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Developing the Tendering Capacity of Anging Construction Industry Association Trainees Using Situation-based Learning Activities

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Abstract

Background: The construction industry faces a critical skills gap in tendering, exacerbated by an aging workforce and the limitations of traditional, theory-heavy training methods. Situation-Based Learning (SBL) offers a promising alternative by situating learning in authentic, contextualized scenarios. This study aimed to: (1) develop and validate SBL lesson plans for tendering training; (2) compare trainees' tendering capacity before and after SBL intervention; and (3) evaluate trainee satisfaction with the SBL approach.

Methodology: A one-group pretest-posttest design was employed with 30 trainees from the Anqing Construction Industry Association. The intervention consisted of seven SBL lesson plans validated by experts (M = 4.35, SD = 0.47). Tendering capacity was assessed using a 100-point performance evaluation, and satisfaction was measured via a 10-item, 5-point Likert scale questionnaire.

Results: A paired-samples t-test revealed a statistically significant increase in tendering capacity scores from pre-test (M = 60.50, SD = 4.15) to post-test (M = 85.97, SD = 6.74), $t(29) = 19.84$, $p < .001$, with a large effect size (Cohen's d = 3.62). Trainee satisfaction with the SBL activities was very high (M = 4.72, SD = 0.54).

Conclusion: The findings indicate that SBL is an effective and highly satisfactory pedagogical model for enhancing tendering capacity in construction training. The study provides a validated framework for implementing SBL to bridge the theory-practice gap in professional development.

Keywords: Situation-based Learning; Tendering Capacity; Construction Industry; Vocational Training; Experiential Learning

Introduction

The construction industry plays a vital role in economic development, contributing to infrastructure growth, job creation, and technological advancements. However, many construction industry associations face challenges in maintaining a skilled workforce due to an aging labor pool and limited opportunities for professional development. In particular, tendering

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capacity, the ability to prepare, submit, and manage competitive bids for construction projects, is a crucial skill that requires continuous learning and adaptation to evolving industry standards (Bilau et al., 2015).

Traditional tendering training often relies on passive knowledge transfer, such as lectures on regulations and the use of standard templates. This approach creates a significant theory-practice gap, leaving trainees ill-prepared to handle the dynamic complexities of real-world bidding scenarios. They often struggle to analyze project specifics, apply technical knowledge flexibly, and develop compelling, compliant tender documents (Graham et al., 2018).

Situated Learning Theory (Lave & Wenger, 1991) provides a robust theoretical foundation for addressing this gap. It posits that learning is inherently situated within the context and culture of its application. Situation-Based Learning (SBL) operationalizes this theory by immersing learners in authentic or simulated professional scenarios. In such environments, trainees can "think and act" like practitioners, thereby constructing knowledge through meaningful problem-solving and social interaction (Brown et al., 1989).

While SBL has been successfully applied in various educational fields, its specific application to tendering training in the construction industry remains underexplored. This study, therefore, aims to develop, implement, and evaluate an SBL-based training program tailored to enhance the tendering capacity of members of the Anqing Construction Industry Association. The findings are expected to contribute a validated pedagogical model that can enhance the competitiveness of construction professionals by equipping them with practical, applicable tendering skills.

In the bidding process of construction projects, technical standards play an important role. It is by no means a simple pile of technical data, but an all-round display of the professional technical background of the bidding enterprise, the unique understanding and control of the project, the fine planning of the construction process, the quality and safety guarantee measures, and the plan to deal with complex construction conditions. An outstanding technical tender can not only meet the strict requirements of the tenderee but also stand out from many competitors and help enterprises win projects, which can be called the "golden key" to open the market door. On the other hand, according to the current situation of Trainees of the Anqing Construction Industry Association, although they are enthusiastic about joining the construction field and are interested in becoming experts in the compilation of technical bids, they are facing many difficulties. Under the traditional teaching mode, training focuses on theoretical knowledge explanation, such as reading the provisions of laws and regulations, applying standard templates, passive absorption by Trainees, and a lack of opportunities for active thinking and in-depth practice. What they have learned in the classroom is seriously out of touch with the complex

