Scaffolded cooperative problem-based approach in entrepreneurship education for vocational preservice teacher

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Abstract

Purpose – This study aims to comprehend vocational preservice teachers’ recalled experiences with the Cooperative Problem-based Learning (CPBL) pedagogical approach in an entrepreneurship course and to reveal how these experiences will impact their future teaching practice. The course under study intends to improve preservice teachers’ entrepreneurial attitudes while equipping them with the skills necessary to create a comparable teaching strategy at school after graduation.

Design/methodology/approach – This study used the semi-structured interview data to triangulate the qualitative data collected from the students’ reflection journals. The data were thematically analyzed whereas the codes with comparable elements were combined, resulting in themes that describe the relevance of scaffolding used with each component of the MUSIC motivational model.

Findings – The results revealed that the student teachers who took part in the research stated in their comments how the scaffolds used in the CPBL sessions impacted their learning. Additionally, they could articulate the experiences that strengthened their perceptions regarding entrepreneurs and entrepreneurship education.

Practical implications – By implementing scaffolded CPBL in entrepreneurship course during the teacher preparation program, the preservice teachers would be able to put a similar approach into the practice of their future teaching profession in guiding students to accomplish instructional outcomes.

Originality/value – This study highlights the importance of providing more innovative practices for entrepreneurship education across teacher preparation curricula to help develop the skills necessary for entering the future profession. The findings also emphasize the value of scaffolding in PBL, including expert, peer and activity design scaffolding. It also completes the body of research indicating that PBL-based

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entrepreneur education instruction can help students develop their entrepreneurial skills and attitudes while also providing a great chance to improve their teaching abilities.

**Keywords** Entrepreneurship education, Problem-based learning, Cooperative learning, Scaffolding, Teacher training program

**Paper type** Research paper

**Introduction**

Realizing the importance of bringing practical experiential learning models and real-world experiences, many educators consider implementing the problem-based approach in entrepreneurship education. This approach provides students the opportunities in solving problems related to entrepreneurial activity while also developing basic entrepreneurship competencies of creativity, critical thinking, leadership, and teamwork (Wee, 2004). Using a case study in a Polytechnic, Tan and Ng (2006) proved the advantage of problem-based learning as effective entrepreneurship pedagogy by a multi-solution problem-solving approach simulating real entrepreneurial situations. Weng et al. (2022) have shown how real-world problem-based learning activities fostered students’ creativity and entrepreneurship.

Findings are intriguing in that adequate exposure to entrepreneurship education in the teacher preparation program has a favorable influence on preservice teachers’ attitudes toward entrepreneurs as well as their content and pedagogical knowledge (Tiernan and Deveci, 2021). Despite the findings that the preservice teachers might not start their own businesses anytime soon, the majority of them said they would be keen to take on the role of an entrepreneur in their prospective employment. Therefore, it is advised that entrepreneurship instructions in teacher education should be connected to the potential teaching profession. The term “teacherpreneur” has been recently introduced to describe teachers who develop and “market” their educational skills in order to find innovative ways to address both specific classroom problems and general education challenges (Berry, 2011).

Reflective teachers with a broad range of experience in creativity and entrepreneurship are essential to motivate students and support them in cultivating an entrepreneurial mindset. Preservice teachers should have the opportunity to experience entrepreneurial learning in their basic training through contemporary pedagogies that involve active learning, real-world experiences, and learning by doing. By presenting open-ended challenges, problem-based learning is regarded as a constructivist teaching method in entrepreneurial education which might also encourage the development of creativity and problem-solving capabilities (Golightly, 2021). As a student-centered strategy, problem-based learning (PBL) could be defined as the learning that results from the process of investigation and solving authentic complex problems (Barrows and Tamblyn, 1980). Further, cooperative problem-based learning (CPBL) is a teaching strategy that incorporates Cooperative Learning (CL) concepts into the Problem-Based Learning (PBL) cycle (Mohd-Yusof et al., 2012). It transforms the role of teachers as they now serve as facilitators (deChambeau and Ramlo, 2017). The correct guiding strategy used by the teachers is a key factor in the success of the application of PBL because poor guidance would result in students showing a lack of interest (Mühlfelder et al., 2016).

To properly apply CPBL as a teaching and learning strategy in entrepreneurship training, teachers must fully comprehend its purpose to cultivate an entrepreneurial mindset in their students, not only concentrate on imparting knowledge about and for entrepreneurship. It is expected that CPBL could develop a culture of entrepreneurship through the acquisition of soft skills that promote and prepare learners to discover, develop, and seize opportunities into account in the collaborating problem-solving process (Ahmad et al., 2021; Arruti and Páñuelos Castro, 2020).

