
Fostering Analytical Thinking through Constructivist and Case-Based Learning: A Study of Vocational Students

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Received: 07/02/2025
Accepted: 18/05/2025
Published: 23/05/2025

Volume: 6 Issue: 3

How to cite this paper: Boonheang, W., & Cojorn, K. (2025). Fostering Analytical Thinking through Constructivist and Case-Based Learning: A Study of Vocational Students. *Journal of Practical Studies in Education*, 6(3), 81-89
DOI: <https://doi.org/10.46809/jpse.v6i3.109>

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Abstract

Analytical thinking is a critical skill that facilitates logical and systematic problem-solving and decision-making. Moreover, it serves as a foundational pillar for effective learning and the advancement of skills across diverse academic disciplines. In other words, a lack of analytical thinking can significantly hinder students' learning outcomes across academic subjects as well as their ability to make informed decisions in real-life contexts. Therefore, this action research study aimed at developing analytical thinking skills through constructivist learning combined with case studies among second-year Vocational Certificate (Vocational) students, with a goal of achieving a minimum passing rate of 70 percent. The study was conducted through two cycles of action research. Data collecting bote quantitative and qualitative by using the 4 multiple-choice of analytical thinking test, behavior observation form, and interview. The research findings showed that all of participant achieved analytical thinking skills meeting the 70 percent criteria set when complete both cycle. In the first action cycle, 5 students (55.56 %) passed the criteria, with the mean score of 20.77 (69.23 %) points. In the second action cycle, 9 students (100.00 %) passed the criteria, with an average score of 24.56(81.85 %). Based on observations and interviews, it was found that the use of case studies enabled students to better understand concrete and clearly defined situations, analyze relationships between different scenarios more effectively, and recognize patterns that could be applied to various contexts. This approach significantly contributed to the effective development of their analytical thinking skills.

Keywords: Analytical Thinking Skills, Constructivist Approach, Case Study, Vocational Students

1. Introduction

Analytical thinking is an advanced skill that must be developed through effective learning, focusing on a step-by-step thinking process, classification, categorization, drawing conclusions, and applying it to new situations (Wongyai, 2019). This skill is critical in vocational education, where problem-solving and adaptability are essential for workforce competence (Zuurmond et al., 2023). Research confirms that analytical thinking enhances technical proficiency and innovation in vocational training, preparing learners for dynamic labor markets (MaGrath & Yamada, 2023). Thailand faces significant challenges due to globalization, rapid technological changes, and internal socioeconomic shifts, which impact the education system. Thailand faces significant challenges due to globalization, rapid technological changes, and internal socioeconomic shifts, all of which impact the education system (OECD, 2018). To remain competitive, the education system particularly vocational education, must adapt to align with national development goals. However, persistent issues related to educational quality, regulatory frameworks, and management inefficiencies hinder progress (World Bank, 2021). It is necessary for the education system to adapt to align with the country's development. However, the system still faces issues related to quality, regulations, and management. If education promotes the security of the people, it will help foster awareness, skills, and values that are appropriate for coping with change, leading to national stability and the ability to handle threats (MaGrath & Yamada, 2023; Office of the Education Council, 2017b).

In Thailand, the Technical and Vocational Education and Training (TVET) plays a crucial role in developing professional skills for the Thai workforce, enhancing the country's competitiveness, reducing educational inequality, and promoting sustainable employment opportunities (Office of the Vocational Education Commission, 2024). According to the Vocational National Educational Test (V-NET), which assesses the knowledge and thinking abilities of students at the third-year and second-year levels of the Vocational Certificate (Vocational) program, the average V-NET score in the area of basic competencies for entering a profession in the 2023 academic year was 37.74 percent. This represents a decrease from the 2022 academic year, in which the average score was 45.54 percent (Regional Education Office 10, 2024). This indicates that the development of educational quality is still unsatisfactory, as the academic achievement at the basic education level is significantly below the average. Although young people are increasingly seeking knowledge, they still lack the ability to manage and synthesize information they have researched and apply it effectively. Furthermore, the issue of morals and ethics among children and youth still requires further development (Office of the Education Council, 2019). Although the Thai workforce has received more education, it still does not align with the skills required by the labor market. This reflects a problem within the education system, which is unable to produce a workforce that meets the needs of the market (Office of the Education Council, 2017b). However, consideration should be given to the development of curricula, weaknesses in academics, necessary skills for employment, and cultural factors that influence students' choice of educational pathways (Klah-harn, 2021: Online). Education management must prioritize the development of students and the workforce, focusing on skills and attributes that are ready to meet the needs of various sectors, rather than simply organizing education based on the readiness of educational institutions (Berkat et al., 2025; Chen et al., 2024; Poláková et al., 2023). Additionally, there should be an analysis of labor demand to set educational goals, both for producing a workforce to enter the job market and for developing human resources to enhance the quality of the workforce (Berkat et al., 2025; Office of the Education Council, 2017b; Wheelahan & Moodie, 2017). The 2024 Vocational Certificate Curriculum emphasizes learner-centered education through hands-on practice, developing students in physical, emotional, social, and intellectual aspects. It aims to enhance key competencies such as in-depth knowledge, analytical thinking skills, communication, problem-solving, and the use of technology, while also instilling positive attitudes and pride in their chosen profession (Office of the Vocational Education Commission, 2024).

