Aligning teaching methods to learning outcomes at Can Tho University: Perspectives of undergraduate students

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Article info.	ABSTRACT
	This study investigates the effectiveness of common teaching methods (TMs) in meeting learning outcomes (LOs) at Can Tho University (CTU) from the students' perspective. A survey was conducted among 373 students across 13 training units to assess their perceptions of the alignment between LOs and TMs. The survey included questions on students' understanding of LOs, the role of lecturers in achieving LOs, and the effectiveness of various TMs in developing specialized knowledge, skills, soft skills, and character. Data were analysed using Excel and SPSS, revealing that students recognize the importance of understanding LOs and appreciate lecturers' efforts in facilitating this through diverse instructional strategies. The findings indicate that practical sessions, use of IT for simulations, and community-based learning are particularly effective in achieving LOs. The study underscores the critical role of aligning TMs with LOs to enhance educational outcomes and suggests that universities should prioritize professional development for lecturers and clear communication of LO to students. Future research should expand the sample to multiple institutions and explore the long-term impact of these TMs on student outcomes. These insights contribute to improving teaching practices and ensuring students acquire the necessary skills and knowledge for their future endeavours.

1. INTRODUCTION

Higher education institutions are increasingly focusing on enhancing the quality of their educational programs to meet the demands of both students and employers. The alignment of teaching methods (TMs) with learning outcomes (LOs) has become a critical factor in ensuring that educational programs are effective and relevant. Learning outcomes, as defined by various educational policies and frameworks, represent the essential skills, knowledge, and attitudes that students are expected to acquire upon completing a course or program. In Viet Nam, the Ministry of Education

and Training has emphasized the importance of LOs in higher education, as stated in several key regulations and guidelines (Ministry of Education and Training, 2021). In this paper, LOs refer to learning outcomes in general. Specifically, CLOs are used for course learning outcomes, while PLOs refer to program learning outcomes.

LOs are specific statements that describe what learners are expected to know, be able to do, or value by the end of a course or program. According to Kennedy (2006), LOs are intended to provide clarity and focus for both teaching and learning activities, serving as a bridge between educational

objectives and assessment criteria. LOs are essential for curriculum design as they help ensure that the educational process is aligned with desired educational achievements (Adam, 2006). TMs refer to the strategies, techniques, and approaches employed by educators to facilitate learning. These methods can range from traditional lectures to more interactive approaches, such as problem-based learning, group discussions, and case studies. Effective TMs are those that actively engage students in the learning process and are aligned with the intended LOs (Bourner & Flowers, 1999; Bligh, 2000).

The theoretical foundation of this study is based on Biggs' Constructive Alignment Theory (Biggs, 2003). This theory posits that the components of teaching, including objectives, TMs, and assessments, should be systematically aligned to support students in achieving the desired LOs. Constructive alignment ensures that all aspects of teaching and learning are geared towards helping students achieve these outcomes, fostering a more cohesive and effective educational experience. Constructive alignment is grounded in constructivist theories of learning, which suggest that learners construct knowledge through active engagement and interaction with their environment (Piaget, 1970; Vygotsky, 1978). Biggs (1996) argues that for learning to be effective, the intended LOs must be clearly articulated and aligned with the teaching activities and assessment tasks. This alignment compels students to engage in learning activities that directly contribute to achieving the specified outcomes. In constructive alignment, the starting point is the desired LOs, which are detailed descriptions of what students should be able to do by the end of the learning process. These outcomes guide the selection of TMs and assessment tasks. Biggs (2003) emphasizes that TMs should be chosen based on their ability to facilitate the achievement of LOs. For instance, if an LOs requires students to develop critical thinking skills, TMs such as problem-based learning or case studies would be appropriate.

