SME project: an approach to maintaining student engagement during online learning

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Abstract

Purpose – The COVID-19 pandemic has dramatically changed educational practices due to the intense use of information technology for teaching and learning. That phenomenon presents challenges for lecturers in higher education establishments because student engagement is threatened during online interactions. This study aims to analyze the effectiveness of the SME project for maintaining student engagement during online learning.

Design/methodology/approach – The research used a quasi-experimental method involving experimental and control groups. Researchers collect quantitative and qualitative data to obtain comprehensive information. The data were collected using an electronic questionnaire. Descriptive statistics, one-way ANOVA, and open coding were used to analyze the data.

Findings – The research used a quasi-experimental method involving experimental and control groups. Researchers collected quantitative and qualitative data using an electronic questionnaire to obtain comprehensive information. Descriptive statistics, one-way ANOVA, and open coding were used to analyze the data.

Originality/value – This study provides the educational community with a new insight into optimizing PBL in the online learning environment. Qualified PBL, as practiced by educators, will lead to student engagement, which leads to meaningful learning.

Keywords Online learning, Student engagement, Business education, Project-based learning

Paper type Research paper

Introduction

The small and medium-sized enterprises (SME) project is a project-based learning (PBL) design implemented to aid learning in the business field. Sagala and Effiyanti (2019) have

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applied the SME project in the field of accounting studies by making SME the subject of their project. Through the SME project, students are assigned to record financial transactions, develop cost/financial reports, analyze economic and managerial problems based on financial data, and produce strategic recommendations for managing SME (Sagala and Effiyanti, 2019). Furthermore, in terms of assessment, the SME project adopts the peer evaluation strategy to control group performance from free-riders (Sagala and Effiyanti, 2019). As a result of the SME project, Sagala and Effiyanti (2019) found that students had better learning satisfaction, better interpersonal skills, and better group work satisfaction.

Concerning the findings, this research will refine the SME project to anticipate increasingly complex learning problems in this digital era, as it is known that information technology (IT) now plays an essential role in the practice of learning. The intensity of IT's utilization has become increasingly massive since the COVID-19 pandemic struck two years ago (Daniel, 2020; Naciri et al., 2020; Sagala et al., 2022). Therefore, fully online, blended, or hybrid learning will become common standards in post-COVID-19 learning practices (Adarkwah, 2021; Jones and Sharma, 2020; Sim et al., 2021). However, the massive integration of IT in learning is potentially problematic, especially in fully online learning programs. Many studies have reported that online learning increases learning pressure, reduces student engagement, and reduces the learning experience compared to face-to-face learning (Alawamleh et al., 2020; Christensen and Knezek, 2017; Oliver, 2016; Ong and Quek, 2023; Sun et al., 2017). Therefore, researchers and learning practitioners must provide ideas and recommendations for learning strategies that can control the various risks from online learning itself (Daniel, 2020; Naciri et al., 2020; Ong and Quek, 2023).

In response to these conditions, the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) of the Republic of Indonesia recommends the use of PBL as an alternative learning design that can provide meaningful learning experiences in post-COVID-19 pandemic learning (Kemdikbudristek et al., 2022). This recommendation encourages education units to provide projects relevant to the material being taught and that are close to the students' environment (context) (Kemdikbudristek et al., 2022). This policy indicates that complex learning designs, such as PBL, will be increasingly recommended to be practiced intensively and massively in learning in this digital era. Therefore, further development and testing of PBL's implementation are needed to obtain scientific justification regarding its effectiveness in producing meaningful learning in the online environment. To address that problem, this study formulates following research questions:

RQ1. Does the SME project empirically affect student engagement in the online learning environment?

RQ2. How is the SME project's design effectively affecting student engagement in the online learning environment?

Previous studies have investigated online PBL to improve students' collaborative skills, the competitive tradition in education, problem-solving skills, and the frequency of interaction during the projects (Thomas and MacGregor, 2005; Wu et al., 2013; Zhang et al., 2009). Previous studies also found that PBL can improve student engagement in an online learning environment through online discussions during the project (Koh et al., 2010). However, previous online PBL emphasizes online discussions to improve students' interaction and collaborative work during the project (Koh et al., 2010; Thomas and MacGregor, 2005; Wu et al., 2013). In this study, the project's design still encourages online discussions. Nevertheless, we also emphasize complex activities, such as mini-research, peer reviews, research paper development, and competition, which could facilitate the inquiry process and challenge it during the project.

Conceptual framework

Student engagement

Alexander Astin defines student engagement as the quantity and quality of physical and psychological energy students devote to their learning experiences (Axelson and Flick, 2010). This physical and psychological energy can be observed from the duration and intensity of students attending, thinking, carrying out various cognitive strategies, interacting actively with peers and teachers, and showing positive emotional tones during the learning process (Fredricks *et al.*, 2004; Lu and Churchill, 2014; Skinner and Belmont, 1993). The more students desire to interact in learning activities, interact with teaching materials, respond to learning activities, and improve their learning methods, the greater the tendency for them to carry out intense and deep learning activities (Carini *et al.*, 2006).

In the online learning, the role of student engagement is increasingly important. Online learning brings the advantages of access, which simultaneously carries the risk of a weak social presence among students (Aschenberger *et al.*, 2023; Ong and Quek, 2023). The risk of social interaction lies in the threat of poor student attendance and social interaction (Alawamleh *et al.*, 2020; Lu and Churchill, 2014; Oliver, 2016). Therefore, lecturers and universities are responsible for giving appropriate attention to maintaining student engagement in the learning process, to ensure students get a meaningful experience even with online learning (Chiu, 2022; Kennedy, 2020).