It is widely accepted that the constructivist approach is one of the most effective principles for developing students' thinking skills in learning management (Fosnot, 2005; Jonassen, 1999). The constructivist learning approach emphasizes hands-on practice and self-directed knowledge discovery by the learners, linking new knowledge with prior knowledge and experience to create new understanding. However, learners must have motivation and basic learning skills. Teachers must plan and support open learning environments to enhance students' thinking skills and social skills (Office of the Education Council, 2007a). The learning process based on the constructivist theory is a process in which learners construct new concepts and ideas by using their existing and prior knowledge as the foundation for new learning. Learners select and modify information, formulate hypotheses, and make decisions in managing their own learning according to the constructivist approach (Bruner, 1986). In vocational education, constructivist methods—such as problem-based learning, project-based tasks, and authentic workplace simulations—enable learners to actively construct knowledge through hands-on experience, thereby strengthening both analytical thinking and technical competencies (Choomnoom, 2022; Wheelahan & Moodie, 2017).

The use of case studies is a powerful pedagogical tool that enables learners to analyze specific events or situations to draw lessons and strategies that can be applied to other situations, leading to more effective decision-making in the future (Herreid, 2007; Oba, 2009). By engaging with real-world problem scenarios, learners must critically evaluate information, apply relevant principles, and justify their solutions—strengthening both analytical thinking and practical problem-solving skills (Jonassen & Hernández-Serrano, 2002). This method is particularly effective in vocational education, where complex, open-ended problems mirror workplace challenges (Kolodner et al., 2003). The use of case studies is particularly appropriate for learning that addresses problems without a single correct answer, especially when the problems are complex and can be viewed from multiple perspectives (Smith & Ragan, 1999).

The lack of analytical thinking skills among students in the Small Enterprises Management course presents a critical challenge to their academic and professional development. In response, this research aims to enhance analytical thinking skills through a constructivist learning approach integrated with case studies for second-year Vocational Certificate students, with the goal of achieving a minimum pass rate of 70 percent. This instructional strategy encourages students to actively construct their own understanding by connecting prior knowledge with new experiences, engaging in systematic analytical thinking, and developing essential social skills through meaningful interaction with peers and instructors. Case studies offer authentic, real-world scenarios that allow students to practice decision-making and problem-solving, enhance their ability to analyze complex situations, and extract transferable lessons applicable across diverse business contexts.

2. Methodology

This study is classroom action research aimed at addressing students' analytical thinking problems. The research was conducted in 2 action cycles according to the concept of Kemmis & McTaggart (1988), as illustrated in Figure 1.

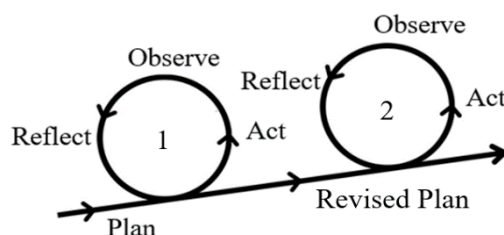


Figure 1. Cycles of Action Research

The planning phase began with identifying the problem through an exploration of the student context and classroom observations, followed by confirming the issue using an analytical thinking assessment. To determine an appropriate solution, relevant literature and previous studies on systems thinking, problem-based learning, causal mapping lessons, and related research tools were reviewed. This process informed the subsequent design and development of suitable research instruments.

The act phase involves implementing the instructional plans developed to address the identified problem. In the first action cycle, lesson plan 1 - 4 were employed. The second cycle utilized lesson plan 5 - 10, which were revised and refined based on reflections and feedback gathered from the first cycle.

During the instructional process, the researcher observed classroom behaviors using an observation checklist. At the end of each action cycle, students' analytical thinking skills were assessed using an analytical thinking assessment tool. In addition, focus group discussions were conducted to gather qualitative insights for reflecting on and improving the learning outcomes.

