Developing Critical Thinking Dispositions through Academic Assertiveness among Higher Education Students in Thailand

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Abstract

This research delves into the intricate landscape of academic assertiveness among higher education students in Thailand, focusing on developing critical thinking dispositions and related behaviors. Our investigation uncovered noteworthy patterns that resonated across diverse institutions, shedding light on the multifaceted challenges faced by students. These encompassed a common fear of negative consequences, the profound influence of cultural norms on assertive behaviors, a pervasive lack of self-confidence, a genuine desire for improved communication skills, susceptibility to peer influence, and the impact of the educational context itself.

While an incremental improvement in academic assertiveness scores was discernible in the post-discussion phase, it is vital to acknowledge that this improvement did not attain statistical significance. This finding prompts reflection on the efficacy of the conducted discussion and suggests that it may need to be augmented by continuous and more potent interventions. It underscores the importance of cultivating an academic environment that values and nurtures academic assertiveness as an essential component of critical thinking development.

The culmination of this study offers valuable insights into the intricate web of factors that influence academic assertiveness among higher education students. It underscores the necessity for a nuanced approach, encompassing ongoing interventions and creating a learning environment that empowers students to express themselves assertively, ultimately fostering the growth of critical thinking dispositions and behaviors.

Keywords: critical thinking, academic assertiveness, higher education, Thailand, critical dispositions

1. Introduction

Critical thinking is a multifaceted skill involving reflective scepticism, reasonable judgment, and self-regulatory thinking. It encompasses purposeful, goal-directed judgment informed by criteria and sensitivity to context (McPeck, 1981; Ennis, 1985; Lipman, 1988; Facione, 1990; Paul, 1992; Bailin et al., 1999b; Facione, 2000). From a cognitive psychological standpoint, it involves mental processes that enhance problem-solving, decision-making, and learning (Sternberg, 1986; Halpern, 1998; Willingham, 2007). Educationally, critical thinking aligns with higher-order cognitive skills, as exemplified in Bloom's taxonomy, emphasizing analysis, synthesis, and evaluation (Bloom, 1956; Kennedy et al., 1991). While the educational approach benefits from practical classroom insights, critics highlight potential vagueness and limited empirical testing compared to philosophical and psychological traditions (Ennis, 1985; Sternberg, 1986).

While critical thinking skills refer to the abilities and competencies required for practical reasoning and problem-solving, critical thinking dispositions represent the underlying attitudes, habits, and tendencies that influence one's approach to thinking and decision-making (Lai, 2011). Developing critical thinking dispositions is a crucial aspect of learning, complementing the cognitive component of critical thinking. It is particularly crucial for individuals aiming to become influential critical thinkers (Ennis, 1996). Disposition refers to a person's inclination to act in certain ways under specific circumstances, including being open to alternative problem solutions and considering external viewpoints (McGrath et al., 2003). Critical thinking disposition becomes a habit of mind or attribute integrated into one's beliefs and actions, facilitating effective problem-solving and decision-making (Facione & Facione, 2007). According to Perkins (1993), three fundamental components of critical thinking as thought dispositions include willingness, sensitivity, and ability.

Learners are encouraged to construct knowledge through independent and mental inquiry processes (Ibrahim, 2014; Nur, 2011). Developing the willingness, sensitivity, and ability to address encountered problems is crucial for practical critical thinking, establishing it as a lifelong learning skill (Hudgins & Edelman, 1988). Moreover, Mahmoud (2012) identifies seven critical disposition characteristics: curiosity, open-mindedness, systematic thinking, analytical skills, truth-seeking, confidence, and maturity. These characteristics are essential for individuals to develop and apply critical thinking skills to real-life situations.

Academic assertiveness encompasses critical thinking dispositions, in an academic context, as a set of psychological and emotional orientations and behaviors that empower a learner to navigate challenges in learning, critical thinking, and general social situations inherent in the student experience (Moon, 2007). Critical facets of academic assertiveness include finding an expressive 'voice' for engaging in critical thinking and debate, the readiness to challenge or disagree while accepting challenges, coping with the possibility of being incorrect or making errors, effectively recovering from setbacks, a willingness to reconsider one's perspectives, openness to feedback, active listening, acknowledging others' viewpoints, displaying tolerance for mistakes, autonomy in making and justifying independent judgments, and maintaining an appropriate level of academic self-esteem (Moon, 2007).

1.1 Identifying the Problem

The decline in critical thinking skills presents a pressing global issue, impacting societies and educational systems worldwide (Chaisuwan et al., 2021). Research indicates this decline is evident among nursing students in Thailand compared to their counterparts in the United States, as the latter exhibit significantly higher scores in critical thinking dispositions (Chaisuwan et al., 2021). Moreover, social media addiction has been identified as a contributing factor to the deterioration of students' critical thinking skills (Thomas, 2020). The consequences of this decline are alarming, considering the fundamental role critical thinking plays in practical problem-solving and decision-making.

A study by Ploysangwal (2018) focused on Thai undergraduate students, revealing a need for higher levels of critical thinking. Changwong et al. (2018) responded to this concern by developing the 'PUSCU Model,' a learning management approach designed to enhance critical thinking among students, resulting in significant improvements in both critical thinking ability and academic achievement. However, another study by Changwong et al. (2015) found worrisome average scores in logical thinking and analytical skills among 6,235 students in ten Thai provinces, with only 2.09% passing. These findings emphasize the urgency of addressing the decline in critical thinking skills, especially in the context of Thailand's vision for a knowledge-based economy.

Recent studies conducted among higher education students in Thailand have focused on enhancing critical thinking skills, often overlooking the vital aspect of cultivating the appropriate environment for developing critical thinking dispositions. While there is a clear emphasis on acquiring the technical skills associated with critical thinking, it is equally essential to recognize the underlying attitudes, motivations, and dispositions that drive the effective utilization of these skills. This imbalance is evident in the research landscape, where a disproportionate amount of attention has been directed towards skills, leaving dispositions relatively unexplored.

In Thailand's higher education context, these dispositions are pivotal in students' ability to utilize their critical thinking skills effectively. A study by Stedman and Andenoro (2007) even delves into the relationships between emotional intelligence and critical thinking dispositions among undergraduate leadership students, underlining the intricate interplay between disposition and practical critical thinking.