Kennedy (2020) argues three types of interaction should be maintained during online learning to achieve student engagement, including 1) learner-instructor interaction; 2) learner-learner interaction; and 3) learner-content interaction. Furthermore, Oluwajana *et al.* (2021) found that collaborative learning is effective in improving social interaction in online learning environments. Social interaction is gained through learner-learner interaction during in-group or inter-group discussions (Kennedy, 2020; Oluwajana *et al.*, 2021). Moreover, Chiu (2022) proposes to apply the self-determination theory (SDT) to designing online learning to motivate student engagement. The SDT considers the social context, by giving students autonomy in developing their learning activities, trusting their competence, and the relatedness of the learning materials (Deci and Ryan, 1985; Chiu, 2022). Zen *et al.* (2022) and Oluwajana *et al.* (2021) found that PBL effectively encourages student engagement and academic performance in online learning. PBL's design is probably designed to generate collaborative learning, social influence, responsibility, contextual and real-time experience, and deep learning intensity within an autonomy setting, which is appropriate in the online learning (Oluwajana *et al.*, 2021). Therefore, in general, the current study adopts PBL as the teaching design to maintain student engagement during online learning.

Student engagement in this study refers to the four aspects of student engagement offered by Reeve and Tseng (2011), namely: agentic engagement, behavioral engagement, emotional engagement, and cognitive engagement. The four aspects of engagement have coverage and completeness in reviewing the cognitive and social dimensions of online learning (Lu and Churchill, 2014). The cognitive dimension will be observed from agentic and cognitive engagement, while the social dimension will be from behavioral and emotional engagement. According to Reeve and Tseng (2011), the four aspects are defined as follows.

(1) Agentic engagement - the constructive contribution of students during the lecture process both in asking questions, expressing opinions, providing ideas, and solving problems relevant to the lecture material.

(2) Behavioral engagement - student engagement responses are shown by activeness in interacting and collaborating with colleagues, seriousness in accepting lecturers' directions, and contributions to completing assignments within groups.

(3) Emotional engagement - responses of pleasure, enthusiasm, and enthusiasm in learning activities independently or in groups.

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(4) Cognitive engagement - responses to student involvement in knowledge-seeking activities, learning strategies, interaction with teaching materials, and efforts to master the knowledge or complete tasks.

SME project

The SME project is developed on a PBL framework. Blumenfeld *et al.* (1991) suggested that PBL is a comprehensive approach that puts students into authentic problems with the output of certain works, products, or ideas. Through projects assignment, students will simultaneously study the topics in the learning materials, they will experience practical development, and solve related problems to obtain a comprehensive understanding of the learning objectives for a particular subject (Jones *et al.*, 1997; Thomas, 2000). The project will be effective in making students become actively involved in learning activities, and they experience meaningful learning activities (Bell, 2010; McCann, 2016; Panicker and John, 2021).

Furthermore, the SME project's assignments are carried out collaboratively among students to facilitate teamwork to finish the tasks (Grimm and Blazovich, 2016; Sagala and Effiyanti, 2019). The collaborative learning's design was also aimed at generating social interaction, constructive discussion, and the confirmation of knowledge among students in online learning. Because in addition to studying the learning material, students also learn how to argue, collect new information, connect it with the initial information they have, synthesize new knowledge, and generate conclusions or joint decisions from the projects they are working on (Bell, 2010; Kirschner, 2002). The stages of implementing the SME project refer to the Grimm and Blazovich (2016) and Anson (2007) instructional frameworks. The steps for these activities are described as follows.

(1) Orientation of learning in the main class - this stage is the delivery of learning materials in the form of concepts and theories related to the business plan, as well as the development of related research and practices.

(2) Project planning - at this stage, students are divided into business groups. Students are free to compose their business group according to their interest in a particular business. Furthermore, students are assigned to develop their business idea and write an overview.

(3) Mini-research - in this phase, students are asked to research the business area they will enter. Students conduct mini-research by observing archival data, related business trends, analysis of their competitors, and brief surveys or interviews with business actors and targeted customers. The mini-research technique refers to the concept of market segmentation analysis in business planning.

(4) Project implementation - at this stage, students are assigned to carry out all the steps of their business plan. Project implementation proceeds step by step, according to the scaffolding of the teaching material. The business planning phase refers to the business model canvas (BMC) technique.

(5) Peer review - this stage is held every week after the presentation process takes place. Students from other groups are allowed to provide responses and input for improving the presenter's business concept. This peer review aims to knowledge confirmation, idea testing, and maturation of business conceptions.

(6) Development of the paper - the paper referred to a complete business plan document. At this stage, the business group already has product specifications, measurable market segmentation, targeted marketing strategies, the business's organizational structure and a clear division of tasks, financing and profit-sharing plans, and future business projections.

(7) Business plan competition - students are asked to participate in a business plan competition. The business group that wins the contest will get maximum value appreciation on the business plan course. Groups that did not succeed in the competition will be assessed according to their business plan document and presentation quality.

Research method

Research approach and participants

This study used a quasi-experimental method to capture the phenomenon from the research subject. Experimental study is capable to show causal relationships in behavioral research because it captures actual behavior demonstrated by the research subject (Kerlinger, 1966). The experimental design in this study was a field experiment with treatments applied to actual learning in the field (Creswell, 2012; Nahartyo, 2012). The subjects in this study consisted of experimental group and the control group. The experimental and control subjects were students from the accounting and management departments. According to the suitability of the SME project's field, the experiment was applied to the business plan course. In the control group, the students undertook business plan courses, with literature studies referring to textbooks and academic journals, but without any projects.

Data collection and research instruments

This study collected the data before (pre-test) and after (post-test) treatment for the experimental group to analyze behavior changes within the sample, and post-test only for the control class to examine behavioral differences between the group (Creswell, 2012). Furthermore, to control any theoretical assumptions, this study evaluated the effectiveness of the manipulation on the experimental subjects. The evaluation was conducted by observing students' perceptions of their learning performance. Theoretically, PBL will improve the students' academic performance (Blumenfeld *et al.*, 1991; Panicker and John, 2021). That perception was collected using questionnaires in conjunction with the post-test testing of the experimental group.