The data were analyzed and synthesized from multiple sources, including student behavior observation, analytical thinking test results, and interviewing. These data provided insights into students' learning progress, challenges encountered, and the effectiveness of the instructional approach. Identified problems and areas for improvement were then used to inform the planning of the next action cycle. This iterative process continued until the research objectives were successfully achieved, at which point the cycle was concluded.

2.1. Target Group

The target group for this study consisted of nine second-year Vocational Certificate students from Mahasarakham Vocational College, Mahasarakham, Thailand. Participants were selected through purposive sampling based on their willingness to participate and their analytical thinking scores falling below the established benchmark. The objective was to enhance their analytical thinking skills to meet or exceed the 70 percent proficiency threshold.

2.2. Research Instrument

The lesson plans with constructivist learning activities combined with case studies consist of 10 plans, divided into 4 plans of Entrepreneurship and 6 plans in Marketing for Small Enterprises. An expert evaluation conducted by five specialists yielded an average score of 4.68, indicating a high level of appropriateness for the lesson plans developed by the researcher.

The analytical thinking skills test, grounded in the Analysis level of the Revised Bloom's Taxonomy (Anderson & Krathwohl, 2001; Kuncoro et al., 2022; OVEC, 2023) assesses 3 key components: differentiating, organizing, and attributing. The test comprises two sets of multiple-choice situational questions, each consisting of 30 items—10 items for each component. The item-objective congruence (IOC) index for all items was 1.00, indicating perfect alignment with the intended cognitive constructs. In terms of discriminative power, Set 1 demonstrated a range from 0.67 to 1.00, while Set 2 ranged from 0.50 to 1.00. The reliability coefficients were 0.89 for Set 1 and 0.97 for Set 2, indicating a high level of internal consistency across both sets.

The semi-structured interview had an average suitability score of 4.82, indicating that the interview was highly appropriate.

Moreover, the observation checklist for students' behaviors had an average suitability score of 4.70, indicating that the observation checklist was highly appropriate.

2.3. Data Collection

The data collection process was conducted by the researcher based on the four stages of the action research cycle: Plan, Act, Observe, and Reflect, across two action cycles. The action cycles were structured based on the coherence and progression

of key content areas. Cycle 1 comprised Lesson Plans 1–4, while Cycle 2 encompassed Lesson Plans 5–10. Throughout the implementation of both cycles, data was systematically collected and used for reflection and improvement. The details of the data collection process in each cycle are presented in Table 1.

Table 1. Summary of Data Collection in Each Action Research Cycle

Action cycle	Lesson plan	Time (hours)	Data Collection
1	Lesson Plan 1: Entrepreneurial Business Concepts	2	- Formative assessment was conducted using a behavioral observation form during the implementation of the learning activities. - Summative assessment was carried out using an analytical thinking test after the completion of lesson plan 4 in the first action cycle and lesson plan 10 in the second action cycle. - Students were interviewed at the end of each action cycle to reflect on their learning experiences and provide feedback on the learning process.
	Lesson Plan 2: Self-Analysis for Entrepreneurship	2	
	Lesson Plan 3: Business Planning for Entrepreneurs	2	
	Lesson Plan 4: Analysis of Entrepreneurial Business Activities and Business Model Development	2	
8 hours			
2	Lesson Plan 5: Marketing Mix of Small Enterprises	2	
	Lesson Plan 6: Marketing for Small Enterprises	2	
	Lesson Plan 7: Marketing Analysis for Small Enterprises	2	
	Lesson Plan 8: Marketing Strategies for Small Enterprises	2	
	Lesson Plan 9: Marketing Planning	2	
	Lesson Plan 10: Promoting Small Enterprises	2	
12 hours			

2.4. Data Analysis

The analysis of the results from the analytical thinking skills test, administered to students who underwent constructivist learning combined with case studies, was conducted by comparing their performance against a criterion of 70 percent. Basic statistical methods, including percentage, mean, and standard deviation, were used to analyze the data. Additionally, the data obtained from the observation of student behavior following the implementation of the learning management plan, along with individual student interviews, were analyzed descriptively to provide a deeper understanding of the students’ analytical thinking skills development and their experiences with the learning process.

3. Research Results

The analysis of students’ analytical thinking after the learning activities in each cycle demonstrated a consistent improvement across all components. Notable progress was observed in their ability to differentiating, attributing, and organizing. The iterative nature of the intervention appeared to significantly enhance the students’ skills. By the second cycle, all participants had achieved the expected proficiency level, reflecting a successful development of analytical thinking skills. Detailed analysis results are presented in Table 2.