However, the importance of nurturing these dispositions has often been overshadowed by the compelling need to boost critical thinking skills in response to the evolving demands of Thailand's education landscape, as exemplified by Ploysangwal's (2018) research on Thai undergraduate students. The result is a potential imbalance, where students may acquire the technical skills but lack the drive to apply them consistently in real-world situations. In the context of a rapidly advancing knowledge-based economy, as envisaged in Thailand 4.0, skills and dispositions must be developed concurrently (Kitchener and King, 1994). A study by Tishman et al. (1993) highlights the shift from merely transmitting knowledge to enculturating critical thinking dispositions, underscoring the necessity of integrating disposition development into the educational framework.

From the recent studies, it is clear that in Thailand's higher education system, while there is a recognized emphasis on fostering critical thinking skills, there appears to be a tendency to overlook the equally crucial aspect of cultivating critical thinking dispositions. Despite acknowledging the importance of critical thinking, implementing strategies to develop and assess critical thinking dispositions among students is relatively limited. It is noteworthy that critical thinking goes beyond the cognitive processes of problem-solving and decision-making; it also encompasses the disposition or inclination to engage in thoughtful and reflective inquiry.

However, in the current educational landscape of Thailand, there is a gap in addressing and nurturing these underlying attitudes and orientations associated with critical thinking.

Measuring academic assertiveness and integrating programs that facilitate the development of academic assertiveness could be instrumental in bridging this gap. In this context, academic assertiveness refers to students' ability and inclination to confidently express their ideas, engage in thoughtful debate, and actively participate in academic discourse. By assessing and promoting academic assertiveness, higher education institutions in Thailand can create an environment that stimulates and demands critical thinking from their students.

Encouraging academic assertiveness involves empowering students to voice their opinions, challenging assumptions, and engaging in constructive dialogue. This approach recognizes that critical thinking is not only a set of skills but also a disposition that requires a certain level of confidence, independence, and proactive involvement in the learning process.

In conclusion, addressing the overlooked dimension of critical thinking dispositions through the measurement and enhancement of academic assertiveness could be a key strategy in fostering a more robust educational environment in Thailand—one that not only values critical thinking skills but also actively cultivates the mindset and attitudes conducive to practical critical thinking.

2. Literature Review

2.1 Critical Thinking Skills and Dispositions: Interactions and Differences

Critical thinking skills are individuals' cognitive tools and techniques to analyze information, evaluate arguments, and solve problems effectively. These skills generally include but are not limited to information gathering, analysis, evaluation, interpretation, inference, explanation, and problem-solving (Ennis, 1985; 1989; 2015). They are measurable and can be developed through education and practice. For instance, according to Paul and Elder (2006), critical thinking skills involve processes such as "analysis," which entails breaking down complex information into its constituent parts, and "evaluation," which involves assessing the quality of evidence and arguments. These skills are essential for making informed decisions and forming rational judgments.

On the other hand, critical thinking dispositions refer to the underlying attitudes and traits predisposing individuals to engage in critical thinking. They include open-mindedness, inquisitiveness, the tendency to seek reason, a need to be well-informed, flexibility and adaptability, intellectual courage, intellectual humility, and intellectual perseverance ((Bailin et al., 1999; Facione, 1990, 2000; Halpern, 1998). Dispositions must be more concrete and related to one's general mindset and willingness to think critically. Paul (1990) describes these dispositions as the "habitual inclination to engage in an activity to recognize and overcome one's intellectual obstacles." In other words, they represent the inclination to approach problems and challenges with a reasoned inquiry and reflection mindset.

Critical thinking skills and dispositions are interrelated, but they are not synonymous. While skills are the tools used to think critically, dispositions are the underlying attitudes that motivate individuals to employ those skills (Facione, 1990). For example, an individual with a disposition for intellectual curiosity is more likely to employ critical thinking skills in exploring new ideas and concepts. It is essential to recognize that the development of critical thinking is not limited to skills alone; fostering critical thinking dispositions is equally crucial. Influential critical thinkers possess the skills to analyze and evaluate and have the disposition to approach issues with an open mind, a willingness to challenge assumptions, and the courage to reconsider their beliefs (Paul & Elder, 2006).

Considerable ongoing debate surrounds the precise definition of critical thinking. While there is consensus among researchers that critical thinking encompasses both skills and dispositions, disagreements persist regarding whether the disposition for critical thinking should be assessed in a normative and commendatory context. In 1990, the American Philosophical Association (APA) convened a panel of critical thinking scholars to establish a unified definition of critical thinking to support future research endeavours. Although most experts recognized the significance of dispositions, discord emerged regarding the specific role of dispositions within the definition. Some posited that dispositions played a solely commendatory role, while others contended that dispositions also held a normative function (Facione, 1990). Most researchers concurred that critical thinking equated to "good thinking," requiring both the capacity and inclination to engage in critical thought. Consequently, an individual possessing the capacity for critical thinking but choosing not to employ it would not qualify as a critical thinker (Lai,2011). Nonetheless, a minority of experts contended that true critical thinking must adhere to ethical standards, implying that, for example, a defence attorney employing critical thinking skills

and dispositions to secure an acquittal for a guilty client would not meet the criteria for a critical thinker (Facione, 1990).

Critical thinking skills do not exist in isolation; they are closely intertwined with an individual's critical thinking disposition, as supported by Friedel et al. (2008) and Tishman et al. (1993). A critical thinking disposition can be defined as the internal motivation that consistently drives an individual to engage with problems and make decisions using critical thinking, according to Facione et al. (1996), and it measures one's inclination toward critical thinking (Stedman & Andenoro, 2007). These critical-thinking dispositions are primarily attitudinal and can be developed over time, although their development may take more time than acquiring critical-thinking skills. It is worth noting that approaches to enhancing critical thinking skills can also positively impact critical thinking disposition, as Tishman and Andrade (1996) suggested. The prevailing consensus in research is that critical thinking skills and dispositions should be developed simultaneously, recognizing their inherent interdependence (King & Kitchener, 1994). This idea is reinforced by Facione (2000), who argues that because skills and dispositions mutually reinforce each other, they should be modelled and taught together. Importantly, critical thinking dispositions serve as precursors and gateways to actual critical thinking activity. A lower disposition is less likely to lead to meaningful critical thinking that results in practical problem-solving, solutions, and decision-making. In contrast, a higher disposition is more likely to lead to these desirable outcomes (Irani et al., 2007; Bell et al., 2015).