Constructive alignment has been widely adopted in higher education as a framework for curriculum design and instructional planning. According to Biggs & Tang (2011), this approach helps ensure that all teaching activities are purposefully directed towards achieving the LOs. This alignment not only enhances the coherence of the educational process but also improves student engagement and motivation, as students can see the relevance and purpose of their learning activities. Empirical studies have provided robust support for the principles of constructive alignment. For example, Ramsden (2003) found that students' perceptions of good teaching are strongly associated with how well TMs align with LOs. Similarly, Hattie (2009) in his meta-analysis of factors influencing student achievement, identified clear articulation of LOs and aligned TMs as significant contributors to effective learning. While constructive alignment offers a valuable framework for educational practice, its implementation can pose challenges. One major challenge is ensuring that LOs are specific, measurable, and aligned with both TMs and assessment tasks. Additionally, educators must be adequately trained to design and implement aligned curricula. Guskey (2002) highlights the importance of professional development in equipping educators with the skills needed to apply constructive alignment effectively. Research on the alignment of TMs with LOs has shown that this alignment is crucial for enhancing educational effectiveness. A study by Ramsden (2003) highlighted that students' perceptions of good teaching are significantly associated with how well the TMs align with the LOs. The more the teaching and assessment tasks reflect the LOs, the more students perceive the teaching to be effective.

Bligh (2000) examined the role of lectures in higher education, concluding that, while lectures are effective for information transmission, they are less effective for promoting higher-order cognitive skills. This finding is supported by Bourner & Flowers (1999), who emphasized the need for integrating active learning methods, such as problem-based learning and case studies, to foster deeper understanding and skill development. Several studies have explored the effectiveness of interactive TMs in achieving LOs. Prince (2004) conducted a meta-analysis on active learning and found that methods involving student participation, such as discussions and problem-solving activities, lead to improved retention and understanding of material. Similarly, Freeman et al. (2014) found that active learning significantly reduces failure rates and increases student performance in STEM courses. Assessment practices that are aligned with LOs are critical for ensuring that students achieve the desired educational outcomes. Brown et al. (1997) emphasized that assessment tasks should be designed to measure the extent to which students have achieved the LOs. Nicol & Macfarlane-Dick (2006) highlighted the importance of formative

assessment and feedback in guiding students towards the attainment of LOs, suggesting that timely and constructive feedback helps students understand their progress and areas for improvement.

In the context of Vietnamese higher education, studies by Bui et al. (2020) and Le (2017) have highlighted the challenges and opportunities associated with aligning TMs with LOs. These studies point out that traditional TMs, such as lectures, are still predominant, but there is a growing recognition of the need to incorporate more active and student-cantered learning approaches. The Ministry of Education and Training (2021) has also issued guidelines emphasizing the importance of LOs in curriculum design, underscoring the national push towards modernizing educational practices.

Can Tho University (CTU), a leading educational institution in the Mekong Delta region, has recognized the need to align its TMs with the intended LOs to improve the educational experiences and outcomes for its students. Despite this recognition, there is limited empirical evidence on the effectiveness of various TMs in achieving LOs in Vietnamese higher education institutions. This research investigates the effectiveness of common TMs in meeting the LOs at CTU from the students' perspective. Evaluating how well the current TMs are meeting the LOs from the students' perspective can provide valuable insights for improving educational practices and ensuring that students acquire the necessary skills and knowledge. Understanding students' perceptions of the effectiveness of different TMs is crucial for enhancing the educational experience and aligning teaching practices with learning objectives.

This research aimed to evaluate the effectiveness of common TMs in meeting the LOs at CTU, identify the TMs perceived by students as most effective in achieving specific LOs, and provide recommendations for enhancing the alignment of TMs with LOs to improve educational outcomes.

To achieve these objectives, the following research questions were formulated:

− How do students at CTU perceive the alignment between LOs and TMs in their educational programs?

− What roles do lecturers play in helping students achieve LOs through various TMs?