Table 2. The Total Scores for Students' Analytical Thinking Skills Across Both Cycle of the Practical Exercises

Action cycle	Analytical thinking skills			Total score (30)	Target group of students (≥ 70%)
	Differentiating (10)	Attributing (10)	Organizing (10)		
1	7.22	7.22	6.33	20.77(69.23%)	5(55.56%)
2	9.00	8.00	7.55	24.56(81.85%)	9(100.00%)

The results presented in Table 2 indicate that, following the learning intervention, all nine students achieved the expected level of analytical thinking skills, meeting or exceeding the 70% proficiency threshold. The outcomes are categorized according to the two cycles of implementation, as detailed below.

In the first cycle of operation, 5(55.56%) students out of the target group of 9 students passed the 70% threshold, the scores from the analytical thinking assessment revealed that the highest mean score (7.22) in differentiating and attributing aspects while the lowest mean score (6.33) in organizing aspect. Based on the observation behavior form, the students were unable to accurately identify or explain the principles related to the content. They lacked a profound understanding of the studied principles and often relied on memorization rather than comprehension. As a result, they were unable to apply those principles in real-life situations or appropriately analyze their limitations. From the interviews, it was evident that the students still lacked an understanding of the principles and were confused about the content of the case studies. They were unable to distinguish the key analytical principles and lacked confidence in applying and systematically connecting the information within the limited time for discussion, resulting in unclear analysis. The following are selected examples:

1. In terms of differentiating, the interviews revealed the following key points:

1.1. Students were able to identify key points of the case study to some extent, but still made errors in selecting the most critical issues. This is reflected in responses such as: *"I think I can identify the key points of the case studies better but I still lacked clarity in determining which elements within the case studies were the most important factors"* (Student 3).

1.2. In terms of data discrimination, it was found that students had the ability to differentiate data but encountered issues with prioritizing and linking key points of information. This was evident from the following examples of their responses: *"I am able to analyze the facts from the given data better but still experienced confusion in linking and applying the information"* (Student 4).

1.3. In terms of summarizing the key points of the information, it was found that students were able to summarize the content, but still lacked conciseness and clarity in the information. This was evident from the following examples of their responses: *"I have an understanding of the content, but when summarizing the key points, I still struggle to communicate it concisely and clearly enough"* (Student 2) and *"I am able to summarize the key points of the content better but sometimes used redundant and overly long phrases"* (Student 6).

2. In terms of attributing, the interviews revealed the following key points:

2.1. In terms of recognizing the relationships between data and analyzing cause and effect, it was found that many students still had issues with ordering cause and effect, leading to confusion in their responses or incomplete explanations. For instance, one student noted: *"When it comes to familiar content, I can analyze cause and effect well, but with new case studies, I need more time to think and could overlook important factors"* (Student 1).

3. In terms of organizing, the interviews revealed the following key points:

3.1. In terms of understanding principles, it was found that most students had a good foundational understanding of principles. They were able to explain the concepts and principles correctly but were unclear in some unfamiliar case studies. This was illustrated by the following student responses: *"If it is content that I have studied directly, I understand the principles well, but if it is a topic I am not familiar with, I may need more time to review"* (Student 2).

4. In terms of learning management, the interviews revealed the following key points:

4. In terms of information complexity, it was found that learners were confused by the large amount of complex information, making it difficult for them to identify key points. Evidence of this can be seen in the following student comments: *"The case studies contained a large amount of detail, causing I confuse and uncertainty about which parts should be prioritized first"* (Student 2).

4.2. In terms of time constraints, it was found that the time allocated for discussion was insufficient, especially for complex case studies. The following excerpts from student responses highlight this issue: *"Some case studies took a considerable amount of time to understand, which reduced the time available for discussion and limited the opportunity for a full exchange of opinions"* (Student 7).

The interviews with the target group of students indicate that they possess analytical thinking skills but have not yet reached the level that the researcher aims to develop. Additionally, the student interviews, the analytical thinking skill assessment, and the results from the first cycle of the practical session show that the students understand the content of the case study but struggle with identifying key points, summarizing information, linking data, applying information, and selecting appropriate principles.

