using instructions (an integration guide) to steer the integration process, students’ intention to use SM for educational purposes and students’ learning process.

2.2. The proposed integration framework

The adopted integration framework (Fig. 1) was developed previously by Hamadi et al. (2020) with the aim to enhance the students’ learning process through incorporating CL principles in the form of SM activities (Hamadi et al., 2020). The framework (Fig. 1) is the outcome of an in-depth integrative review followed by a thematic review. It includes six themes as major components which address different aspects of the integration process: Establishing strong pedagogical basis for the integration process (LEVEL 1), Mitigating major challenges associated with SM in education (LEVEL 2 & LEVEL 3), Developing clear measures and guidance (instructions) for students, Developing Incentives to encourage students’ participation in the activities and Control and monitoring of activities (LEVEL 4), and finally, Evaluating the integration process (LEVEL 5).
A pedagogical approach should be supported by the built-in features and characteristics of the selected SM platform. As a logical consequence, a SM platform is to be selected based on its attributes (features, options, characteristics, etc.) which best support the adopted pedagogical approach. LinkedIn was selected because of its popularity among CDU’s students who are highly familiar with its functionalities and features. In addition, staff at CDU use LinkedIn in various ways and are highly familiar with it. In addition, many researchers found that LinkedIn increased student’s collaboration and engagements which are core objectives of CL (Cooper and Naatus, 2014; Gerard, 2012; Lofgren et al., 2015). Nonetheless, its built-in functions can facilitate the mitigation process of the identified SM challenges, as per level 3 in Fig. 1.

2.3. Cooperative learning

The adopted integration framework (Fig. 1) was developed to support CL through the use of specific SM activities. There are overwhelming literary evidences that supports the adoption of CL approaches as effective pedagogical practices to enhance students learning (Slavin, 2014). For instance, developing practical methods (i.e. SM activities) based on research-validated theory such as CL, would promise positive outcomes in the intended learning environment (Slavin, 2014). Nonetheless, it is important to establish a clear distinction between CL and collaborative learning, as the two terms cannot be used interchangeably (Moallem, 2001).

Johnson et al. (1994) defines CL as the “instructional use of small students’ groups for them to work together and maximise their individual as well the group’s overall learning” (Johnson et al., 1994). Thus, CL is based fundamentally on the concept that developing interpersonal skills is as important as learning itself (Sagar et al., 2016). Kagan and Kagan (1998) summarizes the principles of CL in the acronym PIES which stands for Positive interdependence, Individual accountability, Equal participation and Simultaneous interaction (Kagan and Kagan, 1998). The SM activities adopted in the research’s framework (Fig. 1) were designed specifically to address CL principles and are adopted from (Smith and Waller, 1997).

Despite sharing similar goals, as both cooperative and collaborative learning are founded on the constructivist model of learning (Moallem, 2001), there are several fundamental differences between the two. (Doyle et al., 2015) outlines the major differences between cooperative and collaborative learning approaches as follows (three fundamental differences listed):

- Task completion: team members in collaborative learning attempt to complete tasks together (rather than following “the equal participation principle” in CL).
- Group members’ roles: assigned roles in CL, while shifting roles in collaborative learning.
- Problems to be solved: closed in CL, whereas in collaborative learning they are open-ended.

3. Research methodology and data collection

3.1. Course design and implementation

This research adopted LinkedIn at specific Master's level subjects at an Australian university, Charles Darwin University (CDU), first, to investigate the framework’s effectiveness in supporting students’ learning process. Second, to provide students with an alternative to face-to-face collaboration mediums during COVID-19 pandemic. During the first week of semester 1, 2020, all university classes moved into full online delivery mode due to changed regulations and restrictions caused by the pandemic (i.e. social distancing).

3.2. The SM integration guide

In this study, a student-friendly version of the developed SM integration guide was distributed to the students at the start of semester 1. Students were asked to create personal profiles (if not yet created) on LinkedIn and join private groups (unlisted groups) that were specifically created for the subjects’ assignments’ collaboration. The guide encouraged students to participate in activities that promote CL on the groups. Students used LinkedIn’s various features and options to communicate, interact, collaborate and share ideas and information about assignments with their peers and to optionally communicate with their instructors who also joined the groups.

3.3. Participants

151 students in Information Systems, Data Science and Software Engineering degrees participated in the experiment and they were asked to follow the SM guide. There were 53 groups of 2-to-3 students in total. In the last week of the semester, participants volunteered to complete an online anonymous survey.