However, teachers may find challenges in incorporating CPBL in entrepreneurial education. Accordingly, it is essential to offer meaningful and relevant experiences of CPBL during their teacher preparation courses to be able to understand what is expected in the future teaching profession. Golightly (2021) underlined the significance of introducing
various forms of scaffolding and their contribution to fostering meaningful learning in the PBL context. To better prepare preservice teachers to become certified professionals, especially in entrepreneurship education, this paper seeks to understand their recalled experiences with the CPBL pedagogical approach using a case study in vocational education. Since the preservice teachers could not have recognized the significance of the scaffolding activities that took place during the learning process, it is critical to understand how the facilitator's actions were perceived. Furthermore, it would discuss how the preservice teachers' experiences with this methodology would influence their intention to implement a comparable strategy in their subsequent teaching practices. To gain this insight, motivation theory serves as a beneficial lens since it allows for the analysis of preservice teachers' experiences in a way that reflects their interest in learning. It is hoped that this study will put a spotlight on potential future initiatives that might be implemented to further take into account CPBL within the entrepreneurial instruction in the teacher training program.

The course under investigation is part of the core curriculum in a vocational teacher preparation program specialized in information technology and mechanical engineering at a state university in Indonesia. The course's main focus is to develop the preservice teachers' entrepreneurship attitudes that will contribute to their personal and professional requirements to facilitate comprehensive entrepreneurship education in their future careers. A detailed lesson plan will be elaborated in the Methodology section.

Research question
In the design and implementation of scaffolded cooperative problem-based learning activities for entrepreneurship course in preservice teacher programs, the following research questions emerged.

1) How did scaffolding transpire during the course and how did preservice teachers perceive the scaffolding strategies concerning their course performance?

2) How did preservice teachers perceive their learning experience could increase their motivation and benefit their future careers?

Methodology
Context of study
The course under study adopted a problem-based approach to facilitate preservice teachers in developing their entrepreneurial attitudes while also having the capability to design a similar approach to teaching entrepreneurship at school later after graduating. Further, the learning activities were designed to be cooperative in nature. In this study, preservice teachers worked on three learning problems designed to be completed in three sessions per problem, each focusing on a specified learning outcome.

The teaching team comprises 3 (three) lecturers (authors #2, #5, and #6) who have experience in Cooperative Problem Based Learning. The lecturers act as class facilitators who developed entrepreneurship-related problems under the course learning outcomes. This study only focused on nine consecutive weeks of CPBL activities which were completed at 90 min per session. Preservice teachers worked in small teams to solve a particular problem within a learning session. As shown in Appendix 1, there were three authentic problems introduced to simulate entrepreneurial situations. Further, it also elaborates detailed learning activities along with relevant scaffolding used for learning problem #1. Learning starts with the facilitator presenting an authentic problem to a small group of students at the outset (Wee, 2004). Preservice teachers formulate an action plan to seek, evaluate and synthesize the information that they need to manage the problem. They engage in reasoning and problem-solving under the guidance of their facilitator. In completing the course's assignments and activities, an
intermediate way has been designed to prepare and orient preservice teachers to achieve higher-order learning outcomes. The design of scaffolds was intended to incorporate motivationally relevant scaffolding to encourage preservice teachers’ motivation in entrepreneurship education. The scaffolds were developed to promote motivation and engagement in entrepreneurship learning through CPBL by establishing task value, promoting mastery goals, providing social interaction, promoting emotion regulation, promoting expectancy for success, and promoting autonomy (Belland et al., 2013). By addressing students’ learning needs, scaffolding, which may be divided into soft and hard types, helps them to develop self-directed learning skills (Lajoie, 2005; Saye and Brush, 2002). Soft scaffoldings are flexible and driven by teacher initiatives to help students when they need it. For instance, a teacher regularly circulates among the student groups, inquiries about their comprehension, and provides comments on the learners’ progress (Simons et al., 2004). Hard scaffolding, on the other hand, consists of static supports created in advance to anticipate learners’ issues relating to a particular job. For example, a teacher might create a scaffold to support students’ strong arguments (evidence-based) during a particular learning stage that is challenging for the majority of students.

Participants
Participants in this study included 69 undergraduate students majoring in informatics education (third year) and 75 students in mechanical engineering education (fourth year). They enrolled in a mixed offline-online Entrepreneur course at a public university in Surakarta, Indonesia. About 29% of the participants were women (n = 41) and the other 71% are men (n = 103). The students are prepared to be teacher candidates for vocational high schools in the fields of informatics and mechanical engineering. Students must accomplish an entrepreneurship course during their teacher preparation program in order for preservice teachers to build the critical competencies needed to enable comprehensive entrepreneurship training for their future personal and professional fulfillment in vocational education. The graduate profile of this teacher development course will be a vocational teacher in a discipline related to mechanical engineering or informatics.

Every participant in this research gave their informed consent. The research objectives, procedures, possible risks, and the participants’ rights to voluntary participation, anonymity, and withdrawal from the study at any time without consequences were all explained in detail to the participants.

