

Barriers to Fostering the Critical Thinking Skills in Interior Design Education: An Empirical Study of Interior Design Lecturers' Perception

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ABSTRACT

Teaching Critical Thinking (CT) is an essential skill, particularly for university students. This study explores faculty members' shared experiences on the barriers to fostering CT skills in Interior Design Education (IDE). Using a qualitative research design, data were gathered through semi-structured interviews with 17 Interior Design Lecturers (IDLs). The findings identified three (3) key themes of barriers hindering the development of CT skills in undergraduate IDE. The study recommends strategies to enhance CT development, including empowering students, providing training for lecturers and students, revising the curriculum, and improving facilities and budgets to address student and faculty challenges.

INTRODUCTION

Promoting Critical Thinking (CT) skills is essential to ensure that graduates have the information and skills they need to make wise decisions in the modern world (Goldsmith, 2013). Notably, CT reduces the possibility of accepting, acting on, or reacting to an incorrect viewpoint by allowing one to examine,

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evaluate, clarify, and reorganise one's views (Raj et al., 2022). This skill is crucial for students to practise during the formal education process. CT skills should be included in the curriculum to support educators and students in problem-solving, as learners need to anticipate and identify problems and have confidence, knowledge, and interpersonal/management skills to deal effectively with emerging challenges (El-Daghar, 2020). One of the initiatives to educate individuals to think critically is the incorporation of CT in the course materials (Bağ & Gürsoy, 2021).

CT is essential for professional architects, enabling them to effectively manage their creativity and internalise their architectural thinking. This skill is being integrated into architectural education at the bachelor and master levels to promote a more organised and effective approach to architectural design (Tarasova, 2018). As this skill is essential for architectural education, it will also apply to Interior Design Education (IDE). In particular, Interior Design (ID) encompasses both the art and science of designing interior spaces, including interior architecture (Majlis Akreditasi & Pendidikan Senibina Malaysia (MAPS), 2013) and the services of a professional ID who is qualified by education, experience, and examination to protect and improve the public's health, life safety, and welfare (CIDQ, 2019).

ID requires a wide range of creative, technical and CT skills, which makes it attractive to students who like different learning modalities (Albadi & Zollinger, 2021). CT improves our ability to approach situations tactfully and productively and solve problems in an acceptable way to all parties involved. It also encourages us to consider both sides of arguments, improve our problem-solving skills and promote constructive and acceptable solutions (Deutsch, 2020). This skill must be incorporated into ID classes just as much as CTs are into the higher education curriculum (Ramis & Al, 2018).

There are many previous studies discovered that the acquisition of these skills is influenced by various factors such as student factors (Indar, 2016; Amin & Adiansyah, 2018; Gunawardena, & Wilson, 2021; Franklin et al., 2022) teacher factors (Dwee et al., 2016; Essalih et al., 2022; Khalid et al., 2021) teaching methodology (Dwee et al., 2016; Ismail et al., 2017; Terblanche & De Clercq, 2020) and time constraints (Hamzah et al. (2018).

Considering that teachers' perceptions significantly impact their teaching methods, it is essential to understand how contemporary academics evaluate CT skills and support their students in developing these abilities. Moreover, identifying and analysing the challenges can lead to practical solutions, enabling ID students to enhance their CT skills. Thus, this study aims to investigate the challenges faced by Interior Design Lecturers (IDLs) through semi-structured interviews. The research will address the following specific questions:

- (i) How do IDLs perceive the challenges they face in promoting the development of CT skills in Interior Design Education (IDE)?

LITERATURE REVIEW

Critical Thinking

No definition applies to all aspects of CT, which has developed via contributions from various academic fields, including psychology, philosophy, and education. CT, viewed as a whole, is a rational and intentional process essential to judgment. It includes mental abilities like problem-solving, analysis, reasoning, and evaluation that are contextually adjusted to provide well-founded findings and solutions.

A critical thinker can ask pertinent questions, gather relevant data, evaluate that data originally and efficiently, logically support their conclusions, and make trustworthy judgments about the world. These insights enable the person to lead a successful and meaningful life (Schafersman, 1991). The core competencies of CT include analysing arguments, deriving conclusions from inductive or deductive reasoning, evaluating or analysing, and making decisions or solving problems (Lai, 2011). According to Hussin et al. (2018), CT is the intellectual ability that encompasses various skills, including analysis, reasoning, problem-solving, creative thinking, judgement, and effective decision-making.

The ability to think critically requires a variety of talents that a person must possess. As Table 1 illustrates, these skills are cited by several academics. The ability to analyse is the skill most frequently mentioned by scientists in the CT process. Moreover, the ability to critically evaluate phenomena and arguments using the facts and knowledge of current science is another aspect of CT. It involves selecting the best explanation from various models and explanations (Burhanuddin et al., 2019). Particularly, the most sought-after skill is the ability to analyse things and then evaluate them. In addition, many scientists also emphasise the need for reasoning and explanation as valuable skills.