3.4. The survey

The research used a survey design, in which uncontrolled data was collected using a standardized instrument (Fowler, 2013) to measure the outcomes of the experiment, especially the effectiveness of the framework. The survey was adapted from existing instruments that have measured similar or the same constructs (Biggs et al., 2001; Gerard, 2012; Lorenzo-Romero and Gomez-Bordia, 2012; McCorkle and McCorkle, 2012; Tsay and Brady, 2010). This approach was chosen because it helps ensure that the items have been validated in similar contexts (Fowler, 2013).

The survey was developed based on Likert-scale questions and was open during the last week of the semester. It included 20 questions using five options Likert scale (Strongly Disagree, Disagree, Neutral, Agree and Strongly Agree). The scales and sources of items within the survey are shown in Table 1. These items were used to explicitly address each construct included in the research model.


4. The research model

The framework’s SM activities (Fig. 1) were transformed into a SM integration guide (as described in 3.2). Since this research focuses on validating the effectiveness of the adopted SM integration framework, “the adopted SM integration guide” was a major construct in the model (Fig. 2). In addition, CL is included as a construct since it is the pedagogical basis of the adopted framework. Other constructs were also included, namely Mitigating SM challenges, Students’ intention to use SM and Students’ Learning Process. The meaning and definition of each term (variable) is as follows:

“The Adopted SM Integration Guide” is an independent variable that represents the transformed version (guide) of the adopted integration framework in this experiment (also referred to as instructions) (as described earlier in section 3.2). The “Students’ Intention to Use SM” is a dependent variable that represents the intentions of students to use LinkedIn for learning purposes (as discussed in section 2.1). “Mitigating SM Challenges” is a dependent variable that represents the impact of measures prescribed in the adopted integration framework as shown in Level 3 of Fig. 1 (section 2.2). “Student’s Learning Process” is a dependant variable
which reflects how students’ approach their learning (as discussed in section 2.1). “Cooperative Learning” is a dependant variable which is associated with the fulfillment of key CL characteristics (as discussed in section 2.3). Table 1 provides a list of items for each variable used in this study. In what follows, a description of the underlying hypothesis is presented.

Four hypotheses as shown in Fig. 2 were developed to assess the effectiveness of the integration framework as well as to find out whether the reported literary’ positive effects can be verified in this empirical study:

The literature suggests that students’ intention to use SM is major factor that plays an important role in the success of SM's integration process (Balakrishnan, 2017; Ifinedo, 2017; Kanthawongs et al., 2013; Odevumi et al., 2018). Current researchers such as (Al-Rahmi et al., 2018; Alenazy et al., 2019; Dumpit and Fernandez, 2017) suggested that students’ intention to use SM should be examined as a major factor leading to its adoption in learning. Given that the adopted integration framework (Fig. 1) was developed to ensure a successful adoption of SM in learning, it is important to examine the impact it has on students’ intentions

in this experiment. Accordingly, this research examines the relationship between the students’ intention to use LinkedIn in education and the adopted SM integration guide (Fig. 2) to assess and validate the effectiveness of the adopted integration framework, as well as to find out whether such literary positive effects can be verified in this empirical study. Hence, the following hypothesis was developed. Hypothesis 1 (H1): The SM integration Guide has a positive correlation to students’ intention to use LinkedIn in education.

Current studies such as (Alkis et al., 2017; Au and Lam, 2015; Chugh and Ruhi, 2018a, 2018b; Rambe and Ngambi, 2014; Hrastinski and Aghaee, 2012) suggest that common SM challenges, namely privacy and ambiguity concerns are major barriers to its acceptance as an educational tool. Hence, the success of SM’s integration in HE depends on implementing appropriate measures to mitigate and moderate these challenges (Zheng et al., 2015). The use of well-developed instructions (guidelines to use SM) which address common SM challenges can ensure a successful integration process (De Wever et al., 2015; Menzies et al., 2017; Zheng et al., 2015). Other researches such as (Anderson, 2019) emphasized the importance of mitigating SM’s challenges to promote and encourage its use for learning in HE. The adopted SM integration guide addresses two privacy and ambiguity concerns and promotes SM practices and activities to address these challenges throughout the implementation process as shown in Fig. 1, level 3. To assess the effectiveness and competence of the adopted guide in mitigating the identified challenges, hence ensuring a successful implementation of SM, Hypothesis 2 (H2) was developed: “The SM integration Guide has a positive correlation to mitigating relevant SM challenges”.