Data collection and analysis
In this study, the qualitative data of preservice teachers’ responses were derived through students’ reflection journals which were then triangulated by the semi-structured interview data. Gibb’s reflective cycle was chosen since it structurally provides an approach for documenting, evaluating, and reflecting upon a learning experience. After completing every three sessions, all preservice teachers were encouraged to submit reflective writing following the six steps of Gibb’s reflective cycle (Gibbs, 1988). A semi-structured interview was performed to clarify the responses of randomly selected preservice teachers from the reflection journal in investigating their perceptions and motivation. An interview protocol consisting of some guiding questions (Appendix 2) was designed to ensure reliable data (Smith, 2003). The third and fourth authors who were the colleague lecturers conducted the interviews with ten selected preservice teachers, lasting between 20 and 30 min. The recording was manually transcribed for further analysis with pseudonyms marked for each interviewee.

The data from both sources were thematically analyzed following the procedure of Braun and Clarke (2006). The first step was familiarising with the data during the documentation of preservice teachers’ reflective writing and manual transcription of interview data. The initial codes were then generated based on MUSIC motivational model. Jones (2009) introduced
the MUSIC® Model of Motivation as a framework to examine students’ learning motivation-related perception of a course. This motivation model consists of five principles: empowerment, usefulness, success, interest, and caring which is based on the relation between psychological needs and students’ perceptions and behaviors. In this study, the MUSIC model was chosen as a framework to evaluate how the five components in the model were perceived by the preservice teachers.

Table 1 elaborates on the codes generated for each component of the MUSIC model by considering the themes that emerged from the study of Chittum et al. (2017). Additionally, it illustrates how each MUSIC model element relates to the research questions.

Each preservice teacher’s responses were then coded according to MUSIC model components as described in Table 2. Further, each response was linked to the relevant scaffoldings which were categorized as (1) activity design scaffolding, (2) expert scaffolding, and (3) peer scaffolding (Huang, 2019). It is important to note that for the purposes of authoring this article, preservice teachers’ responses that were originally given in Indonesian were translated into English.

In the next phase, the codes with comparable elements were categorized and later themes were extracted considering the research questions of evaluating preservice teachers’ perceptions of the overall learning experiences that describe the relevance of scaffolding. The final step entailed examination, review, and refinement of the emerging themes before the report was constructed.

**Result**
The activities carried out by the facilitator may not be visible and conceived by the preservice teachers accordingly. Therefore, this research explores preservice teachers’ confirmation of the facilitator’s action that transpired during learning and was perceived as such. Understanding how scaffolding impacts preservice teachers’ learning aids in better conceptualizing its role in the CPBL setting and provides more specific guidance for interventions aimed at improving students’ learning experiences. Table 2 shows the possible implications of scaffolding perceived in some samples of preservice teachers’ perception of the MUSIC model components.

<table>
<thead>
<tr>
<th>Components of MUSIC model</th>
<th>Elaboration</th>
<th>Relation to the research question</th>
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<tbody>
<tr>
<td>Empowerment</td>
<td>M1: had the choice over how to work on the activities</td>
<td>RQ1</td>
</tr>
<tr>
<td></td>
<td>M2: had choice regarding when to participate during the sessions</td>
<td></td>
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<tr>
<td>Usefulness</td>
<td>U1: Learning useful information in the topic</td>
<td>RQ2</td>
</tr>
<tr>
<td></td>
<td>U2: Learning useful information that is useful for future career</td>
<td></td>
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<tr>
<td></td>
<td>U3: Learning useful information for doing something outside of school</td>
<td></td>
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<tr>
<td>Success</td>
<td>S1: Others were helpful during the activities</td>
<td>RQ1</td>
</tr>
<tr>
<td></td>
<td>S2: Success in the activities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S3: enjoy the activities</td>
<td></td>
</tr>
<tr>
<td>Interest</td>
<td>I1: Expressing interest about the course</td>
<td>RQ1</td>
</tr>
<tr>
<td></td>
<td>I2: Expressing negativity about the course</td>
<td></td>
</tr>
<tr>
<td>Caring</td>
<td>C1: Facilitator helps students to be successful</td>
<td>RQ1</td>
</tr>
<tr>
<td></td>
<td>C2: facilitator communicated that they care about</td>
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</table>

**Source(s):** Authors’ own creation/work

<p>| Table 1. Codes generated for each component of the MUSIC model | Scaffolded cooperative problem-based learning |</p>
<table>
<thead>
<tr>
<th>The MUSIC codes</th>
<th>Preservice teachers’ responses</th>
<th>Type of scaffolding</th>
<th>Implications</th>
<th>Theme</th>
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</thead>
<tbody>
<tr>
<td>M1</td>
<td>“We were divided into groups (and instructed to) discuss (in order) to plan the business in as much detail as possible. (This included) the positive and negative aspects of each option as well as the potential and benefits. (I think) this method worked well for the class”</td>
<td>Peer scaffolding: class discussion</td>
<td>The group discussion helps student feel that they can empower to actively participate in the learning process</td>
<td>Small group discussion promote active learning</td>
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<tr>
<td></td>
<td>“In the beginning, we were given questions. We were told this and that, (given) some literature reviews too. The second we were told to watch a video and discuss (the content), and the third we presented”</td>
<td>Facilitator scaffolding: guided questions</td>
<td>The driving questions could stimulate students’ interest and encourage them to select a component of the issue that ties into their proposed solution</td>
<td>Drives greater participation through teacher’s encouragement</td>
</tr>
<tr>
<td>M1</td>
<td>“We explain what entrepreneurship is. Then we were asked one by one what we know about entrepreneurship. Then at that time, I was asked to watch a video in a group discussion and determine what this contribution was for the family, and for society. Then we were also told to look for the attitudes of an entrepreneur, then we were asked to draw conclusions from all the discussion groups of friends and conclude the attitudes of an entrepreneur in the text form”</td>
<td>Activity design scaffolding: template</td>
<td>The offered template helps students work collaboratively to solve an issue by outlining important details</td>
<td>Structuring the lesson with a focus on activities that are relevant to learning outcomes</td>
</tr>
<tr>
<td>M2</td>
<td>“(That is) when the task (assigned) should be completed on time. We have to engage in discussion and (perform) all activities as a team. I believe that’s what motivated us to participate in our groups”</td>
<td>Peer scaffolding: class discussion</td>
<td>The group discussion helps student feel that they can empower to actively participate in the learning process</td>
<td>Small group discussion promote active learning</td>
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</table>

