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Examining vocational college student learning needs toward entrepreneurship courses in Southwestern China

Xiaoqing Wang[1], Thanin Ratanaolarn[2*], Jirarat Sitthiworachart[3], Jianming Cui[4]
[1,2,3]School of Industrial Education and Technology, King Mongkut's Institute of Technology Ladkrabang, Thailand; 65036077@kmitl.ac.th (X.W.) thanin.ra@kmitl.ac.th (T.R.) jirarat.si@kmitl.ac.th (J.S.)
[4]School of Humanities and International Studies, Zhejiang University of Water Resources and Electric Power, China; cui_jm@zjweu.edu.cn (J.C.).

Abstract: The present research aimed to study the student learning needs assessments of entrepreneurship courses in vocational colleges of southwestern China to identify students' learning needs based on the perspectives of creativity, openness to experience, project-based blended learning, design thinking, and entrepreneurship courses. The researcher employed a multi-stage sampling method to select a sample size of 400 current vocational students from four regions in southwestern China to participate in this research. The collected data were analyzed using descriptive statistics to determine the means of 15 items. The results showed that the mean values of the items ranged from 3.66 to 4.28, and all items reached at least the need level. Furthermore, respondents strongly agreed on the importance of enhancing openness to experiences and creativity in entrepreneurship courses. Meanwhile, the respondents also indicated the need for project-based blended learning and design thinking as the learning methods to be used in the teaching practices of entrepreneurship. The results of this study are expected to benefit educators in the process of developing new teaching methods and curricula in the field of entrepreneurship education.

Keywords: *Creativity, Design thinking, Openness to experience, Entrepreneurship, Project-based blended learning, Student learning needs.*

1. Introduction

Southwestern China, with its rich cultural heritage, diverse landscapes, and abundant natural resources, offers significant opportunities for entrepreneurial growth. The rise of Industrial Revolution 4.0, driven by technologies such as artificial intelligence, robotics, and the Internet of Things (IoT), is reshaping the labor market by replacing routine tasks and creating uncertainties for traditional career paths [1, 2]. As job security and steady promotions become less predictable, entrepreneurship has become increasingly essential, especially as vocational colleges play a critical role in preparing students for a rapidly changing workforce [3]. A student needs survey is essential to identify and understand the evolving learning needs and competencies required by students in entrepreneurship courses. By gathering insights into students' preferences and needs, particularly in areas such as creativity, openness to experience (OE), project-based blended learning (PjBBL), and design thinking, educators can tailor their teaching methods to better engage students and help them develop the skills necessary to thrive in entrepreneurial ventures. Creativity, a core aspect of entrepreneurship, is crucial for driving innovation and generating new ideas, while OE enables students to adapt to new challenges and embrace uncertainty [4, 5]. Project-based blended learning, which integrates real-world problems into the curriculum, encourages collaboration and critical thinking, providing students with practical, hands-on experiences that are vital for future success in the entrepreneurial world [6]. Similarly, design thinking,

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* Correspondence: thanin.ra@kmitl.ac.th

with its focus on empathy, ideation, and iterative problem-solving, fosters innovation by helping students approach challenges from multiple perspectives [7]. This study specifically aims to explore the learning needs of students in southwestern China, enabling educators to adjust course content, teaching strategies, and learning environments with students' evolving demands, to enhance vocational college students' learning outcomes and prepare them for success in an entrepreneurial career.

2. Literature Review

2.1. Creativity

Creativity is a core element of entrepreneurial success, and its development is particularly important for vocational students in entrepreneurship education. Defined as the ability to generate original, useful, flexible, and adaptable ideas, creativity plays a critical role in helping vocational students excel in competitive markets. The ability to think creatively is essential for students to innovate, adapt to changing environments, and solve complex problems, making it indispensable for their entrepreneurial success [8]. Vocational students need to harness creativity to develop the skills necessary to thrive in their chosen fields and bring fresh ideas to industries that are constantly evolving. For vocational students, fostering creativity is essential for identifying new opportunities and differentiating themselves in the marketplace. In vocational education, students often receive training for specific trades, and creativity enables them to break out of traditional molds, find innovative solutions, and develop groundbreaking products or services that meet changing consumer demands. This creativity allows students to stay relevant in a fast-paced world, where industries constantly evolve and require new ideas and approaches to remain competitive [9]. Students' needs for creativity extend beyond traditional skills; they need the ability to think critically and adapt quickly to emerging challenges and opportunities in their fields.