As described earlier, SM’s inclusion in HE’s classrooms is driven by aims to enhance the students’ learning process, especially by promoting specific pedagogical approaches such as CL in this study. Current researches such as (Gan et al., 2015; Rasiah, 2014; Tartti, 2015) indicate a connection between SM’s integration in education and students’ learning process. Hence, the success of SM’s adoption in education can be weighed based on its impact on the students’ learning process. In this experiment, the adopted integration framework (Fig. 1) was developed based on an integrative review of six current studies which found significant influence by the use of SM platforms in classrooms on students’ learning process (Hrastinski and Aghaee, 2012). The adopted integration framework aims to enhance the students’ learning process by implementing specific measures as shown in level 5 of the framework (Fig. 1). In order to assess the competence of the adopted guide, the following hypothesis was developed: “The guided SM integration process has a positive correlation to the Students’ learning process”.

Current researches such as (Slavin, 2014) suggest that developing practical methods (i.e. SM activities) based on research-validated theory such as CL, would promise positive outcomes in the intended learning environment. Researches such as (Bagarukayo, 2018; Chookaew, 2015; Menzies et al., 2017) found SM’s use in HE classrooms to positively impact CL in HE by addressing its key characteristics which include independence and individual accountability. The adopted SM integration framework was developed to promote CL by addressing it key principles through promoting specific SM activities adopted from (Smith and Woller, 1997). Nevertheless, the SM integration guide is anticipated to directly impact the student learning process. Given that the students’ learning process should be examined for its impact on CL (which is the outcome), the following hypothesis was developed. Hypothesis 4 (H4): “The student learning process has a positive correlation to the CL pedagogy”.

| Table 1 Summary of survey items and sources for research instrument. |
|---|---|---|
| Code | Variable | Source |
| SI1 | I will recommend the use of this site to others | (Lorenzo-Romero and Gomez-Borja, 2012) |
| SI2 | I would be happy to continue using LinkedIn on future assignments. | (Lorenzo-Romero and Gomez-Borja, 2012) |
| SI3 | Overall, I had a positive experience using LinkedIn for developing group assignments. | N/A |
| LP1 | The use of LinkedIn to complete my assignments complemented my aim to pass the course while doing as little work as possible. | (Biggs et al., 2001) |
| LP2 | Using LinkedIn in my unit is aligned with my belief that studying academic topics can at times be as exciting as a good novel or movie? | (Biggs et al., 2001) |
| LP3 | While using LinkedIn in my unit, I restricted my study to what is specifically set as I think it is unnecessary to do anything extra. | (Biggs et al., 2001) |
| GE1 | The LinkedIn user guide insured a high level of academic language professionalism during group assignments’ development. | (Gerard, 2012) |
| GE2 | In general, Social Media’s use as part of learning must only be permitted if guided by the instructors? | (McCorkle and McCorkle, 2012) |
| GE3 | The guide provided clear instruction on how to start discussions, interact, work collaboratively and manage time effectively while using linked in. | (McCorkle and McCorkle, 2012) |
| CL1 | In my opinion, LinkedIn helped me accomplish the group’s goals and provide constructive feedback to my team members. | (Tsai and Brady, 2010) |
| CL2 | In my opinion, I find LinkedIn very effective in ensuring members in my team are held accountable for completing their share of the group work. | (Tsai and Brady, 2010) |
| CL 3 | Using LinkedIn raised my cooperation level, helped me learn from other members and contribute ideas to the group. | (Tsai and Brady, 2010) |
| SMC1 | LinkedIn privacy features insured high level of personal and group privacy. | (Gerard, 2012) |
| SMC2 | The LinkedIn user guide answered my privacy concerns regarding using SM as an educational tool. | (Gerard, 2012) |
| SMC 3 | The LinkedIn user guide provided by the lecturer was very clear and included all necessary instructions to use LinkedIn for group assignments? | N/A |
5. Data analysis and results

5.1. Measurement model analysis

This research adopted a Structural Equation Model (SEM) for data analysis using SPSS Statistics and Amos 26. To ensure the model's validity, legitimacy and dependability, first, a Common Method Bias (Harman’s test) and an Exploratory Factor Analysis (EFA) were employed and results accepted. Next, the Confirmatory Factor Analysis (CFA) demonstrated an accepted model fit (see Fig. 3). The results of the analysis showed the overall goodness of fit using the following fit indices ($\chi^2$, df, $\chi^2$/df, RMR, IFI, TLI, CFI and RMSEA) as shown in Table 2. Cronbach’s alpha and Composite Reliability (CR) were used to measure the internal consistency reliability as seen in Table 3. As shown in Table 3, the values of both, Cronbach’s Alpha and CR were above the threshold of 0.7, thus, the reliability is confirmed. In addition, Table 3 shows factor loadings and Average Variance Extracted (AVE) which were used for the measurement of convergent validity. The results showed that both measures are accepted (values of factor loadings were all above 0.5 and the values of AVE were all above of 0.5) (Hair et al., 1998).