Interior Design Education

IDE, once a branch of architecture, was introduced in the mid-20th century to meet the demand for trained professionals. The profession has been recognised for contributing to creating beautiful and functional spaces. The curriculum includes courses, workshops, projects, drawings, seminars, visits and final projects. IDE combines academic knowledge with practical skills, industry knowledge and career preparation to provide students with the tools they need to succeed. Course recognition is influenced by relevance to industry, practical experience and adherence to design trends, resulting in more favourable recognition.

The diversity of ID courses at design schools, art academies and architecture schools are vital to today's educational environment. The need for a common platform for the different levels of practice and study led to the formation of professional associations such as Council for Interior Design Accreditation (CIDA) National Council for Interior Design Qualification (NCIDQ) in the 1970s to ensure the quality and professionalism of IDE and practice. In particular, CIDA focuses on the accreditation of higher education programmes in collaboration to ensure honesty, rigor and continuous progress. Meanwhile, NCIDQ certification establishes professional requirements and standards for the practice of ID, with entry-level professionals who meet the requirements being evaluated through a rigorous test. The test is required to obtain a licence in the US or Canadian provinces where ID licences are offered and for professional status in North American ID groups. Both organisations are dedicated to improving excellence in IDE by setting high standards for the emerging profession.

In Malaysia, according to Majlis Akreditasi and Pendidikan Senibina Malaysia (2013), several institutions and colleges provide IDE at various levels, including diploma, bachelor's and master's degree programmes that cover the subject's academic and practical parts. Many Malaysian colleges and universities can offer ID courses that the MQA has approved. The MQA assesses the standards and quality of the courses to determine whether they meet the specified requirements. Students should be sure to inquire whether the MQA has accredited the programme they wish to enrol in. Under current law, IDE, which provides a direct or indirect pathway to becoming a licenced professional, is covered. The Board's regulations for the accreditation of architectural courses are in accordance with the relevant sections of the Malaysian Qualifications Agency Act 2007 (Act 679).

Approach of Teaching CT

Ennis (1989) identified four (4) approaches to teaching CT skills in education: general, infusion, immersion, and mixed. The general approach focuses on teaching CT skills independently from existing subject-matter offerings. The infusion approach embeds CT instruction within subject-specific teaching, providing clear and comprehensive subject-matter instruction and encouraging students to engage in CT. The immersion approach involves deepening students' involvement in the subject but does not explicitly articulate the general principles of CT. At the same time, the mixed approach combines the general approach with either infusion or immersion, with a distinct course designed to impart the fundamental principles of CT while engaging students in subject-specific instruction.

Barriers that Hinder the Development of CT Skills

Developing students' thinking skills and preparing them for success in the real world are the goals of CT instruction in the sciences. One of the many initiatives to educate individuals to think critically is the inclusion of CT in the course material (Bağ and Gürsoy (2021). However, many obstacles hinder the acquisition of these skills in the classroom. That is, students faced many obstacles in developing their CT skills. The literature summarises the barriers to CT as factors ranging from students, teachers, teaching strategies, and lack of support in the form of resources, time, and training. Moreover, students prefer to focus on the subject matter rather than CT since they are unfamiliar with the CT concept, affecting their preparation for practice. Apart from this, students' low reading habits also hinder the development of CT skills (Amin & Adiansyah, 2018; Liu, 2020).

The obstacles educators face in promoting CT skills are influenced by several factors. Some barriers include the lack of CT fundamentals, and the steps needed to promote CT in students. In addition, Hamzah et al. (2018) emphasised that a barrier to critical conversation, according to educators, is a lack of understanding of certain topics and issues. It was reported that teachers' limited knowledge was due to a lack of opportunities for in-depth discussions on new topics. When a topic is not thoroughly understood, courses simply focus on the basics of the topic at hand.

The challenges that both students and educators face in improving CT skills are mainly related to their unfamiliarity with the concept of CT skills. The study by Dwee et al. (2016) indicated that educators admit that they do not know enough strategies or approaches to promote CT skills since they have not been exposed to CT often enough. According to Franklin et al., (2022), students' perception of the education system suggests that the integration of CT in the country's educational institutions is not prioritised. Furthermore, a major reason why students are unaware of the significance of CT skills is that CT skills are neglected in Malaysian higher education institutions (Ahrari et al., 2016). The study by Darby and Rashid (2017) asserted that the conventional exam-oriented teaching method hinders the development of a positive CT disposition in students as it only promotes memorisation of facts and familiarisation with conventional solutions.

The process of CT takes time to develop. Another challenge in developing these skills is time constraints. It takes time and effort to intentionally cultivate a CT mindset and create engaging activities that support specific CT skills. Teachers' increasing time constraints can make it challenging to implement a more active strategy (Hamilton & Klebba, 2011). Teachers often must teach an abundance of material in little time. Lecturing and objective assessments become the norm when subject matter is prioritised over student learning (Snyder & Snyder, 2008). Reynolds (2016) study on the barriers to teaching CT revealed that teachers are unable to devote the extra time needed to create CT exercises while fulfilling mandated curricula and performing additional duties.