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situation of the actual bidding site. Once faced with a real project, Trainees are often at a loss, and they don't know how to accurately analyze the characteristics of the project, flexibly use cutting-edge technology, and skillfully solve the construction problems, resulting in the technical tender being either a mere formality, lacking pertinence, or full of loopholes and difficult to convince the public. At the same time, the theory of situational learning in the field of education is booming. This theory follows the essence of human learning, emphasizing that knowledge comes from practice situations and returns to application situations. When Trainees are immersed in the highly restored bidding simulation situation, perceive the demands of all parties in role-playing, and explore solutions to the dilemma of virtual projects, they can think and act like experienced practitioners. This theory sheds a bright light on innovating the training mode of building technical standard compilation, and urges researchers to think about how to skillfully apply it to the practice of cultivating architectural talents in Anqing, fill the shortcomings of technical standard teaching, and cultivate a large number of professional elites who meet the needs of the industry (Graham et al., 2018)

The aging workforce in the construction sector often struggles to adopt modern tendering practices, which now involve digital tools, complex regulatory requirements, and sustainability considerations (Bilau et al., 2015). Many industry trainees, including younger professionals and those transitioning into construction management roles, lack the necessary experience in tendering due to the limitations of traditional training methods. Conventional approaches, such as classroom-based lectures or generic training programs, do not fully address the situational and context-dependent nature of tendering (Graham et al., 2018).

Significance of the Problem Addressing this gap is crucial to enhancing the competitiveness of construction firms and ensuring that the next generation of professionals is adequately prepared to handle complex tendering processes. Situation-Based Learning Activities provide a practical and interactive approach to developing tendering capacity by immersing trainees in real-world scenarios, promoting problem-solving skills, and fostering decision-making abilities (Kolb, 2014; Egbu & Robinson, 2005)

Studies suggest that experiential learning, such as Situation-based learning Activities, significantly improves professional competence in construction management by offering hands-on experience in tender preparation, bid evaluation, and contract negotiation (Kolb, 2014; Egbu & Robinson, 2005). Implementing Situation-Based Learning Activities within construction industry training programs can bridge the knowledge gap between aging professionals and new trainees, ensuring knowledge transfer and skill development. Additionally, it enhances industry sustainability by equipping the workforce with up-to-date tendering skills that align with modern procurement practices and regulations (Oyewobi et al., 2016). This is to ensure that both

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experienced and novice industry professionals can apply the trained process to bidding more effectively, thus increasing the chances that their companies will win projects and maintain business growth (Kolb, 2014; Oyewobi et al., 2016)

In the United States, the application of situational teaching covers two aspects. One is the work-study rotation teaching model. Trainees are immersed in a professional environment for a long time to ensure that theoretical lessons can be applied to real situations and stimulate trainees' motivation to learn. Therefore, the United States attaches great importance to the establishment of training bases, most of which are collaborative, such as business incubators and industrial parks (Shi, Z. 2021). Influenced by Dewey's modern educational thought, the United States attaches great importance to creating authentic educational situations for trainees through the real world. Therefore, community service and cultural construction are contextual tools in American schools (Wang, Q. 2011). The application of situational teaching in China has its origins in education. Many Confucian classroom behaviors are manifested in natural and social contexts. The concept of situational teaching was formally introduced and applied in China in the 1980s. Li Jilin was the first to interpret situational teaching, which consists of using vivid pictures to create familiar scenes and stimulating trainees' emotions about specific things within the context. And combining intellectual activities with emotional learning (Li, J., 2019), China's situational education aims to seek context through emotions and forms, through 'essence'" (Jiang Hanrong, 2012). Situational teaching involves teachers creating some simulation situations to help trainees understand knowledge, using visual teaching simulation situations to deepen their understanding of textbook knowledge (Chen et al, 2015)

From the above, the researcher has developed the integration of Situation-Based Learning Activity into the training program for members of the construction association to create knowledge, understanding, and skills in construction bidding through learning through simulated experiences through various situations that are close to real situations in construction project bidding. This allows the trainees to practice the learning process through analytical thinking, planning, teamwork, and effective problem-solving in order to apply the knowledge and experience gained from this training course to their future work and professional development. It also enhances the trainees' confidence in their construction bidding skills.

Objectives

1. To develop and validate Situation-Based Learning (SBL) lesson plans for enhancing the tendering capacity of construction industry trainees.

2. To compare Tendering capacity abilities using the Situation-based learning activities, had Tendering capacity post-test, and the pre-test

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3. To assess trainee satisfaction with the SBL-based training program.