Table 2. Excerpts of preservice teachers’ responses from interviews and self-reflection journal

(continued)
<table>
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<tr>
<td><strong>M2</strong> “... I first filled out my ideas on the (Google) jamboard, then I conveyed my opinion to my friends, “This is my idea, what do you think? Agree or not?” We write it down first on the jamboard, and then we discuss it together during group discussions” (IE6)</td>
<td>Activity design scaffolding: template</td>
<td>The offered template helps students work collaboratively to solve an issue by outlining important details</td>
<td>Structuring the lesson with a focus on activities that are relevant to learning outcomes</td>
</tr>
<tr>
<td><strong>U1</strong> “Through being required to actively engage with (other) students, I was able to get an understanding of entrepreneurship ...” (IE1)</td>
<td>Facilitator scaffolding: support and guidance of facilitator</td>
<td>The facilitator guidance provides explanatory rationales for students achieving the learning outcomes</td>
<td>Drives greater participation through teacher’s encouragement</td>
</tr>
<tr>
<td><strong>U2</strong> “... then I can be inspired by those (entrepreneurial) characters from the study case, (the ways in) how these characters can be applied as an entrepreneur” (ME4)</td>
<td>Facilitator scaffolding: support and guidance of facilitator</td>
<td>The facilitator guidance help students to gain perspective on the subject matter for their future careers</td>
<td>Drives greater participation through teacher’s encouragement</td>
</tr>
<tr>
<td><strong>U2</strong> “It could be (applying the same way of teaching). Because the learning was very active. Make students actively discuss. So you don’t just get bored because the students are also actively seeking to find out, it’s not like the teacher is just giving an explanation” (IE1)</td>
<td>Facilitator scaffolding: support and guidance of facilitator</td>
<td>The facilitator guidance help students to gain perspective on the subject matter for their future careers</td>
<td>Drives greater participation through teacher’s encouragement</td>
</tr>
<tr>
<td><strong>U3</strong> “Entrepreneurial qualities and spirit that must be applied, not only when starting a business, when we are looking for profit, when looking for value in money, but in all activities” (ME5)</td>
<td>Facilitator scaffolding: support and guidance of facilitator</td>
<td>The supports provide explanatory rationales for relevance to current life</td>
<td>Drives greater participation through teacher’s encouragement</td>
</tr>
<tr>
<td><strong>S1</strong> “We discussed with friends, we presented, later we made arguments with each other. Give each other feedback or input. So we were more active in learning” (IE7)</td>
<td>Peer scaffolding: support and help from the fellow group members</td>
<td>The support from the fellow group members emphasizes the value of collaboration over competitiveness</td>
<td>Small group discussion promote active learning</td>
</tr>
</tbody>
</table>

(continued)

Table 2.
<table>
<thead>
<tr>
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<tr>
<td>S2</td>
<td>“The lecturer provided several materials and videos which we asked to analyze. So at first we didn’t know about this, then we were given several videos, some of which we could analyze. At that time we received material about the characteristics of an entrepreneur. At that time we were given a video and divided into groups. After that, we listened and concluded, what is it about the video, the entrepreneurs, what attitudes they have and how they implement them. From there we start to have an idea” (IE9)</td>
<td>Activity design: Reading and guidelines</td>
<td>The videos and clear instructions given help students to understand the course material</td>
<td>Structuring the lesson with a focus on activities that are relevant to learning outcomes</td>
</tr>
<tr>
<td>S2</td>
<td>“For knowledge that is new to me, the entrepreneurial attitude is not only applied when you become an entrepreneur, but for example in other professions you can apply that entrepreneurial attitude” (IE3)</td>
<td>Facilitator scaffolding: feedback and summary</td>
<td>The summary provided helps students highlighted substantive elements of their work</td>
<td>Structuring the lesson with a focus on activities that are relevant to learning outcomes</td>
</tr>
<tr>
<td>S3</td>
<td>“Because our study case was very interesting, we wanted to participate in the discussion. (Thus), even though some of our group members were not people we particularly enjoy, it encouraged all group members to be more active” (ME3)</td>
<td>Activity design: guidelines</td>
<td>The clear guidelines inform students the purposes and requirements of each problem, as well as how each student group member contributes to the execution of the assigned group activities</td>
<td>Structuring the lesson with a focus on activities that are relevant to learning outcomes</td>
</tr>
<tr>
<td>I1</td>
<td>“I think it’s better if you see all (students) active in classes. So everyone (take a role) in discussion” (ME7)</td>
<td>Peer scaffolding: class discussion</td>
<td>The class discussion emphasizes the value of collaboration over competitiveness</td>
<td>Small group discussion promote active learning</td>
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</tbody>
</table>