The instrument to measure student engagement was adopted from Reeve and Tseng (2011), while the instrument of perception of academic performance was adapted from Nayak (2018). These instruments were translated and adapted according to the research objectives. Face validity was applied by involving two experts and two subject representatives to review the suitability between the prospective respondents' perceptions and the research objective. Furthermore, the instrument was inputted into the online platform, so the students could access it effectively and efficiently.

Data analysis

This study asked two research questions. Therefore, we performed quantitative and qualitative analyses to answer those questions. Quantitative analysis was conducted to measure the effect of the SME projects on student engagement. The differences in student engagement responses between the experimental and control groups, and the students' perceptions of their academic performance would indicate the effect of the SME project on student engagement. We used the one-way ANOVA and descriptive statistics for quantitative data analysis. Qualitative analysis was conducted to describe how the SME project's design effectively improved student engagement in the online learning environment. Qualitative data were analyzed using open coding to investigate the students' learning experiences during the SME project. That experience indicated the factors that made the SME project effective in maintaining student engagement.

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Experimental procedure
The experimental procedure in this study had several stages, which are described as follows:

(1) Sample selection and matching - the experimental procedure began by identifying the students' digital literacy in each subject group to ensure that the samples had the same characteristics. Students with weak digital literacy were excluded from being the subject of observation. Digital literacy is a proxy for the students' readiness to undergo online learning (Sagala *et al.*, 2022).

(2) Instructional planning – the SME project had been designed and planned from the beginning so that it could be programmed in the syllabus. The principles and stages of instructional design refer to theoretical arguments in the literature review. In the control group, regular instructional designs were applied with limited tasks, including: reviewing the literature and concepts from textbooks and academic journals. There were no field projects in the control group.

(3) Treatment - prior the treatment, the experimental subjects were asked to fill out instruments related to their engagement with online learning in the previous semester (pre-test). Furthermore, the lectures were on-going, and the SME project had been implemented. After each lecture was completed, the experimental subjects were asked to fill out the student engagement instrument again (post-test) and the perceptions of their academic performance. The experimental group was also asked to fill in open-ended questions regarding their engagement during the SME project. Meanwhile, the control group was only asked to fill out instruments related to student engagement.

Result
Demography of sample
This study had 107 experimental participants and 105 control participants. In the experimental group there were 22 (21%) males and 85 (79%) females, while in the control group there were 27 (28%) men and 71 (72%) women. Based on the composition, less than 30% of the subjects were men, and the rest were women. Furthermore, in the experimental group, there were 69 (64%) students from the accounting department and 38 (36%) from the management department. Meanwhile, in the control group, there were 60 (61%) accounting department students and 38 (39%) management students. The difference in composition appears in the departmental categories. However, each department had a representative sample involved in the experimental and control groups, and the sample's characteristics were adjusted using the matching technique. The demography of the sample is tabulated in Table 1 below.

Quantitative data
Descriptive statistics. The results of the descriptive statistics are observable in Table 2 below. For the agentic engagement, the mean score of the experimental group was 3.66, with a standard deviation of 0.71. Furthermore, the control group had an average of 2.81 with a standard deviation of 0.67. For behavioral engagement, the experimental and control groups showed a difference in the mean of 4.21 and 3.91, with standard deviations of 0.67 and 0.58. Regarding the emotional and cognitive engagement dimensions, the experimental group had a higher mean score of 3.96 and 3.95, with standard deviations of 0.67 and 0.65. At the same time, the control group had mean scores of 3.68 and 3.71, with standard deviations of 0.61 and 0.54. These findings showed that overall, the experimental group had a higher mean score in all the dimensions. However, the four dimensions did have different distance variability.

Variable			*n*	%
Experimental Group				
Gender		Male	22	21%
		Female	85	79%
			107	100%
Department		Accounting	69	64%
		Management	38	36%
			107	100%
Control Group				
Gender		Male	27	28%
		Female	71	72%
			98	100%
Department		Accounting	60	61%
		Management	38	39%
			98	100%

Table 1.
Demography of sample **Source(s):** Authors' own work

No	Group	Variable	Avg	St. Dev
1	Experimental Group	Agentic Engagement	3.66	0.71
		Behavioral Engagement	4.21	0.67
		Emotional Engagement	3.96	0.67
		Cognitive Engagement	3.95	0.65
2	Control Group	Agentic Engagement	2.81	0.67
		Behavioral Engagement	3.91	0.58
		Emotional Engagement	3.68	0.61
		Cognitive Engagement	3.71	0.54

Table 2.
Descriptive statistics **Source(s):** Result of SPSS 26 (modified by authors)

One-way ANOVA test. The results of the one-way ANOVA test were observed by observing the *p*-value at <5% (p-value <0.05). The results found that student engagement in the experimental group was significantly different to that in the control group, in all four dimensions. Students who received learning using the SME project experienced higher agentic engagement, behavioral engagement, emotional engagement, and cognitive engagement during the online learning process than students who did not receive the SME project's learning material. It indicates that SME project positively influenced the students' engagement; these conditions indicated that the experimental group had a higher agentic engagement in online learning environment. The results of the one-way ANOVA test can be reviewed in Table 3.

Students' perceptions of their academic performance. The students' perceptions were measured by observing the tendency of their responses to decrease in scores, participation,

No.	Dependent variables	F	Sig.
1	Agentic Engagement	71.021	0.000
2	Behavioral Engagement	11.297	0.001
3	Emotional Engagement	8.711	0.004
4	Cognitive Engagement	7.345	0.007

Table 3.
Result of one-
way ANOVA **Source(s):** Result of SPSS 26 (modified by authors)

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and performance in assignments, due to the implementation of the SME project. These perceptions were tabulated according to the range of responses obtained from the students, based on a 5-point Likert scale. The tabulation results are shown in Table 4. According to the standardized score, the perception related to the decline in grades was 40.56, the perception related to the decline in participation was 41.31, and the perception related to the decline in task performance was 38.5. Referring to these findings, only a tiny proportion (<15%) of students agreed that their academic performance had decreased. In comparison, most (>70%) students did not agree that their academic performance had decreased due to the implementation of the SME project.