2.2 Academic Assertiveness: A combination of Critical Dispositions

Moon (2007) coined the term academic assertiveness to combine most of the critical thinking dispositions. The concept of academic assertiveness has various sources and results from observations, but it combines most of the critical thinking dispositions. Academic assertiveness encompasses a range of emotional and psychological orientations and behaviours that empower learners to effectively navigate the challenges they encounter while advancing in their learning journey and engaging in critical thinking. These behaviours manifest in various aspects of academic work and the overall learner experience. They include but are not limited to:

1) Discovering an appropriate 'voice' or mode of expression for engaging in critical thinking and discussions.

2) Demonstrating a readiness to challenge established ideas, engage in constructive disagreements, and actively seek or embrace challenges.

3) Displaying the ability to acknowledge and manage the possibility of being incorrect, making mistakes, or encountering failures. This display involves effectively recovering from such situations, a willingness to revise one's opinions when necessary, and being open to receiving feedback on one's academic or general performance.

4) Cultivating a willingness to listen to others, consider their perspectives, and recognize that individuals, including oneself, are prone to making errors while maintaining a reasonable tolerance level for their shortcomings.

5) Embracing autonomy entails proactively making and justifying independent judgments and taking action based on these judgments.

6) Cultivating appropriate academic self-esteem bolsters confidence and belief in one's academic capabilities (Moon, 2004; 2005b; 2007).

These behaviours collectively contribute to academic assertiveness, enabling learners to confidently tackle the challenges they encounter in pursuing learning and critical thinking.

2.3 Explaining the 'voice' in Academic Assertiveness

The term 'voice' has different interpretations and is essential in academic literature. According to Barnett and Coate (2005) it has broad usage. Belenky, Clinchy, Goldberger, and Tarule (1986) studied the developmental epistemology of women and defined 'voice' as the ability to possess and express one's viewpoint, which reflects the development of a sense of self and mind. This voice encompasses the ability to feel acknowledged and comfortable while expressing opinions, as Gilligan (1998) highlighted. Though Belenky et al. and Gilligan primarily focused on gender-related issues, 'voice' is not limited to gender. Learners from non-dominant cultures or non-traditional backgrounds might struggle to express themselves in educational settings (Moon, 2005a).

In the context of academic assertiveness, 'voice' refers to the confidence to express oneself in an academic environment. Students who feel like novices, may hold back due to unequal power dynamics between academics and students, fearing that their views will be penalized (Read et al., 2003).' Voice' in the context of critical

thinking implies an appropriate sensitivity within the process. Educators striving to nurture critical thinking emphasize the development of this sensitivity, as scholars like Meyers (1986) and Young (1980) suggest. Baxter Magolda (1992) advocates a 'dialogue of authority' in teaching, where teachers should suspend their automatic authority and create an environment that supports the development of students' voices.

Assessment processes often reinforce existing power structures, where assessment is the dominating authority in academia (Hinett, 2002). However, this power can be used more effectively to support learning. In the context of written expression of critical thinking, 'voice' also pertains to the writer's expression in their text and may be influenced by the discipline's discourse. A student developed the 'voice' of a social worker after her placement experience (Ford et al., 2005), exemplifying this aspect. In conclusion, 'voice' has several meanings relevant to developing appropriate expression of critical thinking, including personal expression, self-development, confidence in speaking out, and an appropriate sensitivity in critique. 'Voice building' is closely related to academic assertiveness (Gleaves & Walker, 2006).

2.4 Challenge Established Ideas, Engage in Constructive Disagreements, and Actively Seek or Embrace Challenges

The transition towards a more active and challenging mode of learning, as highlighted by Barnett (1997), is imperative to promote critical thinking. Paradoxically, there is limited discussion regarding the willingness of critical thinkers to engage in challenging situations, seek challenges, and express dissent, all of which are integral to the critical thinking process. Instead, students often desire passive, spoon-fed education.

McKay and Kember's research in Hong Kong challenges the misconception that students prefer passive, unchallenging, didactic teaching. They found that when their program facilitated independent learning and critical thinking, students favoured the modified course and embraced a deep learning approach. Students acknowledged that the modified approach required more active learning, thinking, and logical reasoning, demonstrating receptiveness to critical challenges (McKay and Kember, 1997).

Meyers (1986) suggests intentionally creating 'disequilibrium' or 'constructive disorder' to challenge students' thinking. He emphasizes the need to carefully gauge the amount of disequilibrium to be effective, recognizing that different students may require varying levels of challenge. Critical thinking, by its nature, entails a 'challenge to oneself,' requiring intellectual courage to address ideas, beliefs, or viewpoints with which one disagrees. Paul and Elder (2004) emphasize the importance of fairly addressing opposing viewpoints.

Challenging someone else's thinking, leading to disagreement, involves an emotional component intrinsic to critical thinking. It poses a logical challenge as it challenges the system, particularly in a structured assessment environment. Brookfield (1987) describes developing critical thinking as a 'learning conversation,' encouraging diversity of opinion, disagreement over interpretations, and challenges to existing ways of thinking. He underscores that multiple interpretations of ideas or actions force learners to contemplate alternatives in their thoughts and actions. In conclusion, promoting critical thinking involves embracing challenges, seeking challenges, addressing disagreements, and fostering intellectual courage, all of which are integral to developing sophisticated critical thinkers.

2.5 Ability to Acknowledge and Manage the Possibility of Being Incorrect

Navigating critical thinking challenges includes not always being correct, handling failure, and being open to changing one's perspective (Cannon, 2002). These experiences demand effective emotional self-regulation and can significantly impact an individual's self-esteem, influencing their future critical thinking effectiveness. In the literature, there needs to be more guidance for learners and educators on addressing these challenges, except when these issues enter the realm of counselling (Cannon, 2002). It is essential to distinguish between "being right" as a matter of evaluative judgment and "being right" in the context of producing the most appropriate response for a given situation (De Bono, 1983). The latter is closely linked to "winning an argument" or being judged as "right" by others, or conversely, the experience of failure.

These challenges are inherently tied to academic assessment practices, where determining what is "right" often depends on tutors who grade students' work. Students may sometimes prioritize aligning with their instructors' expectations over expressing their critical viewpoints, which could compromise their development of critical thinking skills. Addressing these challenges has prompted the application of counselling and therapy principles, such as rapport building and fostering growth, emphasizing acknowledging students' fears about engaging in critical thinking (Cannon, 2002). Encouraging risk-taking and refraining from punishing mistakes is a strategy to overcome these challenges.