Table 2. (continued)
Themes were extracted from the data, however, the most relevant themes were nominated as those highly correlated with the research questions. The themes were synthesized from the codes generated taking into account preservice teachers’ opinions regarding the value of scaffolding. For each theme, excerpts from interviews with preservice instructors are displayed; participants are labeled as IE and ME, respectively, to denote their field of study—informatics and mechanical engineering.

**RQ1.** How did scaffolding transpire during the course and how did preservice teachers perceive the scaffolding strategies in relation to their course performance?

In general, the preservice teachers reported engaging in the PBL activities with their peers as described in Table 2 for each MUSIC model component. It indicates that most preservice teachers had positive impressions of the scaffolded PBL activities in entrepreneurship education. The analysis resulted in three themes emerging: small-group discussion promotes active learning among students, teacher encouragement drives greater participation, and structuring the lesson with a focus on activities that are relevant to learning outcomes.

1. Small-group discussions promote active learning among students

As indicated in Table 2, the findings showed that preservice teachers’ participation in group discussions enhanced academic knowledge, learning autonomy, and enjoyment of learning activities. The self-reflection journal and interview transcripts indicate that the peer discussion had a favorable impact on preservice teacher participation. The encouragement of preservice teachers’ active learning appears to be aided by the inclusion of discussion in collaborative learning.

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<tr>
<td>I1</td>
<td>“. . . with variation of (learning) methods, for example using videos, explanations from lecturers, group discussions, it (the lecture) will be easier to understand” (ME3)</td>
<td>Activity design: Reading and guidelines</td>
<td>The videos and clear instructions given help students to understand the course material which lead to enjoyment (situational interest)</td>
<td>Structuring the lesson with a focus on activities that are relevant to learning outcomes</td>
</tr>
<tr>
<td>I2</td>
<td>“Sometimes when the lecture provided videos that were in English, we were between understand and not understand” (IE10)</td>
<td>Activity design: Reading</td>
<td>Prescribed videos should clearly illustrate the authentic setting</td>
<td>Structuring the lesson with a focus on activities that are relevant to learning outcomes</td>
</tr>
<tr>
<td>C1</td>
<td>“The lecturers did not provide any clear instruction. They provided guidelines, objectives, or even boundaries but we were instructed to draw our own conclusions” (IE9)</td>
<td>Facilitator scaffolding: support and guidance of facilitator</td>
<td>The supports provide explanatory rationales for students achieving the learning outcomes</td>
<td>Structuring the lesson with a focus on activities that are relevant to learning outcomes</td>
</tr>
</tbody>
</table>

*Source(s):* Authors’ own creation/work

Table 2.
Some participants spoke more with confidence because of the smaller audience. Communication was said to be more open when participants were working in small groups, allowing them to talk and better grasp what they were doing. Several participants also mentioned experiencing a supportive environment in the group, which is crucial for the satisfaction of participating in the group with the other students.

2. Drives greater participation through teacher’s encouragement

This study offered empirical support for prior studies’ conclusions proving the significance of teachers’ scaffolding in motivating students to take an active role in teamwork. It was asserted that the likelihood that a group member would be observed passively decreased with the proper guidance from the teacher.

3. Structuring the lesson with a focus on activities that are relevant to learning outcomes

Preservice teachers claim that the structures in the form of pre-reading videos, guidelines, and templates offered also have a significant influence. It is said that by presenting essential information, the provided template encourages participants to cooperatively solve the problems in their group. Meanwhile, the participants were assisted in understanding the course material through the videos and clear explanations provided.

**RQ2.** How did preservice teachers perceive their learning experience could increase their motivation and benefit their future careers as a teacher?

This research question focuses on how the learning experience influences preservice teachers in their future careers. The themes emerging are: (1) perceived benefit to a teaching career, (2) anticipate unsuitability for certain teaching practices, and (3) infusing entrepreneurial attitude.

1. The influence of learning experience on students’ motivation and perceived benefit to future teaching careers.

Notwithstanding the fact that the vast majority of participants were unaware of the correlation between both the course and their future careers as teachers, several seventh-semester preservice teachers established a link between their learning experience and their teaching internship experience. Indeed, the participants majoring in mechanical engineering education (ME) had previously joined school internships and are likely to be familiar with real teaching experience.