Qualitative data
To collect more valuable data, the respondents were given open questions about their testimony regarding the lectures during the SME project. The questions asked were "Please describe your desire to participate in the class to confirm your (1) curiosity, (2) enthusiasm and motivation, and (3) connection to theoretical and practical knowledge during the SME project." The data obtained were analyzed using the open coding method, by observing the similarities, differences, patterns, and themes discussed by students in their comments (Strauss and Corbin, 1998). Based on this method, the responses were classified into five positive response themes, namely (1) field experience; (2) freedom of expression; (3) challenging curiosity; (4) future expectations; (5) space for discussion. Furthermore, there were also negative responses from the students, which were classified into a negative response theme. Example of students' responses to each themes are presented in Appendix 1, Appendix 2, Appendix 3, Appendix 4, Appendix 5, and Appendix 6.

In the first theme (*field experience*), the students reported that they felt the SME project was valuable because it helped them connect theoretical knowledge to practical knowledge. They felt they were getting practical experience in the real world. With this experience, they found more questions and issues to be discussed and resolved, thus forcing them to learn more. Furthermore, in the the second theme (*freedom of expression*), the students revealed that they had the freedom to imagine the business to be developed. Students felt empowered to make decisions to determine their business strategies. They desired to try new things in the SME project, which motivated them to discuss, express opinions, and participate in their discussion groups. In the third theme (*challenging curiosity*), students stated they felt challenged by the demands of developing business ideas. They were also challenged by questions asked by their peers, or even by their own questions. They felt challenged because they must present their business ideas and how their business plan would be implemented. These challenges encouraged students to ask questions, discuss, and participate in class. In

No.	Items/Questions	SD	D	N	A	SA	Avg	St. Score (0–100)
				Response				
1	My score is decreasing in comparison to other subjects due to the implementation of the SME project	48 45%	31 29%	13 12%	7 7%	8 7%	2.03	40.56
2	My participation in class discussions is decreasing due to the implementation of the SME project	44 41%	32 30%	17 16%	8 7%	6 6%	2.07	41.31
3	I cannot finish my task on time due to the implementation of the SME project	53 50%	30 28%	10 9%	7 7%	7 7%	1.93	38.5

Note(s): SD: Strongly Disagree; D: Disagree; N: Neutral; A: Agree; SA: Strongly Agree
Source(s): Authors' own work

Table 4.
Students' evaluation of their academic performance after treatment

the fourth theme (*future expectations*), the students expressed that although they could not be actualized right now, the business ideas or expertise they get from the SME project can be helpful in the future. Some students felt that the SME project task was challenging, but their awareness compensated for the difficulty and that the knowledge and expertise gained would be helpful in the future. In the fifth theme (*space for discussion*), students expressed that there were afraid of asking unqualified questions, or asking about something they misunderstood. However, the students reported that they felt more comfortable discussing things with their colleagues in an informal setting in their business group. In other conditions, some students felt they needed time to think and learn what had been discussed in class, so they often delayed participating. The available discussion rooms allowed students to get a variety of new information, expand their mindset, and learnt to express opinions.

The final theme is the *negative response*. As reported by the students, several obstacles were found, especially related to network constraints during virtual discussions, and the slow responsiveness of group members. Besides that, some students also stated that they chose to be passive, as this was their habit in other classes. Students also stated that passive discussions were usually due to some students being embarrassed, or afraid of being wrong, when expressing their opinions. Therefore, there were at least three conditions to describe negative response theme, namely (1) obstacles due to the network, which tended to be unstable during the discussions; (2) constraints due to uncooperative group members, and (3) constraints due to internal incentives that do not change, even though the information given is designed with project assignments in mind.

Discussion

This study found that the SME project positively affected all four dimensions of student engagement, which are: agentic engagement, behavioral engagement, emotional engagement, and cognitive engagement. The SME project gives students the responsibility to develop their own business plans. These conditions require students to initiate their learning actions with intense energy and concentration to complete their tasks well (Skinner and Belmont, 1993). The SME project also requires each student to be physically and psychologically present, by implementing a collaborative design that generates social demands through the feedback from any discussions that occur in the group (Axelson and Flick, 2010; Reeve and Tseng, 2011). The students should actively present business ideas, confirm their understanding by asking questions, and provide feedback on their peers' questions. The constructive involvement of students while working on the SME project shows that they are experiencing learning engagement.

Based on the qualitative data, some students were reluctant to express their opinions in class because they worried they would make inappropriate statements. However, they also reported that the discussion space in small groups made them feel more comfortable and free to discuss matters. The informal discussion was found to foster learning dynamics, and support constructive discussions involving every group member. The discussion atmosphere in small groups probably reduces the pressure of embarrassment due to expressing incorrect or inappropriate opinions that makes the students feel more comfortable. In line with Nguyen *et al.* (2016) and Sagala *et al.* (2022), an informal learning atmosphere makes students more comfortable in expressing opinions and discussing things. The situation shows that the students experience agentic engagement.