Literature Review

The researcher has conducted a study and research on relevant documents and research, and set the conceptual framework as follows

Brown et al. (1989). Situation-based learning activities are not an isolated concept; it is developed based on reflection on traditional learning theory. Traditional learning theory often focuses on the abstract teaching of knowledge, which separates knowledge from the actual situation of its production and application, making it difficult for learners to understand the true meaning and value of knowledge in the learning process and to apply what they have learned flexibly to real life. In contrast, situational learning emphasizes the close connection between learning and situation, and holds that knowledge is generated and developed through the interaction between individuals and the environment in a specific social and cultural situation.

Lave, J., & Wenger, E. (1997). In essence, situational learning is a learning method that enables learners to acquire knowledge and skills by participating in specific activities in real or simulated situations. The "situation" here is not a simple learning environment, but contains rich social and cultural elements, practical activities, and the interactive relationship between learners. For example, in the study of technical tender preparation in the construction industry, the situation can be a simulated Tendering scene of construction projects, which involves a series of specific activities such as the interpretation of Tendering documents, communication with owners and other bidders, and field visits to the construction site. In this situation, learners no longer passively accept knowledge but actively participate in various tasks, and understand and master the relevant knowledge and skills of technical standard preparation through practical operation and experience.

Chen et al. (2015). In the United States, the application of situational teaching covers two aspects. One is the work-study rotation teaching model. Trainees are immersed in a professional environment for a long time to ensure that theoretical lessons can be applied to real situations and stimulate trainees' motivation to learn. Therefore, the United States attaches great importance to the establishment of training bases, most of which are collaborative, such as business incubators and industrial parks (Shi, Z. 2021). Influenced by Dewey's modern educational thought, the United States attaches great importance to creating authentic educational situations for trainees through the real world. Therefore, community service and cultural construction are contextual tools in American schools (Wang, Q. 2011). The application of situational teaching in China has its origins in education. Many Confucian classroom behaviors are manifested in natural and social contexts. The concept of situational teaching was formally

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Methodology

This study employed a one-group pretest-posttest design (O1 X O2). While practical for initial evaluation, this design is acknowledged to have limitations regarding internal validity, as it cannot fully control for extraneous variables like history or testing effects.

Participants

The target group consisted of 30 trainees from the Anqing Construction Industry Association, recruited via the association's membership network. Participants included a mix of junior estimators, project engineers, and small business owners. All participants provided informed consent, and the study protocol was reviewed for ethical considerations.

Intervention: SBL Lesson Plans

Seven SBL lesson plans were developed, covering: (1) Basic Knowledge of Bidding, (2) Engineering Profile Analysis, (3) Overall Implementation Planning, (4) Specific Construction Plans, (5) Safety Measures and Quality Control, and (6) Integration of Technical Standards. Each lesson followed a five-step SBL process:

This research used an experimental design in the form of experimental research (Experimental Research), One Group Pretest-Posttest Design, and One Group Posttest Only Design (Paisan Worakam, 2021)

Random	group	Test first	Experimental thing	Test after
-	E	O1	X	O2

When E means Experimental group
O1 means measuring variables before experimenting
X means giving an experiment
O 2 means measuring variables after the experiment

Results of developing situation-based learning activities to promote tendering capacity

To develop Situation-based learning activities for the tendering Course framework and analyze the relationship between content and learning objectives using cooperative learning

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activities to enhance academic achievement teaching methods. The researchers developed a lesson plan using the Situation-based learning activities, consisting of the following key components:

1) Concept

2) Learning objectives

3) Curriculum content

4) Learning activities using Situation-based learning activities. The process consists of five steps as follows:

Step 1: Determine the learning goal. The teacher introduces the bidding basis and project cognition of this target to the Trainees, so that the Trainees can clearly understand what skills they need to master. (30 minutes)

Step 2: The teacher should create a situational teaching simulation bidding (60 minutes): the teacher carefully arranges the simulation bidding site, posts bidding posters, and places bidding materials. Trainees are divided into groups and play the roles of bidders, bidders, and supervisors respectively. The tenderer issues a tender notice for virtual housing construction or municipal engineering, detailing the project background and basic requirements. The bidder receives the information and asks questions.

Step 3: Guide the Trainees into the situation, on-the-spot project investigation (90 minutes): lead the Trainees to the real building or municipal engineering construction site, and the project manager will introduce the actual situation of the project. Trainees will observe the construction environment and process on the spot, and learn more about the project by combining the previous bidding information.

Step 4: Group discussion, summary, and exploration (90 minutes): Back in the classroom, each group will discuss the bidding process and project characteristics around the field investigation and simulated bidding, and select representatives to report. The teacher summed up the comments and sorted out the key knowledge.