2. MATERIALS AND METHOD

A quantitative survey approach was employed with a structured questionnaire to gather data from students across various training units. A total of 373 students participated. The sample was selected using a stratified random sampling method, where students were first divided into subgroups based on their training unit. From each training unit, a random sample of students was selected to ensure representation across different academic disciplines. This approach allowed for a more comprehensive analysis of how teaching methods align with learning outcomes across diverse educational contexts. The questionnaire included sections on student awareness of LOs, the role of lecturers in helping students achieve these outcomes, and the effectiveness of common TMs in meeting specialized knowledge, skills, soft skills, and attitudinal requirements. Items were rated on a Likert scale from 1 (strongly disagree) to 5 (strongly agree).

Data collection was conducted via paper-based classroom handouts, distributed directly to students in various classes. Descriptive statistics, including mean and standard deviation, summarized student responses. Cronbach's alpha assessed the internal consistency and reliability of each section, with high values indicating strong reliability. Data analysis was performed using Excel and SPSS. Results were analyzed in the context of existing literature on TMs and LOs, comparing findings with previous studies.

3. RESULTS AND DISCUSSION

To investigate the alignment of LOs and TMs from the perspective of students at CTU, a survey was conducted. The questions primarily revolved around the concepts of LOs, TMs, and the alignment between these two components.

The survey collected 373 responses from students across 13 different training units. The distribution of responses is diverse, with the highest number of responses coming from the College of Engineering Technology (82 responses, 22%), followed by the College of Environment & Natural Resources (63 responses, 16.9%). The lowest number of responses was from the College of Rural Development (5 responses, 1.3%). No responses were collected from the College of Aquaculture and Fisheries and the Institute of Food & Biotechnology.
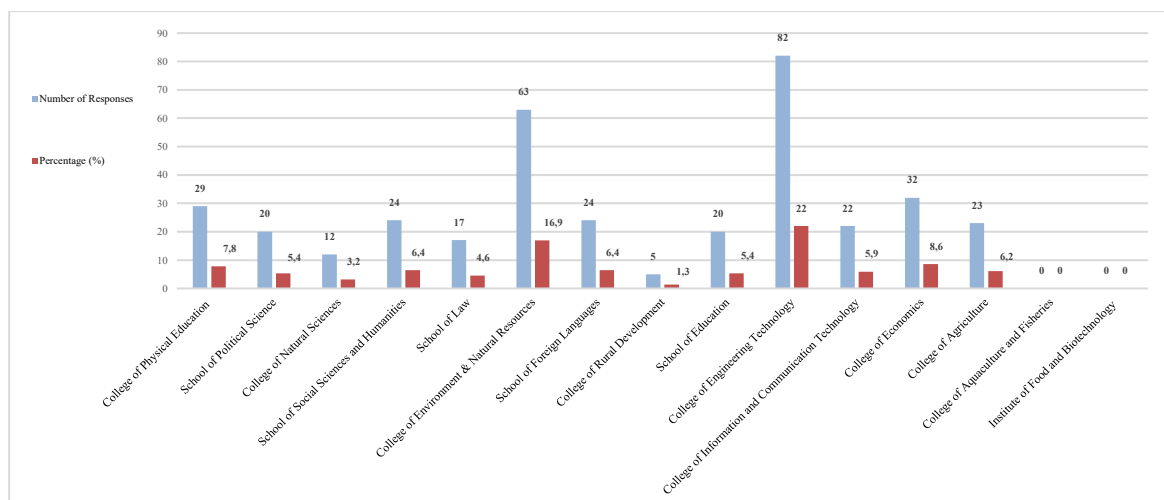
Figure 1. Number of student responses collected from training units at CTU

3.1. Student awareness of LOs in training programs and courses

The survey results, as shown in Table 1, reflect students' perceptions at CTU regarding their understanding of LOs and its impact on their educational experience.