Creativity also enhances vocational students' ability to embrace risk and challenge conventional practices, key traits for entrepreneurs who want to disrupt industries and bring about positive change. In vocational education, fostering a creative mindset enables students to approach their work with a sense of possibility and openness to innovation. This mindset helps them stay agile in their careers and cultivate a culture of continuous improvement, which is crucial for sustaining long-term success in entrepreneurship. Creative students are better equipped to anticipate market shifts, adapt to technological advancements, and continuously refine their skills to stay ahead in a competitive environment [10]. Furthermore, creativity in entrepreneurship education is integral to enhancing communication and collaboration with stakeholders. Vocational students with strong creative skills are able to express their ideas more effectively and engage with customers, partners, and mentors in ways that build trust and foster collaboration. By developing creative problem-solving skills, students can transform setbacks into learning opportunities, enabling them to navigate failure and develop resilience—a vital trait for entrepreneurial success. These skills help students bounce back from challenges, refine their approaches, and maintain a positive outlook, even in the face of adversity [11]. Another crucial aspect of creativity is its role in developing leadership skills among vocational students. Creative students can lead by example, inspiring their peers, motivating teams, and cultivating a culture of innovation within their entrepreneurial ventures. By nurturing creativity, students can better attract new opportunities and create environments that encourage experimentation, collaboration, and the sharing of ideas. These leadership qualities are essential for entrepreneurial success, as they help students navigate the complexities of managing a business, building a team, and engaging with the wider business community [10].

In conclusion, creativity is an indispensable component of entrepreneurship education for vocational students, as it unlocks their potential to innovate, solve real-world problems, and shape the future of industries. By fostering creativity, vocational students are equipped to adapt to changing market conditions, embrace risk, differentiate themselves in their trades, and lead with innovative ideas. Nurturing creativity in entrepreneurship education not only meets students' needs but also empowers

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them to drive innovation, enhance their entrepreneurial skills, and build successful businesses in competitive and evolving markets.

2.2. Openness to Experiences (OE)

Openness to experience, characterized by curiosity, creativity, and a willingness to embrace new ideas and experiences, is a vital trait that directly impacts vocational students' needs in entrepreneurship education. For vocational students, cultivating this trait is critical as it fosters the flexibility and adaptability necessary to navigate the challenges of entrepreneurship. Students with high levels of openness tend to be introspective and engage in intellectual exploration, allowing them to consider multiple perspectives. This openness helps them think critically and creatively, which is essential for solving complex problems, identifying innovative solutions, and recognizing business opportunities [5, 12].

Vocational students need to develop OE in entrepreneurship education, as it enables them to think beyond conventional methods and traditional vocational training. As the business world is dynamic and constantly changing, students must be able to embrace uncertainty, adapt to evolving technologies, and navigate shifting market demands. This flexibility is essential for students to succeed in the entrepreneurial world, where unexpected challenges, market changes, and new opportunities are common. OE empowers students to approach challenges from multiple angles, continuously seek innovative solutions, and embrace novel opportunities, which are key to entrepreneurial success [13, 14].

Additionally, for vocational students, OE is essential for developing a mindset of lifelong learning. Entrepreneurship demands continuous growth and the ability to adapt to new skills, tools, and strategies. Students with a high degree of openness actively seek learning opportunities and are more likely to build networks with industry professionals, mentors, and peers, fostering valuable relationships that support their entrepreneurial journey. This openness helps students embrace new knowledge, refine their skills, and incorporate diverse perspectives into their entrepreneurial ventures, enabling them to remain competitive in a rapidly evolving business environment [15]. Moreover, vocational students with OE are better equipped to handle setbacks and challenges, which are inevitable in entrepreneurship. These students view failure as a learning opportunity rather than a defeat, fostering resilience and perseverance. By continuously seeking ways to improve and innovate, students maintain a positive outlook even in the face of adversity. This adaptability and growth mindset are essential for long-term success, as they allow students to pivot, reframe their strategies, and find new solutions when necessary [15].