In the second cycle of operation, all 9 students (100%) in the target group surpassed the 70% threshold. The scores from the analytical thinking assessment revealed that the highest mean score was 9.00 in differentiating, marking an increase of 1.78 points from the first cycle. The lowest mean score, 7.55, was observed in organizing, although this also represented a 1.22-point improvement from the first cycle. This improvement was due to revised activities from the reflecting data in the first cycle, which included enhancing skills in identifying key points and linking information through various case studies, along with group discussions and exchanges of opinions to develop analytical thinking. Students practiced analyzing causes and outcomes in complex case studies and engaged in collaborative work to promote the full development of analytical thinking skills as result all students in the second cycle passed the threshold set. Additionally, the observation data revealed that students began to demonstrate progress in grasping and applying the key concepts. By engaging with case studies and reviewing content multiple times, they were better able to relate the principles to real-world scenarios and interpret them more effectively. Collaborative group work and the exchange of opinions helped enhance their understanding and appropriate application of those principles. Practicing analysis and evaluating the limitations of the principles allowed students to gain a broader perspective and develop deeper analytical thinking skills. Nevertheless, there were still inaccuracies in identifying the key points of the content. Students had difficulty distinguishing between main and supporting information, were unable to fully connect cause-and-effect relationships, and lacked confidence in applying their knowledge to new situations. Interviews with students highlighted several key aspects of their analytical thinking skills, as outlined below:

1. In terms of differentiating, the interviews revealed the following key points:

1.1. In terms of identifying key points in the content, students demonstrate proficiency in grasping the main topics. However, inconsistencies remained in selecting the most critical issues that influenced the overall content. This was evident in the following student response: *"I am able to understand the overall key points, but sometimes focused solely on areas I understood, which led to the omission of more significant issues"* (Student 4).

1.2. In terms of data differentiation, it was found that students were better able to distinguish between primary and secondary information. However, there were still minor errors in prioritizing the information, as seen in the following examples of student

responses: *“I am better at distinguishing primary from secondary information; however, I still tend to confuse factual details with opinions that are not essential to the analysis”* (Student 9).

2. In terms of attributing, the interviews revealed the following key points:

2.1. In analyzing cause-and-effect relationships, students generally demonstrated an understanding of causal links. However, they occasionally had difficulty articulating these connections clearly in certain situations. This was reflected in the following student response: *“I am better at understanding and analyzing cause-and-effect relationships, but I sometimes struggle to clearly explain the reasons behind the outcomes, which leads to incomplete explanations”* (Student 5).

3. In terms of organizing, the interviews revealed the following key points:

3.1. In terms of understanding principles, students grasp the basic concepts well but still experience confusion with some complex details. At times, their explanations are incomplete or unclear, requiring additional time to fully understand, as seen in the following examples of student responses: *“I think I can better understand of the basic principles in case study analysis, but when faced with more complex content, I still feel confused in making connections and sometimes struggle to explain certain points clearly”* (Student 7).

4. In terms of learning management, the interviews revealed the following key points:

4.1. In terms of handling complex information, students generally demonstrated the ability to analyze data effectively. However, when faced with more intricate content, they often required additional time to make meaningful connections and provide thorough explanations. This was reflected in the following student comment: *“Data can be well connected, but complex information may require extra time for analysis”* (Student 1).

4.2. In terms of time limitations, students have become better at allocating time for review and analysis. However, there are still occasional errors in their analytical thinking due to improper time management. An example of a student’s response is: *“Time is well allocated for review, allowing for comprehensive analysis, but in some cases, additional time is needed for in-depth analysis”* (Student 9).

After engaging in constructivist learning activities integrated with case studies, all students surpassed the 70% threshold for analytical thinking skills. This improvement reflects the impact of active learning, which fostered critical thinking through information analysis, problem-solving, and collaborative discussion.

4. Discussion and Conclusion

After receiving the learning intervention, all 9 students in the target group (100%) achieved analytical thinking skills that met the established criteria. This outcome illustrates that the constructivist learning approach, when combined with case studies, can effectively enhance analytical thinking abilities. Furthermore, this learning activity supported the development of problem-solving skills and the ability to link reasoning through practical, real-world application (Savery & Duffy, 1995). The students were able to discover knowledge independently, exchange ideas, practice communication skills, and work as a team, thereby promoting deep learning and developing social skills (Fosnot, 2005; Office of the Education Council, 2007a). Constructivist learning helps students understand through personal experience, linking knowledge to real-life situations, developing critical thinking skills, questioning, and seeking answers independently. It promotes creativity, exchange of opinions, problem-solving attempts, and the practice of analytical skills (Billett, 2009; Fosnot, 2005; Hmelo-Silver et al., 2007; Jonassen, 1999; Sila-lak, 2009; Zhu, 2023). Moreover, case study allow students to engage with real-world problems, practice problem-solving, and develop analytical thinking skills. It helps broaden their perspectives (Choomnoon, 2022; Jonassen & Hernández-Serrano, 2002; Lundeberg et al., 1999; Moolkhum, 2004). Initially, students demonstrated confusion in identifying key issues and linking information. However, after participating in two cycles of the learning process, their analytical thinking skills showed notable improvement. They became more capable of distinguishing relevant information, connecting causal factors, and applying underlying principles effectively through collaborative discussions and the exchange of ideas. This aligns with the constructivist approach, which provides a solid foundation for future academic development. Therefore, it can be concluded that engaging students in self-directed learning through the analysis of contextualized scenarios—similar to case studies—enhances their understanding of fundamental principles. This process not only supports the development of analytical thinking skills but also promotes the practical application of knowledge across various situations. Such an approach fosters deeper conceptual understanding and significantly improves learning outcomes.