Table 1. Student awareness of LOs in training programs and courses

Statement	Mean ± SD
Advisors should understand PLOs before advising students on study programs.	4.23 ± 0.778
Students should understand PLOs before starting their study programs.	4.26 ± 0.752
Students should understand CLOs before and during their courses.	4.13 ± 0.795
Understanding CLOs positively impacts the study process.	4.17 ± 0.751
Understanding CLOs helps in developing effective study strategies.	4.23 ± 0.741
Understanding CLOs helps in defining the requirements of the study process.	4.20 ± 0.744
Understanding CLOs helps in evaluating the appropriateness and effectiveness of teaching.	4.08 ± 0.794
Understanding CLOs helps in self-assessment of the effectiveness of learning and practice.	4.15 ± 0.772
Cronbach's Alpha: 0.939	

The survey results in Table 1 indicated that students at CTU recognized the importance of understanding LOs throughout their academic journey. The majority of students agreed that advisors and students themselves should thoroughly understand LOs before the commencement of study programs, as well as during the courses. This awareness was seen as critical for developing effective study strategies, defining the requirements of the study process, and evaluating the appropriateness and effectiveness of teaching. Moreover, understanding LOs was perceived as beneficial for self-assessment in learning and practice. These findings suggest that the emphasis placed on LOs at CTU had a significant impact on students' perceptions, leading to a more engaged and purposeful educational experience.

3.2. Role of lecturers in helping students achieve LOs

The survey results presented in Table 2 reflect students' perceptions of the role of lecturers in helping them achieve LOs at CTU.

Students perceived lecturers at CTU as playing a pivotal role in their achievement of CLOs. The data demonstrated that students valued lecturers who introduced CLOs at the beginning of courses and consistently aligned their teaching methods with these outcomes throughout the teaching process. Lecturers who regularly reminded students of the CLOs, selected core content that matched the CLOs, and chose appropriate teaching methods and assessment strategies were seen as particularly effective. Additionally, providing students with opportunities to demonstrate their achievement of CLOs and encouraging self-assessment were also

recognized as key practices by lecturers. These findings underscore the critical role of lecturers in facilitating the alignment of CLOs with teaching

practices, which was essential for students to achieve the desired educational outcomes.

Table 2. Role of lectures in helping students achieve Los

Statement	Mean ± SD
Introduce CLOs and methods to ensure students meet CLOs of courses before teaching begins.	4.20 ± 0.783
Regularly remind students to ensure the CLOs of courses during the teaching process.	4.06 ± 0.772
Select core teaching contents that match CLOs.	4.17 ± 0.793
Choose TMs and learning activities that match CLOs.	4.21 ± 0.751
Choose assessment methods that match the CLOs being assessed.	4.16 ± 0.765
Provide opportunities for students to demonstrate their achievement of CLOs during the study process.	4.21 ± 0.762
Provide opportunities for students to self-assess their achievement of CLOs during the study process.	4.16 ± 0.798
Clarify CLOs that students need to achieve before starting to teach courses.	4.24 ± 0.759
Cronbach's Alpha: 0.940	

3.3. Effectiveness of common TMs in meeting specialized knowledge requirements

The survey results presented in Table 3 reflect students' perceptions of the effectiveness of common TMs in meeting specialized knowledge requirements at CTU.

Table 3. Effectiveness of Common TMs in meeting specialized knowledge requirements