The qualitative data also shows that the students felt interested because they could relate textual knowledge to real life, and believe that the knowledge gained would be helpful in the future. That "confirmation of understanding and expectations" turned out to be the main attraction for the students to actively work on the SME project. They engaged themselves and participated in completing assignments because they were interested in practicing their

knowledge and believed the learning experiences would be helpful, if not now, then later in the future. In this case, the students' awareness of future benefits stimulates their behavioral and cognitive engagement. Their self-awareness is activated through project assignments which in turn help them to self-regulate, so they can study independently (Bandura, 1988). This situation is vital for online learning, which has limited learner-lecturer interaction regarding social attendance and learning duration. Those limitations could be replaced by intense learner-learner interactions in small groups and learner-content interactions during projects (Kennedy, 2020; Oluwajana *et al.*, 2021). If learner-learner interactions within a group are classified as behavioral and emotional engagements, then learner-content interactions during project work lead to cognitive and agentic engagement (Kennedy, 2020; Reeve and Tseng, 2011).

Furthermore, qualitative findings also indicate that the students felt their curiosity was challenged to discover many things during the SME project. The freedom to develop an idea becomes a stimulant for a positive emotional tone, which is demonstrated through enthusiasm, and pleasure, by the students (Skinner and Belmont, 1993; Wang and Kang, 2006). The students' positive emotional tones, in turn, become a determinant of their active participation throughout the project's completion (Groccia, 2018). This finding confirms that students experience emotional engagement due to the implementation of the SME project.

Nevertheless, the result indicates several constraints that the students experienced during the project: (1) problems due to the unstable network during discussions, (2) constraints due to uncooperative group members, and (3) constraints due to internal motives that do not change even though learning is designed with project assignments. The first obstacle is unavoidable, due to the geographical conditions and infrastructure of the internet network in Indonesia, which is not well established in all the regions. If this obstacle occurs during discussions, it will upset the learning process. In the learning design, this condition could be replaced by discussions in chat forums. Chat forums can still facilitate interactive discussions in text form. The quality of the interaction is probably different from discussions in virtual meetings, but it can still facilitate two-way communication between learners to manage engagement. The second and third obstacles are in the context of the same problem, namely the weak internal drive of some students, which interferes with the quality of learning of their other colleagues and themselves. Stimulating their internal drivers is challenging. In this case, university teachers should identify and consider techniques to stimulate the students' internal motivation and curiosity through trigger questions, scaffolding, or gamification. Furthermore, university teachers need to understand their students' interests, and promote projects from their point of view. To overcome these problems, further studies are needed to identify students' interests, talents, motivations, learning styles, and intelligence criteria. The learning design would become more effective for teaching students by addressing specific problems with appropriate treatments. The findings of this negative response will undoubtedly be an insight into further research.

Implication

This study has implications for how lecturers design online learning to maintain student engagement in higher education. We propose critical aspects that online course designers should consider to support PBL in the online environment, including 1) collaborative learning, 2) connection with field practice and valuable future benefits, 3) learning challenges, 4) convenience of discussion, 5) freedom of creation, and 6) controlling student characteristics. Overall, other learning interactions must compensate for online learning that lacks interaction. This interaction can be obtained through discussions in small groups and optimizing collaborative learning (Kennedy, 2020; Oluwajana *et al.*, 2021). Furthermore, the lecturers' challenge is producing constructive discussions involving all group members. For

this reason, lecturers must carefully develop task designs referring to the aspects of activities that are expected to appear in the discussion (Lu and Churchill, 2014).

This research found essential elements from the student's point of view that encourage them to be engaged in the learning process. Learning designers and university teachers should consider those findings to design future PBL. First, the assignment should help students connect their knowledge to actual practices and help them realize that the knowledge they gain through project assignments will be helpful to them in the future (Sarkio *et al.*, 2023). The suitability of knowledge with basic needs in the field, and students' awareness of the benefits of that knowledge, effectively encourages them to participate in learning (Geitz *et al.*, 2023; Sarkio *et al.*, 2023). Second, ensure that PBL can provide learning challenges for the students. These challenges can be a solid impetus to complete assignments well with competitive results. Third, facilitate a convenient learning environment. Learning designers and teachers must realize that students need a comfortable and stress-free environment to express opinions and accept the views of others. This relaxed atmosphere must be distributed in a way that is based on the discussion environment and the topics discussed. Finally, the proposed project should be aligned with the learning objective. Learning designers and teachers should be able to connect and adjust a student's chosen project with the targeted skills that he/she wants to develop from the related course.

Furthermore, this study found several obstacles to implementing the SME project. These constraints have implications for a more careful PBL design, mainly related to the lecturers' mastery of the students' characteristics, interests, motivation, learning styles, and intelligence criteria for designing advanced approaches. The critical issue that learning designers and university teachers must pay attention to is that the learning design should facilitate a deep learning process. This is the most challenging part, as some students lack internal drive. Learning designers should consider students' interests, practical trigger questions, gamification, self-determination learning, and hot news or cases to stimulate their curiosity and participation. Meanwhile, controlling the quality of the infrastructure is an additional aspect that lecturers must consider to facilitate conducive online learning.

Conclusion

This study aims to answer the following questions: (1) Does the SME project empirically affect student engagement in the online learning environment? (2) How is the SME project's design effectively affecting students' engagement in the online learning environment? To answer these questions, this study adopted an SME project design from a previous study (Sagala and Effiyanti, 2019) and refined it to fit the online learning environment and business studies field. Refinement is done by adjusting the PBL design to the online learning environment to control student engagement. The results of this study indicate that the SME project has a positive effect on the four dimensions of student engagement, namely agentic engagement, behavioral engagement, emotional engagement, and cognitive engagement. Furthermore, the qualitative data analysis found that student engagement occurs due to at least five conditions obtained by them from the SME project: field experience, freedom of expression, challenging curiosity, future expectations, and space for discussion. The implementation of the SME project also had some negative responses from students related to (1) unstable network during discussions; (2) uncooperative group members; and (3) lack of internal motivation.