In the first cycle, there were 5 students (55.56%) demonstrated analytical thinking skills that met the 70% threshold. Based on the assessment of their analytical thinking skills, the students had mean score of 20.77(69.23%) of the total score. Considering in each component, the mean scores for differentiating, attributing, and organizing were 7.22, 7.22, and 6.33, respectively. The mean scores for differentiating and attributing were the highest, indicating that students demonstrated a strong understanding of the content through learning and case studies. They were able to identify key points, summarize information effectively, and select appropriate principles. They were able to see the connections between data and understand the overall scenario. The area with the lowest average score was organizing. This aspect requires students to generate new ideas through group discussions. However, when students lack a clear understanding of the principles, they struggle to organize information and identify key points in the content. Consequently, this leads to difficulties in data analysis and the application of knowledge. Additionally, the data from behavioral observations of the target group, whose analytical thinking skills were below the 70% threshold, revealed similar encounters problem. They demonstrated inadequate skills in analyzing the significance of issues and identifying relationships. Their ability to effectively analyze principles was still lacking, primarily due to an inability to

accurately identify or explain the underlying principles related to the content. This indicated a limited depth of understanding. Their learning behavior tended to rely more on memorization than on true comprehension, which hindered their ability to apply the principles in real-life situations or critically assess their limitations. Interviews with the target group of students also revealed that they had skills in analyzing the importance of issues and analyzing relationships, but they still could not demonstrate their ability to analyze principles. The results from the interviews aligned with the findings from the analytical thinking skills test, where principle analysis had the lowest average score. When encountering situations involving multiple variables, the students continued to experience challenges in applying their knowledge, leading to inaccurate analyses or an inability to derive clear and well-founded conclusions. The behavior of the five students who exceeded the criteria threshold in analytical thinking differed significantly. These students were able to recognize the significance of the content more clearly. Case studies helped them understand problems systematically, distinguish key issues, establish cause-and-effect relationships, and engage in idea exchange with peers. As a result, they demonstrated improved analysis and more effective application of knowledge. This aligns with Na Thalang's (2023) perspective on the development of analytical thinking skills, which posits that students who enhance these abilities demonstrate marked progress, as reflected in elevated scores from behavioral assessments, active class participation, and other indicators of cognitive engagement that contribute to improved analytical performance. This finding further supports the efficacy of the constructivist approach—characterized by active student involvement, experiential learning, real-world problem-solving, and collaboration—in fostering a deeper understanding of conceptual content. Such a participatory learning environment not only facilitates comprehension of theoretical principles but also enhances students' capacity to apply their knowledge effectively in practical, real-world situations (Nwamaradi et al., 2024).

In the second round of the intervention, after correcting and improving the learning activities based on the feedback from the first cycle, 9 students (100%) from the target group achieved the 70% threshold. The students' average score on analytical thinking skills was 24.56 out of 30 points, which is 81.85% of the total score. Considering in component, the highest average score was observed in the area of differentiating ($M = 9.00$), followed by attributing ($M = 8.00$). The lowest average score was found in organizing, with a mean score of 7.55. In this cycle, the learning activities were improved by addressing the weaknesses from the first cycle. These improvements included enhancing skills in identifying key points and linking data through various case studies, along with group discussions and idea exchanges to develop analytical thinking. Students engaged in analyzing cause-and-effect relationships within complex case studies, collaborated with peers, and received constructive feedback from both classmates and instructors. This process was designed to enhance their problem-solving abilities in multifaceted situations and to foster the comprehensive development of their analytical thinking skills (Hattie & Timperley, 2007; Johnson & Johnson, 2009; Kolodner et al., 2003). As a result of incorporated solutions from the first feedback to address the issue of students struggling to identify key points and link ideas to case studies, students were able to analyze and explain the content more thoroughly. They also improved their ability to distinguish the relationships between causes and effects and correctly link important data in complex content. By using a variety of case studies that were more relevant to students' daily lives, the approach emphasized that students should understand the principles of the content on their own before engaging in group discussions. After this learning intervention, students showed better understanding of the content through learning and case studies. They were able to identify key points from case studies, ask questions, search for information, summarize and link data logically, and select appropriate principles. They were also able to see the connections between data and understand the overall picture, applying their knowledge to various situations. This led to improved analytical thinking skills (Hattie & Timperley, 2007; Kolodner et al., 2003). However, organizing aspects still had the lowest average score because, although students understood the basic principles well, some were still confused about distinguishing data, connecting knowledge, and applying it in more complex situations. They also lacked confidence in applying knowledge to new or unfamiliar situations. This is consistent with the observation that students have shown progress in understanding and applying the principles related to the content more effectively through the use of case studies and repeated review of the material. They are able to link principles to real-life situations and interpret them more clearly. However, they still lack confidence in applying knowledge to new or unfamiliar situations. Additionally, interviews revealed that students understood the basic principles well but still experienced confusion or lacked clarity on certain complex details. At times, their explanations were incomplete or unclear, requiring extra time to fully understand.