Statement	Mean ± SD
Lecturers lecture on the issue.	4.04 ± 0.743
Lecturers ask students to think and answer questions before concluding knowledge (question-answer method).	4.16 ± 0.746
Lecturers require students to self-study, research, and understand knowledge within the course content.	3.66 ± 0.983
Lecturers encourage students to self-study, research, and understand advanced or expanded knowledge.	3.90 ± 0.900
Lecturers send videos/files of lectures for students to watch before class discussions.	4.04 ± 0.840
Lecturers assign individual activities for students to understand knowledge before coming to class.	4.04 ± 0.807
Lecturers organize group investigations (before class) and presentations (in class) on related topics.	4.05 ± 0.854
Lecturers organize group discussions and teamwork in class to understand knowledge.	4.12 ± 0.760
Lecturers organize individual and group document analysis in class.	4.05 ± 0.800
Lecturers assign practice exercises (not related to real-life practice) after learning knowledge.	3.70 ± 1.022
Lecturers assign tasks to solve practical problems/scenarios designed to discover new knowledge or apply learned knowledge.	4.26 ± 0.765
Lecturers organize students to self-discover and solve real-life problems to discover new knowledge or apply learned knowledge.	3.97 ± 0.830
Lecturers organize case study analysis to apply knowledge.	4.08 ± 0.724
Lecturers organize practical or experimental sessions to derive knowledge.	4.24 ± 0.771
Lecturers organize students to produce projects and present their products and experiences in class.	4.12 ± 0.810
Lecturers organize students to track and evaluate their learning process.	3.85 ± 0.856
Lecturers organize role-playing or drama activities to learn and apply knowledge.	3.87 ± 0.918
Lecturers organize educational games to review and apply knowledge.	4.06 ± 0.808
Lecturers encourage students to vocalize their thoughts, questions, and ideas (think aloud) to understand the lesson deeply.	4.10 ± 0.827
Lecturers use simulations and virtual experiments to teach and apply learned knowledge.	4.10 ± 0.821
Lecturers invite experts to advise and discuss content with students.	4.05 ± 0.833
Cronbach's Alpha: 0.939	

Table 3 revealed that certain TMs were more effective than others in meeting specialized knowledge requirements. Lectures and the question-answer method were perceived as quite effective, highlighting the importance of interactive engagement in the classroom. However, self-study and research within course content were rated as only moderately effective, suggesting that, while

independent learning is important, students might benefit more from structured guidance. Encouraging students to explore advanced or expanded knowledge was also seen as moderately effective. These results suggest that, while traditional and interactive teaching methods are valued, there is a need for more support in facilitating independent learning and deeper exploration of subject matter.

3.4. Effectiveness of common TMs in meeting specialized skill requirements

The survey results presented in Table 4 reflect students' perceptions of the effectiveness of common TMs in meeting specialized skill requirements at CTU.

Table 4. Effectiveness of common TMs in meeting specialized skill requirements

Statement	Mean ± SD
Lecturers lecture on issues related to these skills.	4.12 ± 0.74
Lecturers encourage students to self-study and practice skills.	3.95 ± 0.805
Lecturers model for students to observe and imitate.	3.98 ± 0.793
Lecturers organize practical or experimental sessions under direct guidance to practice skills.	4.28 ± 0.662
Lecturers organize self-study using practice and experiment guides.	3.97 ± 0.765
Lecturers apply IT for simulations and virtual experiments in teaching.	4.20 ± 0.728
Lecturers organize students to produce projects and present products/experiences in class.	4.13 ± 0.717
Lecturers assign tasks to develop specialized skills (e.g., lesson plans, project plans, videos).	4.16 ± 0.694
Lecturers organize students to produce and present products in class immediately after creation.	4.11 ± 0.725
Training units organize internships, observations, field surveys, and practical experiences at workshops/factories.	4.29 ± 0.709
Training units organize practical training to develop future professional skills.	4.31 ± 0.679
Training units guide students in conducting scientific research/thesis to develop specialized skills.	4.23 ± 0.714
Training units organize seminars with experts.	4.10 ± 0.759
Cronbach's Alpha: 0.927	

The students found practical sessions under direct guidance to be particularly effective in developing specialized skills. The application of IT for simulations and virtual experiments was also viewed positively, reflecting the growing importance of technology in education. Organizing students to produce projects and present their experiences in class was another method that students found effective. Conversely, methods that required more self-directed study or use of guides were perceived as less effective, indicating that students may prefer hands-on, guided learning experiences over independent skill development. This preference underscores the importance of practical, experience-based learning in skill acquisition at CTU.