These studies contribute to adding the insight of practical knowledge related to the operationalization of PBL in higher education, especially for online learning. Likewise, learning conditions differ for each subject, the area of study, culture, and region. Further research must adapt and modify the related criteria according to certain learning materials, course subjects, and research subjects. Research that concentrates on specific approaches to

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overcome learning constraints will undoubtedly provide valuable benefits in optimizing the effectiveness of PBL. This research contributes to certain strategic aspects that must be considered when designing PBL for higher education. Further research is needed to optimize the PBL design for SME projects, develop PBL designs for other fields, and solve the stagnation of students' motivation when learning in higher education.

This study has several limitations. First, the SME project was specifically designed for business students with SME as the subject of the project. Therefore, the applicability of SME projects is limited. The application of a course oriented toward a big company would need further adjustment and refinement. Second, the project focuses on students' engagement during synchronous online learning programs. Designs for blended, hybrid, or asynchronous distance learning are probably different. Further research in different online learning settings is significantly needed. Third, this study does not explicitly address the circumstances where students lack internal motivation. Therefore, further research could specifically investigate this issue by exploring and examining students' characteristics, practical trigger questions, gamification, self-determination designs, and cases that stimulate their curiosity and participation. Future research could consider a qualitative inquiry to gain a deeper understanding of students' internal drivers and develop and design research to address that issue.

References

Adarkwah, M.A. (2021), "I'm not against online teaching, but what about us?: ICT in Ghana post Covid-19", *Education and Information Technologies*, Vol. 26 No. 2, pp. 1665-1685, doi: 10.1007/s10639-020-10331-z.

Alawamleh, M., Al-Twait, L.M. and Al-Saht, G.R. (2020), "The effect of online learning on communication between instructors and students during Covid-19 pandemic", *Asian Education and Development Studies*, Vol. 11 No. 2, pp. 380-400, doi: 10.1108/AEDS-06-2020-0131.

Anson, C. (2007), "Warp and weft: reflections on the art of communication weaving", *Sustaining Excellence in 'Communicating across the Curriculum': Cross-Institutional Experiences and Best Practices*, Cambridge Scholars Publishing, Newcastle upon Tyne, pp. 2-18.

Aschenberger, F.K., Radinger, G., Brachtl, S., Ipser, C. and Oppl, S. (2023), "Physical home learning environments for digitally-supported learning in academic continuing education during COVID-19 pandemic", *Learning Environments Research*, Vol. 26 No. 1, pp. 97-128, doi: 10.1007/s10984-022-09406-0.

Axelson, R.D. and Flick, A. (2010), "Defining student engagement", *Change: The Magazine of Higher Learning*, Vol. 43 No. 1, pp. 38-43, doi: 10.1080/00091383.2011.533096.

Bandura, A. (1988), "Self-regulation of motivation and action through goal systems", *Cognitive Perspectives on Emotion and Motivation*, Springer Dordrecht, Berlin, pp. 37-61.

Bell, S. (2010), "Project-based learning for the 21st century: skills for the future", *The Clearing House*, Vol. 83 No. 2, pp. 39-43, doi: 10.1080/00098650903505415.

Blumenfeld, P.C., Soloway, E., Marx, R.W., Krajcik, J.S., Guzdial, M. and Palincsar, A. (1991), "Motivating project-based learning: sustaining the doing, supporting the learning", *Educational Psychologist*, Vol. 26 Nos 3-4, pp. 369-398, doi: 10.1207/s15326985ep2603&4_8.

Carini, R.M., Kuh, G.D. and Klein, S.P. (2006), "Student engagement and student learning: testing the linkages", *Research in Higher Education*, Vol. 47 No. 1, pp. 1-32, doi: 10.1007/s11162-005-8150-9.

Chiu, T.K. (2022), "Applying the self-determination theory (SDT) to explain student engagement in online learning during the COVID-19 pandemic", *Journal of Research on Technology in Education*, Vol. 54 No. sup1, pp. S14-S30, doi: 10.1080/15391523.2021.1891998.

Christensen, R. and Knezek, G. (2017), "Readiness for integrating mobile learning in the classroom: challenges, preferences and possibilities", *Computers in Human Behavior*, Vol. 76, pp. 112-121, doi: 10.1016/j.chb.2017.07.014.

Creswell, J.W. (2012), *Educational Reserach: Planning, Conducting and Evaluating*, 4th ed., Pearson Education, Boston.

Daniel, S.J. (2020), "Education and the COVID-19 pandemic", *Prospects*, Vol. 49 Nos 1-2, pp. 1-6, doi: 10.1007/s11125-020-09464-3.

Deci, E.L. and Ryan, R.M. (1985), "The general causality orientations scale: self-determination in personality", *Journal of Research in Personality*, Vol. 19 No. 2, pp. 109-134, doi: 10.1016/0092-6566(85)90023-6.

Fredricks, J.A., Blumenfeld, P.C. and Paris, A.H. (2004), "School engagement: potential of the concept, state of the evidence", *Review of Educational Research*, Vol. 74 No. 1, pp. 59-109, doi: 10.3102/00346543074001059.

Geitz, G., Donker, A. and Parpala, A. (2023), "Studying in an innovative teaching–learning environment: design-based education at a university of applied sciences", *Learning Environments Research*, Vol. 27, pp. 1-19, doi: 10.1007/s10984-023-09467-9.

Grimm, S.D. and Blazovich, J.L. (2016), "Developing student competencies: an integrated approach to a financial statement analysis project", *Journal of Accounting Education*, Vol. 35, pp. 69-101, doi: 10.1016/j.jaccedu.2016.01.001.

Groccia, J.E. (2018), "What is student engagement?", *New Directions for Teaching and Learning*, Vol. 2018 No. 154, pp. 11-20, doi: 10.1002/tl.20287.

Jones, K. and Sharma, R.S. (2020), "On reimagining a future for online learning in the post-COVID era", *SSRN Electronic Journal*, doi: 10.2139/ssrn.3578310.