In conclusion, integrating constructivist principles with case-based learning significantly enhances students' analytical thinking skills. This approach promotes active, experiential learning and encourages student autonomy, collaboration, and engagement with real-world problems. By fostering deep understanding and the ability to apply knowledge contextually, this model supports both cognitive and social development, ultimately leading to improved academic outcomes.

References

- Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy*. Longman.
- Berkat, B., Setinawati, & Basrowi, B. (2025). The role of educational management in enhancing innovation and problem-solving competencies for students towards global competitiveness: A literature review. *Social Sciences & Humanities Open*, 11, 101280. <https://doi.org/10.1016/j.ssaho.2025.101280>

- Billett, S. (2009). Realising the educational worth of integrating work experiences in higher education. *Studies in Higher Education*, 34(7), 827-843. <https://doi.org/10.1080/03075070802706561>
- Bonney, K. M. (2015). Case study teaching method improves student performance and perceptions of learning gains. *Journal of Microbiology & Biology Education*, 16(1), 21-28. <https://doi.org/10.1128/jmbe.v16i1.846>
- Bruner, J. S. (1986). *Actual minds, possible worlds*. Harvard University Press.
- Chen, M., Wang, Z., Liang, L., Ma, Z., & Liu, Y. (2024). Typical practical cases in blended learning. In M. Li, X. Han, & J. Cheng (Eds.), *Handbook of educational reform through blended learning* (pp. 231-270). Springer. https://doi.org/10.1007/978-981-99-6269-3_6
- Choomnoon, S. (2022). Constructivist learning in Thai vocational education: A case study of hospitality training. *Journal of Technical Education Development*, 35(1), 45-60.
- Fosnot, C. T. (2005). *Constructivism: Theory, perspectives, and practice*. Teachers College Press.
- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77(1), 81-112. <https://doi.org/10.3102/003465430298487>
- Herreid, C. F. (2007). *Start with a story: The case study method of teaching college science*. NSTA Press.
- Hmelo-Silver, C. E., Duncan, R. G., & Chinn, C. A. (2007). Scaffolding and achievement in problem-based and inquiry learning. *Educational Psychologist*, 42(2), 99-107. <https://doi.org/10.1080/00461520701263368>
- Johnson, D. W., & Johnson, R. T. (2009). An educational psychology success story: Social interdependence theory and cooperative learning. *Educational Researcher*, 38(5), 365-379. <https://doi.org/10.3102/0013189X09339057>
- Jonassen, D. H. (1999). Designing constructivist learning environments. In C. M. Reigeluth (Ed.), *Instructional-design theories and models* (pp. 215-239). Lawrence Erlbaum.
- Jonassen, D. H., & Hernández-Serrano, J. (2002). Case-based reasoning and instructional design: Using stories to support problem solving. *Educational Technology Research and Development*, 50(2), 65-77. <https://doi.org/10.1007/bf02504994>
- Kemmis, S., & McTaggart, R. (1988). *The action research planner* (3rd ed.). Deakin University.
- Klah-harn. (2021). *An in-depth look at vocational education – wages and development strategies to address economic demands*. The 101 World. <https://www.the101.world>
- Kolodner, J. L., Camp, P. J., Crismond, D., Fasse, B., Gray, J., Holbrook, J., Puntambekar, S., & Ryan, M. (2003). Problem-based learning meets case-based reasoning in the middle-school science classroom: Putting Learning by Design™ into practice. *Journal of the Learning Sciences*, 12(4), 495-547. https://doi.org/10.1207/s15327809jls1204_2
- Krailert, J. (2021). The effect of case-based learning on the topic of peace and culture on the analytical thinking skills of higher vocational certificate students at Krabi Technical College. *Journal of Teacher Professional Development*, 2(2), 84-92. <https://ph02.tci-thaijo.org/index.php/Withayajarnjournal/article/view/243620>
- Kuncoro, K. S., Harini, E., & Trimono, D. A. (2022). Bloom's Taxonomy Analyze Category: The Analysis of Students' Analytical Skills Based on Gender. *Unnes Journal of Mathematics Education*, 11(2), 156-165. <https://doi.org/10.15294/ujme.v11i2.58473>
- Lundeberg, M. A., Levin, B. B., & Harrington, H. L. (Eds.). (1999). *Who learns what from cases and how?: The research base for teaching and learning with cases*. Lawrence Erlbaum.
- McGrath, S., & Yamada, S. (2023). Skills for development and vocational education and training: Current and emergent trends. *International Journal of Educational Development*, 102, 102853. <https://doi.org/10.1016/j.ijedudev.2023.102853>
- Moolkhum. (2004). *Analytical thinking*. Phapphim.
- Na Thalang, P. (2023). Development of analytical thinking skills of grade 11 students at Wat Bueng Thonglang Secondary School studying Yoniso-manasikara through the method of dialectical thinking. *Journal of Teacher Professional Development*, 4(3), 84-98. <https://ph02.tcithaijo.org/index.php/withayajarnjournal/article/view/247190>
- Nwamaradi, A. T., Onyejike, D. N., Onyeka, E. C., Okonkwo, O. K., & Oluchukwu, C. I. N. (2024). The effect of using constructivist approach of instruction in developing critical thinking skill of estimation among secondary school students. *UNIZIK Journal of STM Education*, 7(1), 140-150.
- Oba. (2009). *Concepts and design of case study research*. Thammasat University Press.
- OECD. (2018). *Education in Thailand: An OECD-UNESCO perspective*. OECD Publishing.
- Office of the Education Council(a). (2007). *Constructivism*. Office of the Education Council (OEC).
- Office of the Education Council(b). (2017). *The national education plan 2017-2036*. Prik Waan Graphic Company Limited.
- Office of the Education Council. (2019). *Education on the trends of labor demand based on a geographical approach*. Prik Waan Graphic Company Limited.
- Office of the Vocational Education Commission (OVEC). (2023). *Thai vocational education standards*. Office of the Education Council Ministry of Education.
- Office of the Vocational Education Commission. (2024). *Curriculum for vocational certificate, Buddhist Era 2024: Business administration program, marketing profession group, marketing field of study*. <https://bsq.vec.go.th/th-th>
- Poláková, M., Suleimanová, J. H., Madzík, P., Copuš, L., Molnářová, I., & Polednová, J. (2023). Soft skills and their importance in the labour market under the conditions of Industry 5.0. *Heliyon*, 9(8), e18670. <https://doi.org/10.1016/j.heliyon.2023.e18670>