2. The scaffolding PBL inspires preservice teachers to adopt it in the near future, but anticipate the unsuitability for certain learning approaches.

Despite an inspiration to adopt a similar approach in a future teaching career, preservice teachers perceived that the approach was merely for a cognitive domain, which is not suitable for practical lessons.

3. The PBL strategy incorporates the new idea of an entrepreneurial mindset

Several participants clarified that they believed entrepreneurial competence to be a fundamental skill for all occupations and applied to all aspects of life.
Discussion
The lesson plan in Appendix 1 clearly shows the scaffolding used by the facilitator to ensure the preservice teacher achieves the learning outcome during the entrepreneurship course. The purpose of this study is to ascertain how effectively these scaffoldings were understood by preservice teachers and whether they helped them comprehend their role in the context of CPBL. Additionally, understanding how scaffolding affects preservice teachers’ learning would provide more focused suggestions for interventions intended to improve students’ learning experiences.

The results suggested three scaffolding strategies which mainly perceived by students in enhancing their course performance of small-group discussion, facilitators’ encouragement, and lesson structure. Similar to the findings of Hammar Chiriac (2014), the preservice teachers gained diverse perspectives through discussion and learning from their peers’ ideas. It supports the concept of scaffolding in guiding the movement toward the zone of proximal development as students require assistance from others in learning a concept because they cannot learn everything on their own (Vygotsky, 2017). Group work could encourage knowledge creation and knowledge exchange among group members in cooperative learning (CL) environments through individual contribution and positive interdependence. In the framework of CL, each group member makes a unique contribution to maximize learning and realize a shared objective for the group, hence the success of any one group member depends on the success of the group as a whole (Lange et al., 2016). Being an active participant in group discussions has an impact on preservice teachers’ motivation to learn since they have the opportunity to speak up during discussions to contribute their opinions, thoughts, and experiences.

Wong and Kan (2022) also discover the contribution of small group work in motivating learning initiatives through students’ individual study and peer interaction during discussions. Students were able to learn more deeply when they were given a position that required them to actively engage with the subject, make decisions, and voice preferences (Williams, 2011). Additionally, since other group members realize that the success of the group depends on everyone’s dedication to completing the work at hand, lower-achieving students could be encouraged to perform better (Kim et al., 2018; Simonson, 2014). This is how peer scaffolding could increase students’ responsibility and independence for effective learning.

However, it can be challenging to get all learners involved in discussion activities. When students do not contribute as fully as they can in the cooperative learning (CL) environment, there is a risk of a free-rider issue. The presence of free-rider students who do not fully contribute to the group work is the largest drawback associated with CL (Elmassah, 2017; Joyce, 2010). Since it is the responsibility of the teachers to ensure the group’s success, they must foster a pleasant environment where students actively participate in their group. In a CL context, group member participation is essential since it aids in learning, knowledge construction, and information retention (Janssen et al., 2007; Lange et al., 2016).

Van de Pol et al. (2018) discovered that within the context of small group activities, the teacher’s assistance through scaffolding may relate the teacher-student engagements to succeeding small group-student interactions. Within the CL group, scaffolding has been associated with both increased levels of satisfaction (Zheng et al., 2014) and participation among the group members (Lange et al., 2016). Greater participation in this study may be explained by the group members’ motivation to participate due to the teacher’s encouragement. Without high internal motivation, students tend to be inactive and look for any opportunity to skip assignments. Through scaffolding, the facilitator was perceived to actively determine all students and initiate group dynamics in ensuring the achievement of learning outcomes. Students understood that they were required to work in groups and cooperatively construct the outcome as mentioned in the assignment.
A teacher’s authority over the learning process is reduced in the CPBL environment because the teacher takes on the role of a facilitating tutor, which encourages students to take charge of their own learning (Kim et al., 2018). Students now have a more autonomous learning environment, which is one of the fundamental psychological demands required to increase students’ intrinsic motivation (Ryan and Deci, 2000).

In supporting the soft scaffolding of teacher encouragement, hard scaffolding is required to allow preservice teachers to engage with the problem, enlisting and sustaining students’ interest, in particular at the problem’s initial stages. The “staging activities” allow students to enter and enlist their attention, making it easier for them to follow the activity structure and develop their knowledge and competence (Ertmer and Glazewski, 2019). Such structures offer a template for the group to follow or fill in keeping track of the work, listing learning issues that contain all the concepts that must be understood in order to solve the problem, and reminding the group of what they need to do as an action plan (Hmelo-Silver et al., 2007).

Additionally, by offering direction and embedding expertise, the scaffolding for activity design offers strategic guidance to support students’ accomplishment. It may involve supplementary material that students could access (Ertmer and Glazewski, 2019) or expert information directly offered (Hmelo-Silver et al., 2007). These content scaffoldings are meant to encourage students to grasp various points of view while also supporting knowledge development, argumentation, and debate. When the facilitator inquires students to describe their ideas in order to assist them to develop a causal explanation, students may become engaged in the constructive learning process (Hmelo-Silver et al., 2007). This particular reasoning strategy could scaffold student learning, supporting them as they make sense of their environment and express their thoughts.