Jones, B.F., Rasmussen, C.M. and Moffitt, M.C. (1997), *Real-life Problem Solving: A Collaborative Approach to Interdisciplinary Learning*, American Psychological Association.

Kemdikbudristek, Aditomo, A., Zulfikri, Anggraena, Y., Felicia, N., Ginanto, D.E., Pratiwi, I, Utama, B., Alhapip, L. and Widiaswati, D. (2022), *Kurikulum untuk Pemulihan Pembelajaran*, Pusat Kurikulum dan Pembelajaran Badan Standar, Kurikulum, dan Asesmen Pendidikan Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi, Jakarta.

Kennedy, G. (2020), "What is student engagement in online learning. . . and how do I know when it is there", *Melbourne CSHE Discussion Papers*, pp. 1-6.

Kerlinger, F.N. (1966), "Foundations of behavioral research".

Kirschner, P.A. (2002), "Cognitive load theory: implications of cognitive load theory on the design of learning", *Learning and Instruction*, Vol. 12 No. 1, pp. 1-10, doi: 10.1016/s0959-4752(01)00014-7.

Koh, J.H.L., Herring, S.C. and Hew, K.F. (2010), "Project-based learning and student knowledge construction during asynchronous online discussion", *The Internet and Higher Education*, Vol. 13 No. 4, pp. 284-291, doi: 10.1016/j.iheduc.2010.09.003.

Lu, J. and Churchill, D. (2014), "The effect of social interaction on learning engagement in a social networking environment", *Interactive Learning Environments*, Vol. 22 No. 4, pp. 401-417, doi: 10.1080/10494820.2012.680966.

McCann, L.M. (2016), "Thinking outside the ledger: a visual representation project for accounting students", *The Accounting Educators' Journal*, Vol. 26, pp. 61-84.

Naciri, A., Baba, M.A., Achbani, A. and Kharbach, A. (2020), "Mobile learning in Higher education: unavoidable alternative during COVID-19", *Aquademia*, Vol. 4 No. 1, ep20016, doi: 10.29333/aquademia/8227.

Nahartyo, Ertambang (2012), *Desain dan Implementasi Riset Eksperimen*, UPP STIM YKPN, Yogyakarta.

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Learning

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Nayak, J.K. (2018), "Relationship among smartphone usage, addiction, academic performance and the moderating role of gender: a study of higher education students in India", *Computers and Education*, Vol. 123, pp. 164-173, doi: 10.1016/j.compedu.2018.05.007.

Nguyen, T.H., Charity, I. and Robson, A. (2016), "Students' perceptions of computer-based learning environments, their attitude towards business statistics, and their academic achievement: implications from a UK university", *Studies in Higher Education*, Vol. 41 No. 4, pp. 734-755, doi: 10.1080/03075079.2014.950562.

Oliver, M. (2016), "What is technology", *Wiley Handbook of Learning Technology*, John Wiley & Sons, New Jersey, pp. 35-57.

Oluwajana, D., Adeshola, I. and Clement, S. (2021), "Does the use of a web-based collaborative platform reduce cognitive load and influence project-based student engagement?", *Current Psychology*, Vol. 42 No. 10, pp. 1-14, doi: 10.1007/s12144-021-02145-0.

Ong, S.G.T. and Quek, G.C.L. (2023), "Enhancing teacher–student interactions and student online engagement in an online learning environment", *Learning Environments Research*, Vol. 26, pp. 681-707, doi: 10.1007/s10984-022-09447-5.

Panicker, R.C. and John, D. (2021), "Fully remote project-based learning of hardware/software codesign", *2021 IEEE Frontiers in Education Conference (FIE)*, pp. 1-5.

Reeve, J. and Tseng, C.-M. (2011), "Agency as a fourth aspect of students' engagement during learning activities", *Contemporary Educational Psychology*, Vol. 36 No. 4, pp. 257-267, doi: 10.1016/j.cedpsych.2011.05.002.

Sagala, G.H. and Effiyanti, T. (2019), "SME project: a method to encourage interpersonal skills among pre-service accountant", *Journal of Applied Research in Higher Education*, Vol. 12 No. 5, pp. 883-895, doi: 10.1108/jarhe-04-2019-0097.

Sagala, G.H., Hasibuan, A.F. and Sriwedari, T. (2022), "Readiness, acceptance, and social presence in full online learning", *Jurnal Kependidikan: Penelitian Inovasi Pembelajaran*, Vol. 6 No. 1, pp. 68-79, doi: 10.21831/jk.v6i1.44970.

Sarkio, K., Korhonen, T. and Hakkarainen, K. (2023), "Tracing teachers' perceptions of entanglement of digitally-mediated educational activities and learning environments: a practice-oriented method", *Learning Environments Research*, Vol. 26 No. 2, pp. 469-489, doi: 10.1007/s10984-022-09442-w.

Sim, S. P.-L., Sim, H. P.-K. and Quah, C.-S. (2021), "Online learning: a post covid-19 alternative pedagogy for university students", *Asian Journal of University Education*, Vol. 16 No. 4, p. 137, doi: 10.24191/ajue.v16i4.11963.

Skinner, E.A. and Belmont, M.J. (1993), "Motivation in the classroom: reciprocal effects of teacher behavior and student engagement across the school year", *Journal of Educational Psychology*, Vol. 85 No. 4, pp. 571-581, doi: 10.1037//0022-0663.85.4.571.

Strauss, A. and Corbin, J. (1998), *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*, 2nd ed., Sage Publications, California.

Sun, Y., Strobel, J. and Newby, T.J. (2017), "The impact of student teaching experience on pre-service teachers' readiness for technology integration: a mixed methods study with growth curve modeling", *Educational Technology Research and Development*, Vol. 65 No. 3, pp. 597-629, doi: 10.1007/s11423-016-9486-x.