In conclusion, vocational students have a significant need to cultivate OE within entrepreneurship education. This trait allows them to think creatively, explore innovative solutions, adapt to changing business environments, and continuously seek learning opportunities. By nurturing openness, students can develop the necessary skills to succeed in entrepreneurship, embrace challenges, and thrive in the fast-paced, unpredictable nature of the business world. Therefore, entrepreneurship education should emphasize the importance of OE, equipping students with the tools and mindset they need to excel as entrepreneurs in the future.

2.3. Project-based blended learning (PjBBL) and Design Thinking

Project-Based Blended Learning (PjBBL) is an ideal learning method for enhancing students' creativity and OE in entrepreneurship education. By combining real-world projects with the flexibility of digital learning, PjBBL offers students a unique opportunity to engage in hands-on, self-directed exploration while receiving structured guidance and feedback. This approach enables students to work on complex, open-ended problems that require critical thinking and the integration of knowledge across various disciplines [16]. Through PjBBL, students have the freedom to experiment, take risks, and reflect on their learning process, helping them develop a mindset focused on innovation, continuous improvement, and adaptability [17]. For vocational students in particular, this flexibility allows them to

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apply their technical knowledge in real-world scenarios, honing their creativity and enhancing their ability to think critically about their work.

When combined with, a human-centered approach to innovation, PjBBL fosters even greater creativity and OE. Design Thinking emphasizes empathy, critical thinking, ideation, experimentation, and collaboration [18]. It encourages students to deeply engage with problems, consider multiple perspectives, and ideate diverse solutions. For vocational students, this focus on empathy and user-centered design is crucial in understanding the needs and challenges of real customers or stakeholders, which directly influences their ability to develop relevant, innovative products or services. Students' needs are addressed as they are empowered to embrace failure as a valuable learning opportunity, enhancing their resilience and adaptability [19]. Integrating PjBBL with design thinking creates a synergistic pedagogical approach that significantly enhances students' creativity, critical thinking, and innovation. PjBBL offers a structured yet flexible environment where students apply theoretical knowledge to practical situations, fostering the development of problem-solving and critical thinking skills [20]. Meanwhile, the iterative process of design thinking, which includes ideation, prototyping, and testing, strengthens students' ability to generate creative solutions while also building resilience as they refine their ideas through trial and error [21]. This iterative process ensures that students learn to approach problems from multiple angles, constantly evolving their solutions based on feedback and real-world insights. Furthermore, the collaborative nature of PjBBL supports teamwork and the exchange of ideas, which enhances the students' ability to work collectively toward innovative solutions. In an entrepreneurial context, these collaborative skills are essential, as real-world ventures often require team efforts to solve complex challenges. The synergy between PjBBL and design thinking fosters a growth mindset, encouraging students to remain open to experimentation, learning, and adapting. This approach not only nurtures students' creativity but also promotes lifelong learning and positions them to thrive in an ever-evolving business environment [15].

In conclusion, vocational students in entrepreneurship education have critical needs that are met by integrating PjBBL and design thinking. This combination enhances creativity, fosters OE, and builds essential skills in problem-solving, critical thinking, collaboration, and adaptability. By applying these methodologies, students are better equipped to tackle real-world challenges, generate innovative solutions, and thrive in the dynamic world of entrepreneurship.