This study also revealed how the preservice teachers could relate their learning experiences during this innovative entrepreneurship course to their future teaching professions and real-world situations. The participants said that engaging in the learning activities had given them new insight into applying some pedagogical ideas of the scaffolded PBL approach. As Bosica et al. (2021) showed, preservice teachers could develop their pedagogical competencies in the PBL learning environment. The concern over the adoption of scaffolded PBL in future careers was articulated by participating preservice teachers to the extent that the method is considered a novel strategy for their learning experience. This encouraging finding demonstrates that preservice teachers become aware of the type of learning they are engaging in, resulting in a positive environment for the growth of the skills required to instruct utilizing the PBL approach in their classrooms (Tsybulsky and Munchnik-Rozanov, 2021). Positivity in one’s attitude toward the PBL approach as well as positive emotional experiences during the PBL process (Adanalı and Alim, 2017; Tsybulsky and Munchnik-Rozanov, 2021) could be associated with the development of preservice teachers’ pedagogical competence. This finding extends to the current literature indicating that PBL-based entrepreneur education instruction can help students develop their entrepreneurial skills and attitudes (Fassbender et al., 2022; Tan and Ng, 2006). The PBL approach provides a significant opportunity for teacher development programs to improve their pedagogic abilities which also aligns with the findings from (Hattingh and Killen, 2003; Kharade and Peese, 2014; Martin and Jamieson-Proctor, 2022).

Nevertheless, since numerous published works have demonstrated the effectiveness of this technique in technical and vocational education, the participants’ concerns about using the CPBL strategy for practical-related learning require further examination. For instance, Jabarullah and Iqbal-Hussain (2019) evaluated the implementation of the PBL technique as facilitating greater skill and knowledge acquisition based on the hands-on approach employed in Technical Vocational Education and Training (TVET) courses. It is argued that the PBL approach could support the development of requisite skills that encompass elements
required in the working environment in addition to technical knowledge. The finding is also inconsistent with Monks (2010) that the adoption of PBL in practical application and laboratory work was considered useful and worthwhile for apprentices. This might occur as a result of preservice teachers’ frequent exposure to lecture-based teaching methodologies rather than constructivist learning strategies like CPBL. To ascertain whether and how these potentials might be fulfilled, extensive analysis is required before CPBL is applied in more varied contexts for practical-related learning in TVET courses.

Concerning entrepreneurial behavior which is now more widely acknowledged to emerge in a variety of circumstances, entrepreneurial competencies are essential in the workplace regardless of whether one works as an entrepreneur or in any other profession because they currently have a broader definition than just the abilities related to starting a venture (Joensuu-Salo et al., 2020). To promote learning for, about, and through entrepreneurship in the teaching context, professional teacher competencies are included in the teacher’s ethos and practices. The notion of the entrepreneurial teacher is directly related to universal aspects of entrepreneurship including innovative, collaborative, proactive, opportunity-minded, risk-tolerant, visionary, and self-improvement-oriented (Verboon and Salamon, 2021).

The literature states that PBL emphasizes achieving learning objectives that are closely related to the general characteristics of entrepreneurship. Conceptual knowledge and intrinsic motivation as well as the skills of problem-solving, teamwork, and self-directed learning abilities were identified by Hmelo-Silver (2004) as the primary goals of PBL. Tan and Ng (2006) provided examples of how PBL training helped students develop the typical desirable characteristics needed for entrepreneurs. Therefore, it could be claimed that problem-based learning in teacher preparation programs might well have contributed to fostering preservice teachers’ entrepreneurial attitudes.

Conclusion and recommendation

One of the essential elements of a problem-based learning (PBL) setting is scaffolding. This study aims to comprehend preservice teachers’ recalled experiences with the CPBL pedagogical approach’s scaffolding since the facilitator’s actions may be invisible to the preservice teachers, including how these actions are valuable to the learning. Hence, this study investigates preservice teachers’ validation of the facilitator’s action that occurred during instruction and was understood as such. The results point to the importance of activity design as well as expert and peer scaffoldings. Interactive peer discussion, participation from students and the facilitator, and a well-planned intervention with clear instructions for students all contributed to the evaluation of preservice teachers’ performance in this scaffolded PBL approach. By guiding students to accomplish instructional outcomes through scaffolding in a methodical problem-solving approach, PBL is an effective teaching-learning paradigm for knowledge acquisition and skill development. This finding indicates that the preservice teachers were starting to realize the value of the scaffoldings they utilize in PBL and how important they are to learning.