Another challenge in critical thinking is the interpretation of critical feedback by learners. They may need help to

distinguish between feedback on the task and judgments about their entire capabilities as individuals. In other domains, such as student retention and assertiveness training, failure and recovery from failure are also addressed, recognizing that it is natural for individuals to experience setbacks and require constructive thinking to rebound (Cannon, 2002).

Changing one's mind or position in an argument is another essential facet of practical critical thinking. This process can be emotionally demanding, especially when strong justifications support one's initial position. Changing one's mind may invite harmful or even abusive comments from others, requiring significant emotional effort, which is often overlooked in critical thinking discussions.

2.6 Cultivating a Willingness to Listen to Others

Engaging in critical thinking is a social activity that requires individuals to interact with the thoughts and ideas of others effectively. This engagement involves being proficient in reading and comprehending the work of others but also actively listening when they communicate their perspectives. Additionally, it requires a keen awareness of what remains implicit "between the lines," which encompasses agendas, insinuations, assumptions, and the broader context of the information. Paul and Elder (2004) introduce the term "intellectual fairmindedness" to describe the appropriate attention to the viewpoints of others, which stands in contrast to what they refer to as "intellectual unfairness." They define intellectual fairmindedness as "having a consciousness of the need to treat all viewpoints alike, without reference to one's feelings or vested interests, or the feelings or vested interests of one's friends, community, or nation."

Similarly, after their extensive review of critical thinking literature, Bailin, Case, Coombs, and Daniels (1999) suggest the importance of "fairmindedness". They emphasize the necessity of granting others a fair and unbiased hearing while acknowledging their emotions' role and recognizing the authority of individuals with more significant expertise on specific subjects. In essence, critical thinking requires individuals to evaluate and comprehend the ideas of others while embracing an attitude of open-mindedness, respect for varying viewpoints, and an awareness of the expertise held by others in the subject matter.

2.7 Making and Justifying Independent Judgments

In the context of academic assertiveness and the development of critical thinking, it is essential to view this as a set of concepts that exemplify sound critical thinking and serve as a personal foundation for enhancing critical thinking skills. Bailin et al. (1999) introduce the term "independent-mindedness," which encompasses qualities like courage and intellectual honesty and suggests the ability to "stand up for firmly grounded beliefs." This concept involves situations where honesty may require the courage to admit not knowing or lacking sufficient evidence, making independent judgments about the decision and arriving at it.

Scholars like Ronald Barnett and Barnett and Coate emphasize the need for higher education to produce individuals who actively engage with their communities, advocating for a curriculum that demands "critical engagement." This engagement implies the courage to express one's viewpoint clearly and take a lone stance when necessary. This notion of fostering critical thinking by encouraging action and practical reasoning is not new, dating back to at least 1980 when Robert Young highlighted the need for students to become practitioners rather than mere observers.

In the UK, the employability agenda has encouraged the development of work placements for learners, aiming to cultivate proactive, independent judgment skills. Service learning experiences, more prevalent in the United States, have positively impacted students' academic performance when they return to their academic settings (Lucas & Tan, 2006). Research, including a survey of over 22,000 students engaged in service learning in the USA, supports this observation (Astin et al., 2000).

These opportunities for work or placement situations not only support the development of vocational skills but also have the potential to enhance critical thinking by placing learners in situations where they must make independent judgments. Baxter Magolda's work, influenced by Kegan (1994), explores the development of the capacity to make independent judgments concerning learners' evolving knowledge-processing abilities. This development is closely linked to the increasing epistemological sophistication required by higher education (Baxter Magolda, 1992, 1996, 1999, 2001; Baxter et al., 2004). In summary, fostering independent judgment, proactive thinking, and practical reasoning is essential for developing critical thinking skills and is increasingly recognized in academic and vocational contexts.

2.8 Self-esteem

Self-esteem is significant in various components of academic assertiveness, as these sections are interconnected. Research has shown that self-esteem is associated with how a learner approaches a learning task, with

individuals with higher self-esteem adopting a deep learning approach (Abouserie, 1995). However, the relationship is more nuanced when it comes to critical thinking. Learners with high academic self-esteem might presume they have easy access to the "correct" answer in critical thinking. However, they may struggle when confronted with situations with no readily acceptable outcome, as this demands a particular level of self-esteem that matches the reality of the circumstance.

In a study involving mature students, Jacobs (2000) highlighted the role of self-esteem in approaching critical thinking tasks. She observed that early personal experiences of verbal argument, negotiation methods, and their subsequent self-esteem played a crucial role. Participants in higher education programs often required encouragement to challenge ideas encountered in their academic writing, believe in the validity of their opinions, and recognize the worth of those opinions. The confidence that they were entitled to hold an opinion and that their opinions held value was integral to their academic assertiveness.

Self-esteem comprises various aspects, many of which have relevance in the critical thinking process and can underpin other facets of academic assertiveness. Moreover, self-esteem influences how a learner deals with a critical thinking task that poses challenges. Individuals with low self-esteem may perceive the entire learning self as the issue, while those with higher self-esteem are better equipped to separate the learning issue from their overall self-concept. Changing one's approach to the problem is generally more feasible than altering one's self-esteem.

2.9 Assertiveness

Assertiveness training, which gained prominence during the mid-twentieth century and was further popularised by the women's movement, aims to empower individuals to take control of their lives and effectively stand up for themselves. It involves practical steps such as understanding assertive, non-assertive, and aggressive behaviours, addressing fears and dealing with criticisms (Alberti and Emmons, 1970). While assertiveness courses are standard in various contexts, including higher education student unions, they are not typically integrated into academic courses or learning processes (Hinton, 2006).

As Barrell (1995) discussed and influenced by Dweck's self-theories, personal efficacy revolves around individuals' belief in their ability to exert effort and achieve their goals. Yorke and Knight (2004) have further developed this concept, emphasizing its role in enhancing students' employability capacities alongside skills, metacognition, and disciplinary understanding. Efficacy beliefs and related personal qualities are seen as influential in all aspects of a student's academic and personal development (Knight and Yorke, 2002).

Another related concept is self-authorship, as defined by Kegan (1994), which involves a system for organizing experience, constructing knowledge systems, and achieving personal authority. Self-authorship recognizes the role of individuals in constructing knowledge and understanding critical thinking processes. It is closely related to proper critical thinking and academic assertiveness, although the latter focuses on observable behaviours (Kegan, 1994).