Step 5: Question-and-answer and homework assignment (30 minutes): Answer Trainees' questions and assign marks with different gradients after class.capacity

5) Learning media or learning resources

6) Measurement and evaluation

Develop learning activities using situational learning activities to promote bidding competence.

1. The results of the development of 7 learning management plans are as follows:

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2. Basic knowledge of bidding
3. Engineering profile analysis and writing
4. Overall implementation planning
5. Specific construction plans
6. Safety measures and quality control
7. Integration of technical standards

The 7 lesson plans developed for the Situation-Based Learning Activity model were evaluated by three experts across 16 criteria using a 5-point Likert scale (Section 3.4). The mean suitability score was 4.35, with a standard deviation of 0.47, indicating high appropriateness. Detailed results are provided in Appendix B (Table B-1). The high suitability scores confirm the lesson plans' alignment with Tendering capacity abilities objectives, ensuring effective scaffolding implementation.

Results

Compare the results of Tendering capacity abilities using the Situation-based learning activities, with the Tendering capacity post-test and the pre-test.

The Tendering capacity abilities assessment form is a 5-level scale assessment form for collecting scores on the performance of Tendering capacity abilities activities of the trainees using Situation-Based Learning Activity learning.

1) Project overview (20%)
2) The construction organization design (20%)
3) Construction scheme (20%)
4) Quality and safety (20%)
5) Progress and resources (20%)

Objective 2: To compare the bidding ability before and after the training. Pre- and post-training tests were conducted using a 30-item bidding competency test.

Assessment	Mean	SD	t	df	p	Cohen's d
Pre-test	60.50	4.15	19.84	29	< .001	3.62
Post-test	85.97	6.74				

Post-training, 70% of trainees (n=21) achieved an "Excellent" level (scores 76-100), and 26.67% (n=8) achieved a "Good" level (scores 51-75), indicating a substantial overall improvement.

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Analysis results: The average post-training score increased significantly at the .05 level, indicating that the situational learning activities affected the development of the trainees' bidding ability.

Trainees' ability scores of learning activities according to the situation before the test, and the Trainees' scores after the test

No.	Pre-test (100 Point)	Post-test (100 Point)	results
1	68	94	Excellent
2	61	95	Excellent
3	62	93	Excellent
4	62	82	Excellent
5	58	91	Excellent
6	61	86	Excellent
7	53	81	Excellent
8	62	86	Excellent
9	64	79	Excellent
10	55	95	Excellent
11	61	94	Excellent
12	59	82	Excellent
13	55	73	Good
14	57	74	Good
15	53	83	Excellent
16	62	78	Excellent
17	66	87	Excellent
18	60	95	Excellent
19	62	86	Excellent
20	67	94	Excellent
21	65	78	Excellent
22	54	83	Excellent
23	60	95	Excellent

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No.	Pre-test (100 Point)	Post-test (100 Point)	results
24	61	92	Excellent
25	56	80	Excellent
26	67	82	Excellent
27	58	91	Excellent
28	62	84	Excellent
29	58	77	Excellent
30	66	89	Excellent
Sum	1,815	2,579	
Average	60.50	85.97	
S.D.	4.15	6.74	

Shows that participants who received the scenario-based training had a pre-test average bidding ability score of 60.50, and a post-test average score of 85.97. This means that participants' bidding ability was significantly higher after the test than before the test at the .05 level.

The evaluation after training was divided by the ability level as follows:

Ability level	score range	number of people	percentage (%)
Excellent	76 – 100	21	70.00%
Good	51 – 75	8	26.67%
Moderate	26 – 50	1	3.33%
Below Standard	0 – 25	0	0.00%

The majority of participants had "good to excellent" bidding skills, accounting for 96.67 percent, reflecting the effectiveness of the activity design, which clearly promotes potential.

Results of the study on trainees' satisfaction using the Situation-based learning activities to promote Tendering capacity.