3.5. Effectiveness of common TMs in meeting soft skill requirements

The survey results in Table 5 reflect students' perceptions of the effectiveness of common TMs in meeting soft skill requirements at CTU. Some TMs,

while primarily targeting soft skills, also contribute to professional skills, such as language proficiency and research. These methods are included under soft skills because they develop transferable abilities like communication, critical thinking, and problem-solving, which are essential for both personal and professional success.

The findings showed that students at CTU valued practical sessions and community-based activities for developing soft skills. These methods were seen as more effective than those that relied solely on lectures or self-study. The emphasis on experiential learning, such as through direct guidance and real-world application, aligns with the broader educational trend toward developing interpersonal and professional competencies. This suggests that for soft skills, interactive and community-based learning environments are particularly beneficial, fostering skills that are not easily developed through traditional lecture-based teaching alone.

Table 5. Effectiveness of common TMs in meeting soft skill requirements

Statement	Mean ± SD
Lecturers lecture on issues related to these skills.	3.99 ± 0.808
Lecturers encourage students to self-study and practice these skills.	3.97 ± 0.856
Lecturers model for students to observe and imitate.	3.90 ± 0.828
Lecturers organize practical sessions under direct guidance to practice skills.	4.14 ± 0.721
Lecturers organize self-study using guides.	3.97 ± 0.869
Lecturers apply IT for simulations and virtual experiments in teaching.	4.16 ± 0.708
Lecturers assign tasks to develop language skills for professional work (e.g., translating videos/lectures).	4.12 ± 0.755
Lecturers organize students to research case studies.	4.11 ± 0.741
Lecturers assign tasks to develop counseling skills (e.g., planning support for a case).	4.13 ± 0.726
Training units organize internships, observations, field surveys, and practical experiences to develop soft skills.	4.27 ± 0.735
Training units organize practical training to develop soft skills.	4.27 ± 0.712
Training units guide students in conducting scientific research/thesis to develop necessary skills.	4.18 ± 0.753
Training units organize seminars with experts.	4.06 ± 0.772
Training units organize community activities related to these skills.	4.17 ± 0.738
Cronbach's Alpha: 0.946	

3.6. Effectiveness of common TMs in meeting attitudinal and character development requirements

The survey results presented in Table 6 reflect students' perceptions of the effectiveness of common TMs in meeting attitudinal and character development requirements at CTU.

Students perceived practical training, internships, and community activities as effective in fostering attitudinal and character development. Lecturers who integrated character education into their teaching, particularly through storytelling and modeling behaviors, were also seen as effective. These results highlight the importance of a holistic approach to education that goes beyond academic knowledge to include the development of character and civic responsibility. The findings suggest that CTU's teaching methods, which incorporate experiential and moral education, are effective in promoting well-rounded character development among students.

Table 6. Effectiveness of common TMs in meeting attitudinal and character development requirements

Statement	Mean ± SD
Lecturers lecture on issues related to the qualities students need to ensure.	4.03 ± 0.801
Lecturers tell stories that integrate character education.	4.10 ± 0.804
Lecturers encourage students to self-study and practice necessary qualities.	4.01 ± 0.807
Lecturers model behaviors for students to observe and imitate.	4.03 ± 0.832
Lecturers organize tasks to demonstrate qualities (e.g., role-playing, handling tasks related to their training).	4.05 ± 0.817
Lecturers organize tasks to demonstrate other necessary citizen qualities (e.g., completing tasks responsibly, honesty in study and exams, amicability with peers).	4.14 ± 0.730
Lecturers regularly remind students to ensure adherence to qualities (e.g., altruism, dedication to the profession, fairness, objectivity).	4.16 ± 0.774
Training units organize internships, observations, field surveys, and practical experiences at workshops/factories to develop qualities.	4.21 ± 0.753
Training units organize practical training to develop qualities.	4.14 ± 0.804
Training units organize seminars with experts on qualities.	4.05 ± 0.822
Training units organize community activities to develop professional and civic qualities.	4.25 ± 0.731
Cronbach's Alpha: 0.938	