3. Research Methods

This study conducted a needs assessment survey among vocational college students in Southwest China to identify their specific learning needs for entrepreneurship courses. The survey targeted a population of approximately 1.16 million vocational college students in Southwest China as of 2023. Using the Yamane method for sample size calculation, 400 samples were required to ensure the sample's representativeness [22]. Multi-stage sampling method has been used to select samples during data collection. The researcher firstly used simple random sampling method to select one vocational college per region from four regions in southwest China: Sichuan Province, Yunnan Province, Guizhou Province, and Chongqing City, four vocational colleges has been selected in total. Secondly, the researcher used sample random sampling method select 100 respondents per vocational college from those selected four vocational colleges, 400 respondents in total. Among the respondents, 54.25% were female, and the largest group were first-year students (38%), followed by second year (33%) and third-year students (29%). An equal number of respondents were selected from each of the four regions, and all participants expressed an interest in studying entrepreneurship as part of their academic program.

A needs assessment questionnaire was developed to identify students' learning needs in entrepreneurship courses, utilizing a five-point Likert scale ranging from "Strongly disagree (1)" to "Strongly agree (5)." The questionnaire covered five dimensions—creativity, OE, design thinking, PjBBL, and entrepreneurship courses, each dimension with three items, totaling 15 items. Content validity has been tested by item objective convergence (IOC), the IOC vales of five dimensions were higher than 0.5, indicating that these items were qualified to collect data for this study. Besides that, A

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Cronbach's alpha test was performed, and the value was 0.79, indicating good reliability [23]. Descriptive statistics, including means and standard deviations (SD), were used to analyze the data. There were five need levels based on mean scores: strongly disagree (1.00–1.49), disagree (1.50–2.49), neutral (2.50–3.49), agree (3.50–4.49), and strongly agree (4.50–5.00).

Table 1.
Demographic information of respondents (n=400)

Demographic factors	Items	Frequency	Percent (%)
Gender	Male	183	45.58%
	Female	217	54.25%
Grade	Grade 1	152	38.00%
	Grade 2	132	33.00%
	Grade 3	116	29.00%

4. Results

The results indicated a consistent need for improvement in all five dimensions: creativity, OE, design thinking, PjBBL , and entrepreneurship courses, with mean scores surpassing the threshold of 3.41, suggesting students' needs in developing these areas. For creativity, the item "To be cultivated with creativity through entrepreneurship courses" emerged as a significant need, achieving a mean score of 4.28, the highest within this dimension. Similarly, in the OE dimension, the mean scores ranged from 4.15 to 4.21, indicating a pronounced need to enhance students' openness and adaptability traits.

In the design thinking dimension, innovative learning methods that help transform marketing needs into business opportunities and build empathy with customers were strongly emphasized, with a mean score of 4.08. Within the blended learning dimension, methods that offer students flexibility and link learning to real-world applications stood out, with one item achieving a mean score of 4.70, the highest across all dimensions. For entrepreneurship courses, the strongest need was identified in the item "Entrepreneurship courses should adopt new learning methods that provide sufficient online resources and train students to transform marketing needs into business opportunities", scoring 4.00. These findings highlighted students' specific needs in practical, innovative, and adaptable approaches to learning

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Table 2.
Result of need assessment

Dimensions	Items / To What Extent Do You Agree with the following need statements …	Means	SD	Level
1. Creativity	1.1 More knowledge about creativity due to its importance in a fast-changing market	3.72	0.86	Agree
	1.2 To enhance creativity due to its importance in entrepreneurship activities	4.16	0.81	Agree
	1.3 To cultivate creativity through entrepreneurship courses	4.28	0.66	Strongly agree
	Total of creativity	4.05	0.78	Agree
2. Openness to experiences	2.1 More knowledge about OE due to its importance in a fast-changing market	4.21	0.66	Strongly agree
	2.2 To enhance OE due to its importance in entrepreneurship activities	4.15	0.67	Agree
	2.3 To be cultivated with OE through entrepreneurship courses	4.18	0.68	Agree
	Total of OE	4.15	0.67	Agree
3. Design thinking learning	3.1 A new learning method that practices students to turn marketing needs into business opportunities in entrepreneurship activities	4.10	0.78	Agree
	3.2 A new method that helps students to understand targeted customers in entrepreneurship activities	4.10	0.79	Agree
	3.3 A new method that helps students build empathy with targeted customers	4.03	0.71	Agree
	Total of design thinking learning	4.08	0.76	Agree
4. Project based Blended learning	4.1 A new method that enables learning of entrepreneurship courses through both online and offline	3.76	0.97	Agree
	4.2A new method that links learning to reality	3.66	0.83	Agree
	4.3 A new method that could offer students more flexibility and practice in the learning process	4.70	0.76	Strongly agree
	Total of blended learning	4.04	0.85	Agree
5. entrepreneurship courses	5.1 More knowledge about entrepreneurship	3.74	0.94	Agree
	5.2 Entrepreneurship courses to enhance creativity and OE	3.94	0.81	Agree
	5.3 entrepreneurship courses shall adopt new learning methods that could offer sufficient online learning resources, and Practice students turning marketing needs into business opportunities	4.00	0.77	Agree
	Total of entrepreneurship courses	3.89	0.84	Agree