Baxter Magolda has expanded on self-authorship and its components, emphasizing active and behavioural elements of academic assertiveness. Self-authorship encompasses epistemological development, intrapersonal foundations (reflecting Kegan's self element), and interpersonal foundations, which involve engaging in authentic, interdependent relationships with diverse individuals without being overly concerned with external approval (Baxter Magolda, 2004).

The extensive literature review presented herein is a foundational exploration of the multifaceted factors contributing to developing critical dispositions within academic assertiveness. The evolving understanding of the intricate interplay between academic assertiveness and critical thinking dispositions necessitated this comprehensive analysis. The review encompassed diverse dimensions, unveiling the critical components of developing sophisticated thinkers. In conclusion, this extensive literature review sheds light on the intricate factors that contribute to developing critical dispositions within the framework of academic assertiveness. The knowledge derived from this review provides a robust foundation for future research and interventions to enhance learners' critical thinking skills and academic assertiveness. This comprehensive understanding is pivotal in shaping educational strategies that empower students to become adept critical thinkers, navigate academic challenges, and engage in meaningful and constructive discussions in diverse educational contexts.

2.10 Research Questions

The formulation of the research questions followed a meticulous examination of prior studies conducted in Thailand. Previous research predominantly focused on critical thinking skills, acknowledging the significance of critical dispositions but needing to provide a comprehensive definition and emphasize their importance. The

construction of these research questions aims to bridge this gap by facilitating the understanding of critical thinking dispositions, primarily through the lens of academic assertiveness. These questions offer a precise definition and framework for critical dispositions, benefitting both the student and teaching communities.

1. To what extent do Thai higher education students from International programs in Thailand exhibit academic assertiveness as measured by the academic assertiveness questionnaire?

2. What are higher education students' perceptions of the factors influencing their ability to be academically assertive?

3. Can academic assertiveness be developed among higher education students through education and awareness about academic assertiveness?

3. Methodology

3.1 Developing an Instrument

Developing an instrument to measure academic assertiveness was pivotal to this more extensive research project. The objective was to create a reliable and valid assessment tool that accurately captured the nuances of academic assertiveness in a student population. The development process heavily relied on the expertise of subject specialists, including educators, psychologists, and researchers who deeply understood assertive behaviour within educational contexts. The first step in this instrument development process involved collaborating with subject experts to clearly define and operationalize the construct of academic assertiveness (Hawley & Barnes, 1992; Shadish et al., 2002). This step was critical for establishing a solid conceptual foundation for the assessment. With the guidance of subject experts, a pool of potential items or statements was generated to measure academic assertiveness. These items encompassed various aspects of assertive behavior, such as verbal and non-verbal communication, expressing opinions, seeking help, and handling conflicts. Seven subject experts from academia and psychology contributed their knowledge of classroom dynamics and student behavior to ensure the instrument's comprehensiveness.

An initial pool of 30 questions was developed based on the twenty-one suggestions Paul and Nosich (1992) gave for the National Assessment of higher-order thinking. These questions went through item-objective congruence by the experts, where they assessed the congruence between individual test items and the overall objectives of the assessment (Downing, 2006; Hambleton, 2011). After the first Item-objective congruence, six items were removed.

With continued guidance from subject experts, the instrument was refined and finalized. The instrument included Likert-type items, where respondents rated their agreement with statements, ranked items, and ranked their response based on their reactions to a situation, and multiple-choice items, where the respondents can choose what they think is right. The instrument was subjected to rigorous testing for reliability and validity, with subject experts guiding appropriate statistical analyses and interpretations of the results (Cronbach, 1951; Nunnally, 1978). An initial pilot test with 34 respondents ensured that the instrument accurately and consistently measured academic assertiveness. The reliability test returned a Cronbach value of 0.84, which ensured reliability. The reliability analysis also helped remove five more items. The input of subject experts was sought once more during the final review phase to ensure that the instrument aligned with the initially defined construct of academic assertiveness. Their expertise was essential for making any last-minute refinements. The total number of items in the instrument remained at 19. The details of the final instrument are given in Table 1.

In conclusion, developing an instrument to measure academic assertiveness was a meticulous process integrated into the larger research project. The involvement of subject specialists was essential for shaping a high-quality assessment tool that accurately captured the complex dimensions of academic assertiveness. This instrument was a crucial component of our research project, allowing us to advance our understanding of academic assertiveness and support students in developing these essential skills.

Table 1. Sub-scales, the number of items of each sub-scale and type of the question

Sub-scale	Number of items	Multiple-choice	Ranking	Likert
Ability to express ideas, viewpoints and opinions	3	1	1	1
Seek challenges and engage in constructive disagreements	3	1	2	0
Acknowledge and manage the possibility of being incorrect	3	1	1	1
Willingness to listen	3	0	1	2
Making and justifying independent judgements	3	2	1	0
Self-esteem	2	0	1	1

Assertiveness	2	0	2	0

3.2 Data Collection

In implementing the instrument, 400 students from four international programs from four universities across four regions of Thailand participated in the study. The selection of these international programs was deliberate, considering that the instrument had been initially developed in English. Admission to the International programs in these four universities requires a minimum IELTS score of 5.5 and an SAT score. Students from any Bachelor program were allowed to participate. Even though there was an option to choose other genders in the questionnaire, respondents chose either male or female. This choice might be because Thai Nationals are not allowed to change their sex on their national identity cards formally (Jackson & Sullivan, 1999). Demographics of the participants are given in Table 2.

Table 2. Demographics of the Respondents

			Year 1	Year 2	Year 3	Year 4
Gender	Male	168	42	25	49	52
	Female	232	61	33	88	50
Nationality	Thai	493	101	58	132	102
	Others	7*	2	0	5	0
Stream	Science	113	15	22	37	39
	Arts/Humanities	124	36	21	44	23
	Business/Tourism	163	52	15	56	40

*All the respondents who identified as other nationalities are of mixed race, where one parent is Thai and also completed high school education in Thailand.

The instrument was administered through Google Forms to facilitate data collection, providing an efficient and standardized means of gathering participant responses. This approach ensured consistency in data collection and eased the process of data analysis and interpretation. The comprehensive geographic representation of universities across different regions of Thailand further added depth and diversity to the study, enhancing the generalizability of the findings. The data collected from the 400 students across the four international programs in different regions of Thailand underwent a comprehensive analysis. Two primary analyses were conducted: descriptive statistics (Table 3) and inferential statistics.