Nonetheless, convergent validity alone is not enough to establish the construct validity, thereby, discriminant validity was tested using Heterotrait-Monotrait ratio (HTMT) which is regarded as a significant measure for testing the discriminant validity (Henseler et al., 2015). Table 4 indicates that the HTMT ratio has been confirmed, given that all values conform with the thresholds (0.850 for strict and 0.900 for liberal discriminant validity) thus, the discriminant validity has also been established. Accordingly, the measurement model is confirmed, and this lead to proceed with the assessment of the structural model. Note: CL: Cooperative Learning, GE: SM integration guide, SI: Students’ intention to use SM, SMC: Social Media Challenges, LP students’ Learning Process.

5.2. Structural model and results of Hypothesis testing

Fig. 4 shows the results of the research model using Amos 26. It shows the hypotheses estimates which are used to examine the relations between the model’s constructs. The results support the adopted integration framework as the relations between its construct (Integration_Guide) and all other constructs were found to be positive and significant (see Table 5). Table 5 illustrates standard errors for the structural model. Note: (***)<0.001).

The relation between the use of the adopted SM integration guide and the students’ intention to use SM was found to be positive and significant with ($\beta = 0.818$, p < 0.001). This finding
supports H1 proposing a significant relationship between SM integration Guide and students’ intention to use LinkedIn in education.

The relation between the adopted SM integration guide and the mitigation of relevant SM challenges was found to be positive and significant with ($\beta = 0.616, p < 0.001$). This finding supports H2.
proposing a significant relationship between the adopted SM integration guide and the mitigation of relevant SM challenges.

The relation between the adopted SM integration guide and students’ learning process was found to be positive and significant with ($\beta = 0.782, p < 0.001$). This finding supports H3 proposing a significant relationship between the adopted SM integration guide and students’ learning process.

The relation between the students’ learning process and CL pedagogy was found to be positive and significant with ($\beta = 1.075, p < 0.001$). This finding supports H4 proposing a significant relationship between the students’ learning process and CL pedagogy.

In addition, Fig. 2 shows an indirect effect of GE on CL which is (fully) mediated by variable LP. The indirect relations between GE and CL was found to be positive and significant with ($\beta = 0.841$) which is between bounds of 0.705–1.04.

5.3. Discussion of results

H1’s result shows that the adopted integration framework was successful in impacting students’ intention to use SM in learning. Although researches such as (Zheng et al., 2015) emphasised the importance of providing students with a predeveloped guide (instructions) to ensure the success of the integration framework, the current literature lacks empirical studies that examines the relationship between a predeveloped SM integration framework and the students’ intention to use SM. Hence, this paper adds a new finding into the body of knowledge by identifying a significant relation between the use of a SM integration guide and students’ intention to use SM. Accordingly, the adopted guide in this experiment (Fig. 1) proved to be effective at influencing students’ intention to use SM which is a key factor for a successful SM integration in HE classrooms as identified by many researches such as (Balakrishnan, 2017; Ifinedo, 2017).

H2’s result indicates that the adopted guide was effective in mitigating the specified SM challenges (Fig. 1). Similar results, such as, (Sobaih et al., 2016) recommended that faculty should implement appropriate measures to to mitigate SM challenges. In addition, (Au and Lam, 2015; Bahati, 2015)’s findings suggest that addressing SM’s challenges in education would promote its acceptance as an educational tool. Furthermore, (Au and Lam, 2015) suggested that appropriate planning of SM’s integration in education might mitigate its barriers. This result adds a new finding into the body of knowledge by providing empirical evidence which shows that well-developed instructions (the adopted guide) can be effective in mitigating the identified common challenges which were identified by many researches such as (Alkis et al., 2017; Chugh and Ruhi, 2018; Rambe and Ng’ambi, 2014; Hrastinski and Aghaei, 2012) as common barriers to its adoption in learning.

Slavin (2014) suggested that developing practical methods (i.e. SM activities) based on research-validated theory such as CL, can promise positive outcomes in the intended learning environment. Other studies such as (Gan et al., 2015) suggested that SM’s use in HE impacts students’ learning process. However, the literature lacks studies that examine the impact of SM’s adoption following a predeveloped guide on students’ learning process. H3’s result provides empirical evidence that shows the effectiveness of using a predeveloped integration framework to enhance student’s learning. This result also proves the importance of using instructions (a guide) when adopting SM in learning to enhance students’ learning process.