5. Discussion

The findings of this research provide valuable insights into the specific areas where students require further development to enhance their entrepreneurial competencies. These results align with existing literature on entrepreneurship education, offering both theoretical and practical implications for curriculum design and pedagogy.

Creativity was found to be important and needed for students want to be entrepreneurs, furthermore, a strong need among students for greater knowledge and skill development has also been identified. The result of this study emphasized that the importance of fostering creativity through entrepreneurship education. This finding is consistent with research by Weng, et al. [4] who argue that creativity is a critical skill for entrepreneurs, enabling them to navigate uncertainty and develop innovative solutions. Creativity not only helps in generating new business ideas but also in adapting to rapidly changing market conditions. Similarly, Anjum, et al. [9] found that creativity is a vital component of entrepreneurial success, allowing individuals to think divergently and identify opportunities in challenging circumstances. The emphasis on creativity in entrepreneurship education has been echoed by many scholars, who argue that entrepreneurial courses should focus on developing both the cognitive and practical aspects of creativity [8].

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OE emerged as the highest-scoring need among the five dimensions, signaling a significant desire among students to enhance their openness to new ideas, perspectives, and challenges. This aligns with Ahmed, et al. [12] which identifies openness as a key trait for successful entrepreneurship. Openness fosters curiosity, adaptability, and a willingness to take risks—traits that are essential for navigating the dynamic and unpredictable nature of the business world. In line with Bernoster, et al. [14] who found that OE is strongly correlated with entrepreneurial behavior, this study suggests that Chinese vocational students recognize the importance of cultivating this trait in entrepreneurship education. Open-mindedness is particularly crucial for students to engage with novel ideas and diverse entrepreneurial strategies, and it is essential for effective decision-making in uncertain environments. This finding further supports the call for entrepreneurship programs that promote personal development and emotional intelligence alongside business skills [15].

Design thinking learning was identified as another key area of need, Design thinking has gained significant attention in entrepreneurship education as a creative problem-solving framework. This approach emphasizes empathy, user-centered design, and iterative testing, which are crucial for identifying and addressing customer needs and turning those insights into viable business opportunities. The importance of design thinking in entrepreneurship education is well-documented in the literature. Svalina, et al. [24] posits that design thinking enables entrepreneurs to approach business problems with a fresh perspective, focusing on customer empathy and human-centered innovation. Mayer and Schwemmle [25] highlights the role of design thinking in fostering creativity and collaboration, both of which are essential for entrepreneurial success. This study's findings align with those of Svalina, et al. [24] indicating that students are aware of the value of design thinking methodologies in transforming marketing needs into business opportunities, understanding customer preferences, and building empathy with target customers. Given the findings, it is crucial for entrepreneurship courses to integrate design thinking principles to encourage students to adopt innovative approaches when addressing entrepreneurial challenges. This can also facilitate the development of soft skills such as problem-solving, critical thinking, and collaboration, which are essential in today's competitive business landscape.