The findings from this study underscore the critical role of aligning TMs with LOs to enhance educational experiences and outcomes at CTU, consistent with previous research emphasizing the importance of clear learning outcomes in enhancing

student engagement and performance (Biggs & Tang, 2011; Harden, 2002). Students' perceptions highlighted the importance of understanding LO and the effectiveness of lecturers in facilitating this through diverse instructional strategies. Effective methods were identified across various dimensions, including specialized knowledge, skills, soft skills, and character development. Practical sessions under direct guidance and the use of IT for simulations and virtual experiments were particularly effective in developing specialized skills and knowledge (Kolb, 1984; Prince, 2004; Garrison & Kanuka, 2004; Freeman et al., 2014). Additionally, community-based learning and practical training were highly valued for developing soft skills and character, aligning with research on experiential and moral education (Astin, 1993; Lickona, 1996; Kuh, 2008; Sanger & Osguthorpe, 2013). These findings emphasize the need for a holistic approach to education that integrates various teaching strategies to meet diverse learning outcomes, thereby enhancing student engagement, motivation, and overall educational effectiveness (Shulman, 1987; Hattie, 2009). The alignment with studies on active learning and flipped classrooms further suggests that student engagement increases with interactive and varied TMs (Prince, 2004; Freeman et al., 2014), and hands-on, practical experiences and technological integration are crucial in skill development (Kolb, 1984; Garrison & Kanuka, 2004). Overall, the findings highlight the significance of experiential and community-based learning in developing soft skills and character, ultimately supporting improved interpersonal and professional competencies (Kuh, 2008; Astin, 1993).

This study is subject to several limitations. The data collection relied on self-reported surveys, which may introduce bias due to social desirability or inaccurate self-assessment. Additionally, students may have expressed opinions influenced by others' experiences rather than their own, and some might not have fully understood the learning outcomes PLOs or program outcomes CLOs, potentially leading to overstated responses or misconceptions. This limitation highlights the possibility that students' perceptions may not entirely reflect their personal learning experiences. Furthermore, TMs employed by lecturers are diverse, and students may have difficulty accurately evaluating the relationship between TMs and CLOs. Since the analysis relied on average scores, this approach might not fully capture the variability of students'

perceptions across different TMs. Finally, the sample size, while adequate, may not fully represent the diversity of the student population at CTU. Additionally, the study was limited to one institution, which may affect the generalizability of the findings to other contexts or educational settings.

4. CONCLUSION

The findings from this study underscore the critical role of understanding and implementing effective TMs that align with LOs at CTU. This alignment is vital in enhancing the educational experiences and outcomes of students. The study reveals that both students and lecturers play crucial roles in this alignment process. Students recognize the significance of understanding LOs, and lecturers facilitate this understanding through various instructional strategies. Effective TMs have been identified across multiple dimensions, including specialized knowledge, skills, soft skills, and character development, emphasizing a holistic approach to esofucation. The implications of this study are significant for educational practice and policy. First, it highlights the necessity for continuous professional development for lecturers to equip them with the skills needed to employ diverse and effective TMs that cater to different LOs. Additionally, the study suggests that universities should prioritize clear communication of LOs to students, ensuring that they understand the objectives and expectations from the outset. This can be achieved through structured orientation programs and ongoing support throughout their academic journey. Furthermore, the study proposes several orientations for future research. Expanding the sample to include multiple institutions would provide a broader understanding of the effectiveness of TMs across different educational contexts. Additionally, longitudinal studies could explore the long-term impact of these TMs on student outcomes, providing insights into their sustained effectiveness over time. Investigating the interplay between different TMs and specific LOs could also yield valuable information on optimizing teaching strategies to maximize student achievement. Future research should also consider employing more advanced statistical methods, such as regression analysis, to examine potential causal relationships between TMs and LOs. This would allow for a more detailed understanding of how diverse teaching methods influence specific outcomes and how students' perceptions of these methods evolve over time.

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