After the trainees completed the Situation-based learning activities to promote Tendering capacity, the researchers measured their satisfaction using a satisfaction questionnaire. The results are as follows:

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Trainee Satisfaction Questionnaire on Situation-based learning activities to promote Tendering capacity.

list	$\bar{X}$	S.D.	Satisfaction Level
1. I like this learning activity because it allows me to study, research, and understand the connections between various areas of knowledge in construction bidding.	4.70	0.60	very high
2. I like this learning activity because it is interesting and challenging.	4.72	0.47	very high
3. I like teamwork activities because they help promote effective communication and cooperation.	4.74	0.58	very high
4. I like this learning activity that plays a role in motivating everyone to learn by themselves and explore problems together.	4.69	0.56	very high
5. I like this learning activity because it trains thinking and reasoning in planning work, which helps to learn how to solve problems.	4.84	0.55	very high
6. I like this learning activity in integrating knowledge and solving complex problems that are close to real situations.	4.71	0.60	very high
7. I like summarizing and reflecting on learning together, which helps to solve problems more accurately.	4.76	0.47	very high
8. I like developing analytical and decision-making skills in preparing for construction bidding.	4.67	0.58	very high
9. I like this learning activity because it helps to improve my ability to bid for construction.	4.70	0.56	very high
10. I am proud and confident that I can apply the knowledge I have gained to my career.	4.77	0.55	very high
Total	**4.72**	**0.54**	**very high**

The results of the analysis of Trainees' satisfaction with situational learning activities, with the mean ($\bar{X}$ = 4.72, S.D. = 0.54)

Trainees most strongly agreed with the item that the Trainees enjoyed I like this learning activity because it trains thinking and reasoning in planning work, which helps to learn how to solve problems at the highest level of satisfaction ($\bar{X}$ = 4.84, S.D. = 0.55), followed by I am proud and confident that I can apply the knowledge I have gained to my career. ($\bar{X}$ = 4.77, S.D. = 0.55) And I like summarizing and reflecting on learning together, which helps to solve problems more accurately. ($\bar{X}$ = 4.76, S.D. = 0.47), respectively.

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Conclusion

This study successfully developed, implemented, and evaluated a training program using SBL to enhance the tendering capacity of construction industry trainees. The findings demonstrate that the SBL lesson plans were highly suitable, the training was associated with a statistically significant improvement in tendering capacity, and participant satisfaction was very high. While the one-group design precludes definitive causal claims, the strong positive outcomes suggest that SBL is a highly effective approach for practical skills training in the construction sector. It effectively bridges the gap between theoretical knowledge and the complex demands of real-world tendering.

Discussion

The results strongly support the efficacy of SBL for tendering training. The significant pre-to-post-test gains align with the core tenets of Situated Learning Theory (Lave & Wenger, 1991; Brown et al., 1989). By immersing trainees in realistic bidding scenarios, the SBL intervention facilitated the construction of conditionalized knowledge—knowledge that is integrated with the context of its use. The five-step process (simulation, investigation, collaboration) effectively created a "community of practice" where trainees learned from each other and from the authentic tasks.

The very high satisfaction scores, particularly regarding problem-solving and career confidence, indicate that SBL not only builds competence but also enhances self-efficacy. Trainees appreciated the opportunity to "think like a bidder" in a low-risk environment, which is a noted advantage of simulation-based pedagogies.

To fulfill the research objective of developing an effective tender capacity training program, this section details the design of a series of Situation-Based Learning activities, grounded in the theoretical foundation established in Chapter 2. The design directly addresses the core issue of the "theory-practice gap" in traditional training identified in Section 2.2, and is guided by the framework of Situated Learning Theory (Brown et al, 1989) and the SBL Model (Isrok'atun & Tiurlina, as cited in Muhamad Ramdan, 2019), as elaborated in Section 2.3. The SBL activities developed for the seven lesson plans achieved a high average suitability rating of 4.35. This data preliminarily validates the effectiveness of the program in bridging the theory-practice divide and lays the groundwork for the positive training outcomes presented in Chapter 5. The success of the design stems from a dual-verification process: firstly, its content was rooted in an in-depth analysis of industry standards and the aforementioned SBL model, ensuring precise alignment with core tender capacity objectives (e.g., project overview analysis, construction scheme compilation, safety and quality control). Secondly, the plans were refined through

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validation by experts in curriculum design and evaluation (refer to Section 2.4), ensuring a systematic and step-by-step learning progression. In practice, the integration of theoretical lectures with authentic scenario activities (e.g., simulated bidding sites, on-site project investigations) operationalizes the principle of "knowledge generated through interaction with specific situations" from Situated Learning Theory. The "five-step instructional process" (goal setting, simulation, investigation, discussion, feedback) comprehensively mirrors the core cycle of the SBL model: creating scenarios, posing problems, solving them, and applying concepts. Furthermore, the incorporation of collaborative group work (e.g., team-based tender preparation) embodies the core constructivist principle (Piaget, 1970, as discussed in Section 2.5) that knowledge is constructed through social interaction.