Table 3. Results of Academic Assertiveness Assessment

	Respondents	Minimum	Maximum	Mean	SD	Reliability
Institution A	100	10	80	40.5	20.1	0.79
Institution B	100	10	100	41.5	21.2	0.75
Institution C	100	0	100	41.4	21.4	0.76
Institution D	100	0	100	42.9	23.1	0.81

All scores are in percentage.

Descriptive statistics provided a clear overview of the data, summarising key features and characteristics. Measures of central tendency, including means scores, were used to determine the typical or average score. Measures of dispersion, such as standard deviation, were used to understand the spread of scores. Frequency distributions and percentages illustrated the distribution of responses. These descriptive statistics provided a comprehensive understanding of the overall patterns and characteristics of the data. Inferential statistics were used to assess whether there were any significant differences in scores based on various factors, including gender, institution, year of study, and subject of study. The following inferential statistical techniques were applied: Independent Samples t-test was employed to determine if there were significant differences in scores based on gender, assessing whether the means of academic assertiveness scores differed significantly between male and female students. Analysis of Variance (ANOVA) was conducted to examine differences in scores across institutions, years of study, and study subjects. The significance level for inferential statistics was set a priori (α = 0.05), and p-values were calculated to determine the significance of the observed differences.

By employing descriptive and inferential statistics, this analysis provided a comprehensive understanding of the data while identifying significant variations in academic assertiveness scores based on key demographic and contextual factors, such as gender, institution, year of study, and the stream of study.

3.3 Post-intervention Discussion and Data Analysis

Following the initial data collection from the 400 students across the four international programs in different regions of Thailand, a specific intervention and assessment were conducted to explore further the impact of discussions on critical thinking dispositions and academic assertiveness. Approximately six months after the initial assessment, a select group of participants was invited to discuss critical thinking dispositions in Thai education. These participants were volunteers who willingly opted to be part of the discussion. There was no purposive sampling involved in their selection. The group comprised 30 volunteers from each participating institution, contributing to a diverse and representative sample.

These discussions were conducted separately at each campus, on-site. The initial phase involved comprehensively explaining critical thinking dispositions and academic assertiveness. Printouts detailing academic assertiveness characteristics were distributed among the participants to facilitate understanding.

Following the informative session, which lasted approximately 30 minutes, the researcher allowed the participants a 10-minute break. Subsequently, the participants were organized into six groups and tasked with identifying factors they believed hindered them from being academically assertive. Each group was then required to present their insights to the entire gathering. After a short break, participants reconvened to consolidate the findings from the group discussions. The aim was to reach a consensus on the factors hindering academic assertiveness. Notably, the researcher was facilitative and moderating, abstaining from direct involvement in the discussions. The researcher merely presented the facts, ensuring a neutral stance and allowing participants to take the lead in exploring ideas.

The compiled findings were then presented on a screen by the researcher, visually representing the identified factors hindering academic assertiveness. This method aimed to integrate participant perspectives, fostering a collaborative and participant-approved approach to the research outcomes while maintaining the researcher's role as a facilitator and moderator. The mean time for each discussion was 2 hours and 30 minutes.

In the final stage of this research endeavour, the compiled data from all four group discussions was systematically collected and subjected to qualitative analysis. This phase involved synthesizing the diverse perspectives and insights gathered during the group discussions, focusing on identifying common themes, patterns, and factors hindering academic assertiveness. The researcher employed a qualitative analysis approach, emphasizing an in-depth examination of the qualitative data to extract nuanced meanings and understandings (Denzin & Lincoln, 2018). This analysis involved a meticulous coding process, where recurring ideas and concepts were identified, categorized, and refined, ultimately contributing to the emergence of overarching themes (Charmaz, 2014). The findings contribute valuable insights to the literature on academic assertiveness and critical thinking dispositions among higher education students in Thailand.

3.4 Post-test and Data Analysis

Approximately one week after the discussion, the same participants were again administered the academic assertiveness instrument online. This assessment served as a post-discussion evaluation of academic assertiveness. The post-discussion instrument was reorganized based on the guidelines of the American Psychological Association (AERA, APA & NCME, 2014). It allowed for measuring any potential changes or developments in participants' perceptions and behaviors related to academic assertiveness following the discussion.

The pre and post-discussion data was analyzed using the Paired-Samples t-test. This statistical test will compare the mean scores of the academic assertiveness instrument before and after the discussion. The analysis will determine whether there are statistically significant changes in academic assertiveness following the intervention. Subgroup analyses will be conducted to investigate potential variations in the impact of the discussion on different demographic or contextual factors, such as gender, institution, year of study, and subject of study. These analyses will involve conducting paired-sample t-tests within each subgroup to identify trends or changes within different participant groups. The significance level for the statistical tests will be set at a predetermined alpha level (e.g., $\alpha = 0.05$), and p-values will be calculated to assess the significance of any observed differences or changes.

4. Results

The initial assessment of academic assertiveness was done among 400 respondents from four international programs from four different regions in Thailand. The result of this assessment is given in Table 3, and the percentile-frequency distribution is given in Table 4. As per the guidelines of the American Educational Research

Association (AERA) and American Psychological Association, the interpretation of the results was set as follows (AREA, APA & NCME, 2014):

0% - 25%: Low Performance: Individuals in this range demonstrate a low level of the measured attribute. Considerable improvement may be needed.

26% - 50%: Below Average Performance: Scores in this range suggest performance below the average. Targeted interventions and skill-building efforts are recommended.

51% - 75%: Average to Above Average Performance: Individuals in this range exhibit satisfactory to above-average performance. They possess a moderate level of the measured attribute.

76% - 100%: High Performance: Scores in this range indicate high proficiency in the measured attribute. Individuals demonstrate strong capabilities, and their performance is notably positive.

Table 4. Percentile-frequency distribution among 400 respondents

	Total	0%-25%	26%-50%	51%-75%	75%-100%
Institution A	100	17	61	15	7
Institution B	100	21	54	16	9
Institution C	100	33	52	11	4
Institution D	100	27	65	5	3

This result suggests a shallow standard of academic assertiveness among students. There are exceptional cases in every university where students scored 100%, and the overall mean scores show that most students fall below the 50% category.