H4’s result indicates that the student’s learning process impacted CL in the examined classrooms. Accordingly, the adopted framework which includes specific SM activities that were adopted from (Smith and Waller, 1997) was able to achieve CL in the designated classrooms. In addition, this result provides empirical evidence that support the use of a predeveloped SM integration framework to achieve CL. Hence, this result is in line with previous findings, namely (Chookaew, 2015; De Wever et al., 2015; Menzies et al., 2017; Zheng et al., 2015) who stated that SM can achieve CL in HE classrooms if implemented in accordance with well-designed instructions (such as guides).

6. Implications

This research examined the relationship between five identified constructs on the adoption of SM in HE as follows: CL, The SM integration guide, Mitigating SM challenges, Students’ intention to use SM and Students’ learning process. The four hypotheses related to the use of the adopted integration framework (as in Fig. 1) and its impact on major factors for SM’s use in HE (see Fig. 2) were all supported by the analysis of empirical results (Table 5). Nonetheless, the results of this study were consistent with findings by (Gan et al., 2015; Rasiah, 2014; Tartari, 2015) suggesting that SM’s inclusion in HE classrooms contributed positively to students’ learning process. In addition, empirical results were consistent with several studies such as (Chookaew, 2015; De Wever et al., 2015; Menzies et al., 2017) which suggested that SM can be effective in achieving CL within HE classrooms.

The findings of this study stress on the importance of adopting a comprehensive integration framework to implement SM in HE classrooms. Accordingly, the followings highlight major practical and theoretical contribution of this research.

- The integration framework (Fig. 1) which proved to have direct impact on major factors that influences SM’s use in HE (Fig. 2), can effectively steer and guide the integration process.
- The adopted conceptual integration framework (Fig. 1) supports the use of SM as a CL tool, ensures the mitigation of the identified major SM challenges (Fig. 1), and impacts students’ intention to use SM and enhances their learning process. Hence, this paper proposes a new factor to be considered when examining SM’s adoption in HE, namely “Instructions”.
- The validation and establishment of a novel framework for integrating SM as CL in HE classrooms (Fig. 1).

7. Limitations

Notwithstanding the merits of this study, some limitations must be acknowledged. First, the experiment was conducted on IT courses, hence, survey data were gathered solely from IT students which does not provide a comprehensive presentation of all student population at the mentioned university. The experiment was held within three different classes, to ensure the participation of a diversified student group (including, domestic, international, units of different level (first year and second year units), external and internet students). Secondly, LinkedIn was selected specifically for this study. Though, LinkedIn share many similar built-in features and characteristics with other popular SM platforms, thus, lessons learned from this study may be applicable on experiments using various SM platforms such as Facebook, twitter, and wikis. Lastly, the research model focussed on the relation between the adopted integration framework and four major factors for SM’s use education. The risk of this limitation was overcome by discussing the findings of other similar studies which examined other factors that influences SM’s integration in HE. Hence, the links between this study and previous relevant studies were adequately established in the literature review as well as in the discussion section of this research.
8. Conclusion and future studies

The pedagogical arguments for SM’s use in HE have its roots in existing theoretical research. This paper examined current major research in this field of study to develop an adequate understanding of how SM is being used as a pedagogical by identifying major factors affecting its inclusion in HE classrooms. Based on an extensive literature review, the paper identified five major factors which drive SM’s integration in HE classrooms: integrating SM based on an appropriate pedagogy approach, addressing SM’s Challenges in education, students’ intention to use SM for educational purposes, use of instructions and students’ learning process. In addition, the paper assessed the effectiveness of the adopted SM integration guide and examined its impact on students’ learning process. The framework proved to have direct and indirect impact on the identified factors. Accordingly, it should be employed by instructors to facilitate SM’s integration in HE’s classroom, ultimately to scaffold student’s learning process.

Further empirical studies will be conducted based on the adopted integration framework in different HE settings, namely in courses other than IT, in order to share best practices and teaching tips on incorporating SM such as LinkedIn into diverse HE courses. In addition, other SM platforms will be the focus of the authors’ future similar experiments. Such studies would be very useful to assess the effectiveness of the adopted framework under various conditions, thus, establishing it as a comprehensive integration framework. Future study will also address the relation between the adopted integration framework and factors other than those identified in this research, especially the ubiquity of the SM platform, learning attributes (i.e. deep learning) and other learning approaches (i.e. project-based, problem-based, etc.).

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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