PjBBL emerged as another critical area of need in the study, The respondents expressed a strong desire for learning methods that offer flexibility in the learning process and provide access to both online and offline resources. This finding is consistent with research by Tong and Wei [26] who emphasize the advantages of blended learning in enhancing student engagement, providing more personalized learning experiences, and increasing access to learning resources. Blended learning models combine the best aspects of face-to-face and online instruction, offering flexibility, accessibility, and interactive learning opportunities. Salma, et al. [27] suggests that blended learning can foster a more student-centered approach, where learners have more control over their learning paths and pace. This aligns with the findings of this study, where students expressed a need for methods that provide them with access to diverse learning resources, both digital and traditional, and that enable them to engage in self-directed learning. furthermore, findings also illustrated a need for linking learning to reality and willingness to have more practices, Project-based learning provides a context for students to apply their knowledge and skills to real-world challenges. By working on authentic projects, students develop critical thinking, problem-solving, and collaboration skills. Additionally, project-based learning can foster creativity and innovation, as students are encouraged to think outside the box and develop unique solutions, educators can create dynamic and interactive learning experiences, while students can use a variety of digital tools, such as online collaboration platforms, video conferencing software, and learning management systems, to work together, share ideas, and receive feedback [16].

6. Suggestions

The findings of this study highlight several key recommendations for enhancing entrepreneurship education in Chinese vocational colleges, emphasizing a comprehensive and practical approach. Firstly, entrepreneurship education should prioritize fostering creativity and OE, as these traits are fundamental

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for entrepreneurial success. Curricula should include activities and assignments that challenge students to think innovatively and embrace diverse perspectives. Secondly, the integration of design thinking and PjBBL methodologies is vital to develop problem-solving skills, encourage customer-centered innovation, and cultivate flexibility. Educators should structure courses around real-world, open-ended projects that guide students through the stages of design thinking—empathize, define, ideate, prototype, and test—ensuring they gain practical experience in identifying and solving problems while iteratively improving their ideas.

In the implementation of integration of design thinking and PjBBL learning model, class activities can further enrich the learning process. For example, brainstorming sessions can help teams generate innovative solutions to real-world issues, while techniques like the "5 Whys" allow students to drill down into root causes of problems, such as identifying poor customer engagement as a barrier to retention. Activities like prototype creation using simple materials or digital tools can simulate product development, while "Shark Tank"-style pitch presentations can boost confidence and refine communication skills as students present their business ideas to peers, educators, or industry professionals. The use of advanced technology and digital tools, such as online learning platforms like Moodle or Canvas, is another critical component. These platforms can deliver foundational content, such as video lectures or case studies on market research, while providing tools for collaboration and feedback. Additionally, these platforms can support the use of prototyping software or simulation tools to bring students' ideas to life. Regular reflection sessions, such as journaling or group discussions, can be incorporated to help students analyze their learning experiences, develop critical thinking, and refine their approaches. Furthermore, involving industry mentors in the educational process adds immense value by bridging the gap between theoretical knowledge and real-world application. Mentors can guide students, offer professional insights, and evaluate student pitches to simulate authentic entrepreneurial experiences. Opportunities for students to interact with entrepreneurs and business leaders through workshops, internships, or networking events can also inspire and prepare them for future challenges.

Finally, entrepreneurship courses should be restructured to align with modern learning needs, emphasizing hands-on, practical applications and the integration of contemporary learning tools. This approach ensures that students are equipped not only with theoretical knowledge but also with the skills, mindset, and experience necessary to navigate the evolving demands of the business world and succeed as future entrepreneurs

7. Conclusion

This study provides valuable insights into the learning needs of Chinese vocational college students in entrepreneurship courses. The findings highlight the importance of creativity, OE, design thinking, PjBBL , and practical entrepreneurship courses in preparing students for entrepreneurial success. By aligning curricula with these identified needs, educators can enhance the effectiveness of entrepreneurship education and better equip students to meet the challenges of the dynamic and competitive business landscape. Furthermore, the integration of PjBBL and design thinking learning has been highlighted in the research findings, thereby, the researcher will intend to develop a teaching model integrating PjBBL and design thinking learning and find its effectiveness in entrepreneurship education in the future.

Institutional Review Board Statement:

All procedures in this study were conducted in accordance with the Ethics Committees of Tongren Polytechnic College, China.

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Transparency:

The authors confirm that the manuscript is an honest, accurate and transparent account of the study that no vital features of the study have been omitted and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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