- Regional Education Office 10. (2024). *Average score of national educational testing for vocational education (V-NET)*. <https://reo10.moe.go.th>
- Savery, J. R., & Duffy, T. M. (1995). Problem based learning: An instructional model and its constructivist framework. *Educational Technology*, 35(5), 31–38.
- Smith, P. L., & Ragan, T. J. (1999). *Instructional design* (2nd ed.). Prentice-Hall.
- Sila-lak. (2009). *Creative learning: Approaches and methods*. Chulalongkorn University Press.
- Suhendi, A., Purwarno, P., & Chairani, S. (2021). *Constructivism-based teaching and learning in Indonesian education*. In *Annual International Conference on Language and Literature (AICLL 2021)* (pp. 76–89). *KnE Social Sciences*. <https://doi.org/10.18502/kss.v5i4.8668>
- Wheelahan, L., & Moodie, G. (2017). Vocational education qualifications' roles in pathways to work in liberal market economies. *Journal of Vocational Education & Training*, 69(1), 10–27. <https://doi.org/10.1080/13636820.2016.1275031>
- Wongyai. (2019). *Developing creative innovation skills*. Center for Leaders in Innovation Curriculum and Learning Development.
- World Bank. (2021). *Thailand education policy review: Challenges and opportunities*. World Bank Group.
- Zhu, L. (2023). The Application of the Constructivism Theory in Enhancing Classroom Teaching. *Journal of Contemporary Educational Research*, 7(12), 209-213. <https://doi.org/10.26689/jcer.v7i12.5792>
- Zuurmond, A., Guérin, L., Ploeg, P. v. d., & Riet, D. v. (2023). Learning to question the status quo: Critical thinking, citizenship education and Bildung in vocational education. *Journal of Vocational Education and Training*, 76(5), 1185–1204. <https://doi.org/10.1080/13636820.2023.2166573>