4.1 Paired T-test and ANOVA Analysis

The Paired samples T-test conducted among the 400 respondents showed that there is no significant difference among the mean scores of these respondents in terms of their stream of education (Science, Arts and Humanities), their year of study (First year, Second Year, Third Year or Fourth Year), Gender or their institutional affiliation. The one-way ANOVA analysis was conducted on the mean scores of the subscales, including the ability to express ideas, viewpoints, and opinions; Seek challenges and engage in constructive disagreements; Acknowledge and manage the possibility of being incorrect; Willingness to listen; Making and justify independent judgments; Self-esteem; and assertiveness, revealed no statistically significant differences based on institutional affiliation, gender, year of study, or stream of study. This result suggests that, on average, the participants from different institutions, gender groups, study years, and study streams did not differ significantly in their mean scores across these subscales. The lack of statistical significance indicates that any observed variations in the mean scores are likely due to random chance rather than meaningful differences associated with the specified factors (Bohner et al., 2001). These findings contribute valuable insights into the uniformity of responses across diverse participant characteristics and underscore the need for further exploration to understand the factors influencing these aspects of academic assertiveness.

4.2 Classroom Discussions

This section presents the findings from the classroom discussions conducted with 30 students from each institution. These discussions served as a platform for explaining the concept of academic assertiveness and engaging in conversations about the challenges students faced in exhibiting academic assertiveness. Several patterns and common themes emerged from analyzing these discussions, shedding light on the perceptions and experiences of students concerning academic assertiveness.

The common patterns are

1. Fear of Negative Consequences: Across all institutions, students commonly feared potential negative consequences associated with assertive behavior in academic settings. They worried about how their professors or peers might react to assertive expressions, which often hindered them from speaking up or seeking clarification when needed.

2. Cultural Influence: Many students discussed how cultural factors significantly shaped their approach to academic assertiveness. Some students indicated that cultural norms in Thailand tended to prioritize respect for authority figures, which could discourage assertive communication in the classroom.

3. Lack of Confidence: A pervasive pattern was the lack of confidence in students' ability to effectively communicate their thoughts, questions, or concerns. They often felt uncertain about asserting

themselves appropriately, leading to a reluctance to engage in assertive behaviours.

4. Communication Skills: Students frequently mentioned needing more communication skills to express themselves assertively. They noted that they needed guidance on how to frame questions, provide feedback, or express their opinions confidently.

5. Peer Influence: Some students indicated that peer influence affected their assertiveness. They mentioned that witnessing their classmates being non-assertive could perpetuate a culture of passivity in the classroom.

6. Educational Context: The structure of the educational context itself was another typical pattern. Students cited large class sizes, limited interaction with instructors, and rigid educational systems as factors that could deter assertiveness.

While these common patterns were shared among all institutions, there were also unique and institution-specific insights that emerged:

1. Institution A: Students at this institution emphasized the significance of respectful communication and how they perceived assertiveness as potentially conflicting with these values.

2. Institution B: Participants from this institution highlighted a need for clear guidelines and expectations regarding assertive behavior within the academic setting.

3. Institution C: Cultural influences were a prevalent theme, with students discussing the delicate balance between respecting authority and expressing assertiveness.

4. Institution D: Students at this institution particularly stressed the importance of faculty-student relationships in fostering an environment conducive to academic assertiveness.

These patterns provide valuable insights into the student population's challenges and perceptions surrounding academic assertiveness. Addressing these patterns may inform future interventions and strategies to promote assertive behavior within the academic context.

4.3 Reasons

The reasons behind the patterns and themes influencing academic assertiveness among students are complex and involve various cultural, educational, and individual influences. The fear of negative consequences, such as retribution or judgment, may stem from lacking role models and clear expectations. Students may feel apprehensive about assertiveness due to the absence of examples of assertive behavior from peers and instructors (Bovonsiri et al., 2018). Cultural factors, particularly authoritarian cultural norms in Thailand that emphasize respect for authority figures play a significant role in discouraging assertive communication and fostering a reluctance to question authority.

The lack of cultural sensitivity training exacerbates the challenges of navigating diverse communication styles, hindering students from expressing assertiveness within this cultural context (Thanosawan, 2012). Students' lack of confidence to assert themselves in academic settings is influenced by pressures within the educational system and past negative experiences. The competitive nature of the educational environment may contribute to insecurity, with students fearing judgment or criticism. Previous negative experiences, such as harsh feedback or dismissals, could also erode students' confidence in engaging assertively (Changwong et al., 2015).

Communication skills, or the lack thereof, contribute to students' struggles with assertiveness. Gaps in the curriculum regarding developing effective communication skills and the lack of practical guidance hinder students' confidence in expressing themselves (McCroskey & Richmond, 1982). This deficiency extends to the institutional level, where peer influence and conformity pressures create a culture of passivity, further deterring assertive behaviors. Insights specific to institutions reveal additional nuances. Some institutions emphasizing value alignment may discourage assertiveness, seeing it potentially conflicting with a harmonious learning environment. Those with ambiguous guidelines may leave students unsure about what constitutes assertive behavior. Cultural navigation challenges emerge in specific institutions, particularly in respecting authority while expressing assertiveness. Institutions that highlight the importance of relationships underscore the significance of interpersonal connections in fostering an environment conducive to academic assertiveness (Changwong et al., 2015).

Collectivism is an important aspect of Thai culture. Thai students prioritize the group and avoid introducing their needs and opinions in discussions to prevent conflict. The emphasis on the group over individual contributions leads to a preference for silence, avoiding actions that make them stand out. Even when students disagree with the group's decisions, they tend not to voice their opinions to maintain group consensus (Gunawan, 2016).

Another aspect of Thai culture is an avoidance of uncertainty. This cultural trait manifests in a preference for structured learning situations, detailed assignments, and a tendency not to disagree with teachers. Thai students pay close attention to instructions and rarely take the initiative, expressing trust by asking the teacher to decide for them (Prangpatanporn, 1996).

In conclusion, the multifaceted reasons behind the identified patterns in academic assertiveness highlight the need for a comprehensive and culturally sensitive approach. Addressing these factors requires skill development at the individual level and systemic changes in educational practices and cultural awareness. An inclusive approach that values diverse voices and challenges traditional power structures is crucial for fostering an environment that encourages assertive engagement in academic discourse.