Thomas, J.W. (2000), "A review of research on project-based learning".

Thomas, W.R. and MacGregor, S.K. (2005), "Online project-based learning: how collaborative strategies and problem solving processes impact performance", *Journal of Interactive Learning Research*, Vol. 16 No. 1, pp. 83-107.

Wang, M. and Kang, M. (2006), "Cybergogy for engaged learning: a framework for creating learner engagement through information and communication technology", *Engaged Learning with Emerging Technologies*, Springer Dordrecht, Berlin, pp. 225-253.

Wu, S.Y., Hou, H.T., Hwang, W.Y. and Liu, E.Z.F. (2013), "Analysis of learning behavior in problem-solving-based and project-based discussion activities within the seamless online learning

integrated discussion (SOLID) system", *Journal of Educational Computing Research*, Vol. 49 No. 1, pp. 61-82, doi: 10.2190/ec.49.1.c.

Zen, Z., Ariani, F. and Syamsuar (2022), "Academic achievement: the effect of project-based online learning method and student engagement", *Heliyon*, Vol. 8 No. 11, e11509, doi: 10.1016/j.heliyon. 2022.e11509.

Zhang, K., Peng, S.W. and Hung, J.L. (2009), "Online collaborative learning in a project-based learning environment in Taiwan: a case study on undergraduate students' perspectives", *Educational Media International*, Vol. 46 No. 2, pp. 123-135, doi: 10.1080/09523980902933425.

Appendix 1

No.	Student comments (excerpts)
1	" …, I desire to discuss issues that are in line with the reality or market conditions of SME at present."
2	"… because it is implemented in our daily activities."
3	"… SME project provide more extensive knowledge because we are required to learn about existing SME, and this provides a broader experience."
4	"I am very interested in asking questions or expressing opinions …, because this lecture directly placed me into real life …."
5	"My curiosity is even greater with the project task because there is more practice in the real world. This raises more questions in my mind, …"
6	"When I ask or express my opinion during the SME project lectures, I can immediately understand because this SME project is directly put into practice, …"

Table A1.
Field Experience

Source(s): Authors' own work

Appendix 2

No.	Student comments (excerpts)
1	" …, it helps students in exploring the business they like."
2	" …, we are given the free space to express and explain what we think; even though it is sometimes imaginative, it becomes a gateway to introduce something new and innovative …"
3	" …, I have become more active in exploring knowledge because I am doing what I like and doing something tangible, … to help other people who want to build their businesses."
4	"I desire to ask questions or express opinions because I want to try something new regarding SME."
5	"… because we are required to be creative and innovative in responding to all matters relating to SME, …"
6	"My curiosity certainly makes me continue to explore more deeply about SME."

Table A2.
Freedom of Expression

Source(s): Authors' own work

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Appendix 3

No.	Student comments (excerpts)
1	" . . ., curiosity will increase, and this leads to questions to find solutions. If there are no projects, maybe just reading a few trusted sources will be enough."
2	"I feel pleased because I can finally release my curiosity."
3	" . . . raise more questions and curiosity than without project assignments."
4	"Everyone has their own curiosity; if there are interesting and exciting things, it provides broader insight because ideas are exchanged."
5	"I feel that we are more challenged to discuss SME project problems . . ., because there is much more information to learn and much more work to do."
6	" . . ., because I want to know the strategies, constraints, and operational aspects of the SME we benchmark."
7	" . . ., it suddenly seems that many things can be done. Sometimes I hesitate and do not dare to run it, but I try to follow it out of curiosity."

Source(s): Authors' own work

Appendix 4

No	Student comments (excerpts)
1	". . . because they make a plan that will be done for the future."
2	" . . ., I think that in the future it is essential to understand or know what SME are."
3	" . . ., even though it is difficult, but it will be useful in the future."
4	"I am delighted to play an active role in the SME project and increase my knowledge in the future."
5	"When we graduate and are faced with difficulties applying for a job, this knowledge could be used to run our own businesses."
6	" . . ., If it is successful, it will produce promising opportunities, because we get the foundation to be young entrepreneurs."
7	"I certainly have many questions to discuss to increase my understanding of business. Because this SME project will help students to create an idea or work as they dream."

Source(s): Authors' own work

Appendix 5

No.	Student comments (excerpts)
1	" . . ., they allow for more discussion than lectures without assignments."
2	"In online lectures, I rarely ask the lecturer anything. However, in group discussions about the SME project, I often ask questions and share ideas with my peers in the group."
3	"I more often express opinions/suggestions when discussing things with friends than during the class, because I need time to think about and understand the project that will take place."
4	"I often ask questions and learn to express opinions when discussing the project with my group of friends, . . . and there will also be no intense question and answer session."
5	"I also feel confused and afraid of making a wrong argument in classroom discussions. So I discuss things more in learning groups."

Source(s): Authors' own work

Appendix 6

No.	Student comments (excerpts)
1	" ..., but because some friends have slow responses when I set up a virtual meeting, so I am a bit lazy to work on the project ..."
2	"I am not very interested in expressing opinions and prefer to listen and accept the opinions of other students, and compare them with my views."
3	"I often have difficulty working on the SME project due to the connection."
4	"My curiosity is only limited to the obligations I have to meet in lectures, ..."
5	"I don't want to ask questions or express opinions ... because usually, my questions or ideas have been put forward by my classmates."
6	" ..., I often prefer not to ask. I do not feel confident enough to ask."
7	" ..., but sometimes students are shy or reluctant to ask questions, so they often make mistakes when working on their projects."
8	"Online lectures and discussions make it difficult for me to do any task or discussion related to the SME project, because the network is not very good."
9	"I have a lot of curiosity ..., but I'm insecure and fear getting critiqued if my question seems irrelevant or wrong."
Source(s): Authors' own work	

Table A6.
Negative Responses
of Student

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