In addition, the participants reported that taking part in the learning activities had improved their understanding of how to implement some of the scaffolded PBL approach’s pedagogical concepts. The preservice teachers’ apparent adoption of scaffolded PBL in their future professional lives is a result of their perception of it as a cutting-edge learning approach. More investigation is necessary, nevertheless, given the participant’s concerns about applying the CPBL approach to practical learning in fields related to technical and vocational education. This research also completes the body of knowledge indicating that scaffolded PBL-based entrepreneur education instruction can help students develop their entrepreneurial skills and attitudes while also providing a great chance to improve teaching abilities in teacher training programs.
This current study is not without limitations since it did not describe detailed observations of preservice teachers' behavior during CPBL activities. Recognizing the value of participation in the entrepreneurship class, it is crucial to investigate how scaffolding might enhance participation rates and encourage better equality of involvement in group projects. Therefore, future studies may focus more closely on the role that teacher support and peer scaffolding play in advancing student learning. It also will be beneficial to introduce the preservice teachers to the PBL experiences in other practical-related courses during their teacher education. The advantage of the hands-on approach promoted by vocational education and training is expected to be maximized by experiential learning such as PBL.

References


Appendix 1

Learning problem #1: concept and significance of entrepreneurial attitude
There were negative perceptions of a person’s choice for being an entrepreneur. It was believed that an entrepreneur might gain a lower income than an employee. On the other hand, a lack of support from the government and society hinders a conducive environment for entrepreneurship. How do you convince society of the important role of entrepreneurship and entrepreneurial attitude in economic and social development? Provide advice to the Indonesian government on how to nurture entrepreneurial characteristics.

Learning problem #2: Identify business opportunity
The pandemic has impacted many aspects including economics. Bu Ani is a womenpreneur at her 56 age she can become one of the promising suppliers for Rambak Crackers in Supermarket Tangerang. Unfortunately, she must believe that the company has no longer accepted a demand for almost 6 months during Covid 19 which cause no income for her family at all. She then plans to change the business with the remaining savings but she confuses to enter the new market again. All of her employees have been laid off because she can’t stand big operational costs. She has a daughter who is still in the third semester and is good at digital illustration. Bu Ani asks her daughter to find a potential business to sustain the family income. Bu Ani is a really good cook and also an amateur baker but not a good digital marketer. Her savings right now is very limited to only 1 million rupiahs. Now let’s imagine, if you are her daughter. what is your suggestion regarding finding a new business that can survive her family business?

Learning problem #3: creating a business proposal
You are a group of young people who are about to complete your studies. Worrying about the current unemployment rate among graduates, and the challenges in the 4th Industrial Revolution unpredictable working environment, you are considering starting your own business. Furthermore, you and your friends are the kinds of people who would like to explore new things, are highly inquisitive, and would want to have yourself in charge of your life. Being employed would somewhat restrict you from being creative and innovative. Starting your own business would give you so much time for your own, and mostly being able to make you more creative and innovative as it would challenge your every day to come.

In your group, you are required to develop a business model analysis based on team members’ proposed business ideas. These ideas MUST be related to the Sustainable Development Goals (SDGs). It can be a completely new business or an improvement to the current business. The business ideas and plan are to be executed according to the Business Model Canvas.

Table A1. Learning problems and lesson activities in cpbl-based entrepreneurial course (continued)
## Meeting session

1st meeting: team forming, problem identification and team discussion

### Preparation

- Form team of 4–5 members
- Set team norms to ensure that each team appoints roles among members

### Phase 1

- Presents the problem to the students
- Allows students to discuss and re-statement the problem

### Phase 2

- Allows time for the students to identify the key facts
- Encourages students to share their thoughts and generate possible ideas on entrepreneurial attitude

### Phase 2 (cont.)

- Synthesis and elaborate new knowledge by peer sharing and learning
- Request team to formulate solution and prepare presentation

2nd meeting: team discussion, formulate solution

### Phase 3

- Each team visually present solution
- Submission of students’ individual reflection and peer evaluation
- Provides feedback on presentation, peer evaluation and reflection

3rd meeting: presentation and reflection

### Sources:

- Authors’ own creation/work

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Table A1.
Appendix 2

Interview protocol

Instructions
Good morning (afternoon). My name is ___. Thank you for coming. In this interview, I will ask you about your recent experiences during the entrepreneurship course. The purpose is to get your perceptions of your experiences in a course implementing a problem-based learning approach. There are no right or wrong or desirable or undesirable answers. I would like you to feel comfortable saying what you think and how you feel.

Tape recorder instructions
If it is okay with you, I will be tape-recording our conversation. The purpose of this is so that I can get all the details but at the same time be able to carry on an attentive conversation with you. I assure you that all your comments will remain confidential. I will be compiling a report which will contain all students' comments without any reference to individuals.

Preamble/consent form instructions
Before we get started, please take a few minutes to read this preamble (read and sign this consent form) (H and R consent form/preamble.) (After R returns the preamble/consent form, turn the tape recorder on.)

A. Perception
   Q1. What did you learn in the Entrepreneurship course?
   Q2. What were the topics covered in these 3 (three) sessions?
   Q3. Did you observe any innovations in the delivery methods used in the learning process? Please give an example!
   Q4. What was the impact of this teaching approach on your understanding?

B. Engagement
   Q5. How did you and the other students participate during the lecture?

C. Future relevance
   Q6. What are the pros and cons of the approach/method that was taken?
   Q7. When you become a teacher in the future, have you ever imagined using this approach in your teaching delivery?

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