Trainees who received situation-based learning activities demonstrated an overall good level of tendering capacity, with results categorized as Excellent (70.00%), Good (26.67%), and Moderate (3.33%). This was because the situation-based teaching method combined theoretical knowledge with practical application through simulated real-world scenarios, utilizing both classroom and on-site resources. Data analysis and trainee feedback indicated significant improvements in specific tendering skills, including project analysis, organizational design, and safety management. These improvements were attributable to the model's capacity to provide repeated practice and immediate feedback within authentic contexts, enabling trainees to actively solve problems and refine their approaches. Trainees reported a high level of engagement and satisfaction with the learning process. These findings are consistent with the concept of Situated Cognition proposed by Brown et al (1989), which emphasizes that knowledge is best acquired within the context and culture of its application. The situation-based learning activities established a "community of practice" in which trainees, much like apprentices, developed professional skills through guided participation in authentic tasks. This approach also aligns with the principle of developing psychomotor and cognitive skills through integrated learning experiences, where competence is reflected in the quality of task execution. The results further resonate with the operational model outlined by Luo & Li (2021), which stresses that situational teaching should follow a structured process involving scenario design, learner exploration, and knowledge consolidation. This view is supported by Huang (2016), whose research confirmed that scenario-based teaching significantly enhances trainees' practical abilities. The findings are also consistent with those of Liu et al. (2024), who found that situational teaching helps concretize abstract concepts and strengthen trainees' problem-solving skills. This aligns with the study byLiu et al. (2024), which demonstrated that situational teaching methods significantly improved trainees' problem-solving abilities and learning engagement, with post-test scores reaching a high level ($\overline{X}$= 4.68, S.D. = 0.42).

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The results of the satisfaction questionnaire analysis were sorted from highest to lowest as follows: Trainees liked this learning activity because it trains their thinking and reasoning abilities, which helps them learn how to solve problems. Next, trainees felt proud and confident, believing they could apply the knowledge they gained to their careers. Additionally, trainees enjoyed summarizing and reflecting on the learning process, as it helped them solve problems more accurately. This is because situation-based learning activities enable trainees to immediately apply the knowledge acquired through theoretical learning to simulated tender preparation practice, thereby helping to bridge the gap between understanding and application. Solving practical problems in real-life contexts, such as analyzing tender documents and preparing technical proposals, helps trainees better understand and remember relevant knowledge and procedures. For example, combining theoretical explanations of tender laws and regulations with hands-on simulations of tender document preparation and evaluation enhances trainees' comprehension and application skills. This aligns with the perspective of Brown et al (1989), who explained the benefits of situated learning as enabling learners to acquire knowledge and skills by participating in specific activities in authentic or simulated contexts. Trainees learn from real experiences by integrating knowledge, problem-solving, and collaboration. This maximizes the learners' potential. Trainees learn how to tackle complex tasks in their careers and can appropriately and effectively apply the knowledge they have gained to real-life bidding situations. Moreover, this is consistent with the concept of Luo & Li (2021), who also found that situational experiential teaching can connect learners' knowledge with practical experience, thereby enhancing their motivation and problem-solving abilities. This aligns with the findings of Wang H.H. (2025), who conducted research on an innovative English teaching model for geological engineering based on interdisciplinary integration and contextual construction. The results showed that trainees highly evaluated this teaching model for stimulating participation and improving practical application skills. Situated learning transforms teaching from a traditional teacher-centered approach to a trainee-centered model of active exploration.

Recommendation

Recommendations for implementation

1) Continue to use situation-based learning in technical training programs, particularly in construction and project management.

2) Increase the duration of training or break up the modules into longer periods to facilitate deeper engagement and reflection.

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3) Incorporate a wider range of case studies reflecting different project types and bidding complexity.

4) Improve supporting materials such as templates, checklists, and video demonstrations for pre- and post-class review.

Recommendations for further research

1) Conduct comparative studies between situation-based learning and other active learning strategies, such as problem-based learning (PBL).

2) Expand the sample size and include participants from different construction regions or sectors to generalize the findings.

3) Study the long-term retention of skills and knowledge gained from situation-based learning.

4) Develop a digital or hybrid situation-based learning platform to increase accessibility and scalability. In summary, situation-based learning is effective in building the skills required for bidding on construction projects. Integrating it into training frameworks can help address the skills gap and prepare professionals to meet industry demands.

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