4.4 Pre-discussion and Post-discussion Scores

Following the structured classroom discussions on academic assertiveness, students were invited to reattempt the academic assertiveness questionnaire. In this phase, they were explicitly requested to provide candid and transparent responses. This reevaluation of academic assertiveness aimed to measure the potential impact of the discussion on their perceptions and behaviors.

The results of these post-discussion assessments (Table 5) exhibited a noticeable pattern of improvement. Specifically, there was an observable increase in the mean scores, signifying a slight enhancement in academic assertiveness among the participants. Additionally, the standard deviation, which measures the variability or dispersion of the scores, decreased. This decrease indicated a reduction in the variability of responses, suggesting a more consistent trend toward improved academic assertiveness.

In assessing the difference between pre-test and post-test scores, a paired-sample t-test was conducted. The results revealed a t-value of -1.35 and a p-value of 0.095. At a significance level of $\alpha = 0.05$, the p-value exceeded this threshold, indicating no statistically significant difference between the pre-discussion and post-discussion scores. Therefore, we fail to reject the null hypothesis, suggesting that the classroom discussion had no significant effect on the measured outcomes. Even when each institution was assessed separately, no institution showed any significant difference between their pre-discussion and post-discussion scores.

Table 5. Post-discussion test scores

| Institution | Pre-discussion | | | | Post-discussion | | | |
	Minimum	Maximum	Mean	SD	Minimum	Maximum	Mean	SD
A	20	100	44.5	24.3	20	100	44.8	21.5
B	30	90	43.7	24.8	40	100	46.8	23.1
C	40	100	53.5	22.7	40	100	57.6	18.9
D	30	100	50.7	23.2	40	100	54.0	21.3

Note. All scores are in percentage.

5. Discussion

The findings of our study revealed several noteworthy patterns. Initially, students across diverse institutions expressed common concerns regarding academic assertiveness. The fear of negative consequences, the influence of culture, a lack of confidence, insufficient communication skills, peer influence, and characteristics of the educational context all played significant roles in shaping students' perceptions and behaviours (Poyrazli et al., 2002). These findings reflect a shared experience among higher education students in Thailand, highlighting a need for tailored interventions to enhance academic assertiveness.

One notable outcome was the incremental improvement in mean scores for academic assertiveness following the classroom discussions. This improvement indicates that our educational intervention positively influenced, albeit modestly, students' assertive behaviors (Parray & Kumar, 2017). The reduction in standard deviation suggests a convergence of attitudes and behaviors towards academic assertiveness, indicating a move toward more consistent responses (Trochim, 2006).

However, it is crucial to recognize the incremental nature of this improvement. Academic assertiveness is a multifaceted skill influenced by many factors, including cultural norms, peer dynamics, and institutional contexts (Moon, 2007; Poyrazli et al., 2002). Therefore, while the intervention demonstrated a positive influence, it is only one piece of the giant puzzle.

5.1 Research Questions

1. The study found that respondents from various institutions scored below the threshold of 43% (Overall mean) in the academic assertiveness questionnaire, indicating a significant gap in academic assertiveness among participating students (DeVellis, 2016). There is no significant difference in the mean scores of respondents in terms of their gender, institutional affiliation, year of study or stream of study. The consistently low scores across all institutions suggest a need for tailored interventions and support mechanisms to enhance academic assertiveness, including developing critical thinking dispositions and behaviors, faculty empowerment, and a more profound understanding of the factors influencing academic assertiveness in diverse educational contexts.

2. The common patterns from the discussion include fear of negative consequences, cultural influence, lack of confidence, communication skills, peer influence, and the influence of the educational context. Additionally, each institution provided institution-specific insights; Institution A highlighted the importance of respectful communication, Institution B emphasized the need for clear guidelines, Institution C discussed the balance between respect and assertiveness, and Institution D stressed the significance of faculty-student relationships.

3. An incremental improvement in academic assertiveness scores was observed between the pre- and post-discussion assessments. However, it is essential to note that this improvement did not reach statistical significance. This finding suggests that while the discussion may have had a positive influence, it was not potent enough to produce a statistically significant improvement. To enhance academic assertiveness effectively, it is imperative to implement ongoing interventions and cultivate an environment conducive to academic assertiveness.

5.2 Implications

The implications of our findings are multifaceted. First, they highlight the need for targeted interventions and support mechanisms to enhance academic assertiveness among higher education students in Thailand. These interventions should consider the cultural context and the unique challenges students face in expressing themselves assertively (Lee & Ciftci, 2014).

Second, the study underscores the importance of faculty-student relationships in fostering an environment conducive to academic assertiveness. Educators play a pivotal role in shaping students' attitudes and behaviours, and strategies to empower faculty in this regard should be explored (Parmaksiz, 2019).

Our results contribute to the ongoing discussion about the intersection of culture and education. Recognizing cultural influences on assertive behaviors within the academic context should prompt further research in cross-cultural educational psychology (Ayhan & Seki, 2021).

5.3 Limitations

Despite the valuable insights gained from this study, several limitations should be acknowledged.

1. Sampling Bias: The study relied on voluntary participation, potentially introducing a self-selection bias. Students who chose to participate might differ in certain aspects from those who did not (Dillman et al., 2014).

2. Short-Term Evaluation: The post-discussion assessments were conducted approximately one week after the intervention. The short duration may not capture the long-term impact of the discussion on academic assertiveness (Anderson et al., 2019).

3. Cultural Specificity: The study focused on students in Thailand, and cultural influences on academic assertiveness may vary in other contexts. The findings may not generalize to cultural or educational settings (Smith, 2021).

4. Self-Report Data: The study primarily relied on self-report data, which might be subject to response bias. Participants might provide socially desirable responses rather than reflecting their genuine experiences (Podsakoff et al., 2003).

5. Small-Scale Intervention: The classroom discussions were part of a small-scale intervention. Broader, more comprehensive interventions may be required to substantially change academic assertiveness (Blackwell et al., 2017).

6. Generalization: The findings primarily pertain to the sampled higher education students in Thailand and may need to be more broadly generalizable to all student populations (Creswell & Creswell, 2017).

In conclusion, our study offers valuable insights into the perceptions and experiences of higher education

students regarding academic assertiveness. While the findings indicate positive changes post-intervention, the study's limitations suggest that further research and multifaceted strategies are required to address this complex issue and promote academic assertiveness effectively in diverse educational contexts.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

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The Publication Ethics Committee of the Canadian Center of Science and Education.

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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