METHODOLOGY

Research Design

This study employed a qualitative research approach. As Merriam and Tisdell (2015) noted, qualitative researchers aim to understand how individuals construct their realities, derive meaning from their experiences, and interpret those experiences. Data were collected through semi-structured interviews with IDLs teaching in the Bachelor of Interior Architecture programme at Universiti Teknologi MARA (UiTM), Shah Alam. The interviews were recorded with the participants' consent, and data collection was conducted over a period of more than two (2) months, from October 23 to December 2024.

Sampling

Participants for this study were selected using a non-probability purposive sampling technique. This method was deemed appropriate as the participants were selected based on specific criteria relevant to the study (Cohen et al., 2018). The selection criteria were established prior to the interviews and included lecturers teaching in the Bachelor of Interior Architecture programme at UiTM with a minimum of 5 years of teaching experience. Permission to conduct the study was obtained from the head of the department. Participants who agreed to participate in the study were contacted personally to schedule a date and time for the interview sessions. Most participants preferred to be interviewed online using the Google Meet platform.

The semi-structured interview method was employed to collect the data from 17 IDLs from the Department of Interior Design, UiTM, Shah Alam. There are seven (7) male and ten (10) female lecturers who are still actively teaching in the Bachelor of Interior Architecture programme at UiTM Puncak Alam. The semi-structured interview was conducted in two (2) ways: in person at their UiTM office and partly via the online platform due to logistical constraints and their availability.

Table 1. Participants' Profile

Bil	Code	Teaching Experiences (years)	Industry Experiences (years)	Gender
1	IDL 01	33	13	M
2	IDL 02	28	32	M
3	IDL 03	27	5	M
4	IDL 04	23	5	F
5	IDL 05	22	20	M
6	IDL 06	19	10	F
7	IDL 07	18	3	F
8	IDL 08	17	6	F
9	IDL 09	17	2	F
10	IDL 10	16	8	M
11	IDL 11	16	2	F
12	IDL 12	15	3	M
13	IDL 13	5	10	F
14	IDL 14	8	3	F

15	IDL 15	9	6	F
16	IDL 16	5	3.5	M
17	IDL 17	15	6	F

Source: Authors (2025)

Data Analysis

Data from semi-structured interviews were recorded and transcribed verbatim into Microsoft Word. The data was then imported into ATLAS.ti software for the analysis process. Thematic analysis was used to define the associated theme and answer the research questions introduced by Braun and Clarke (2006). The coding method of this study was employed from Saldana's (2016) study.

Reliability and Validity

The reliability of this study was ensured through the use of high-quality recording equipment, accurate transcription of the digital data, and detailed field notes taken during the interview sessions (Creswell & Poth, 2018). Additionally, to further enhance the study's reliability, the initial findings were validated by two (2) experts in the field.

FINDINGS AND DISCUSSION

A total of 23 codes emerged from the interview data analysis process. The data analysis identified three (3) primary themes, namely student barriers and educators-related and faculty barriers that emerged from those codes. Three (3) categories were identified under the students' barriers theme, one (1) under educator-related themes and two (2) under the faculty-related barriers, as shown in Figure 1. This result is concurrent to a study by Khalid et al., (2021), which revealed barriers to promoting CT skills development in classrooms. It includes teacher preparedness, inadequate background knowledge, and inadequate resources. In the study by Bezanilla et al., (2019), learning is determined by multiple factors. Among others are each student's characteristics, what the teacher understands through CT, and how he or she applies this competency in the subjects taught.

Table 2. Sample of Thematic Structural Analysis

Semantic level of analysis		Latent level of analysis	
Meaning unit	Code	Category	Final Theme
[...] For example, recently, I took some students to Korea. I noticed that students who have prior experience, such as those with a diploma background, tend to have a higher ability for CT compared to the current students. By "current," I mean those who have been in the degree programme here from the start until now. I feel that having experience plays a significant role in	Prior experiences	Environmental Factors	Students' barriers

enhancing their CT skills [...] (IDL 08)			
[...] Like when we go to a restaurant, we never design the restaurant, right? We see there's a counter here, oh.. there's this here, right? We understand. Then, how we want to arrange it, we can explore. Like when we go to a hospital or clinic... oh.. okay.. there's this here. So that's what the students don't want to do lately [...] (IDL 05).	Students less effort	Environmental Factors	Students' barriers
[...] When I'm in class, sometimes, I notice that students are often busy on their phones. They keep scrolling and playing with their phones. Back in our time, we didn't have that. If we had social media, it wasn't like this—no Facebook, no Instagram, no Twitter back then. But, nowadays, the challenge with students is that they are constantly occupied with social media [...] (IDL 10).	Distraction	Environmental Factors	Students' barriers

Source: Authors (2025)

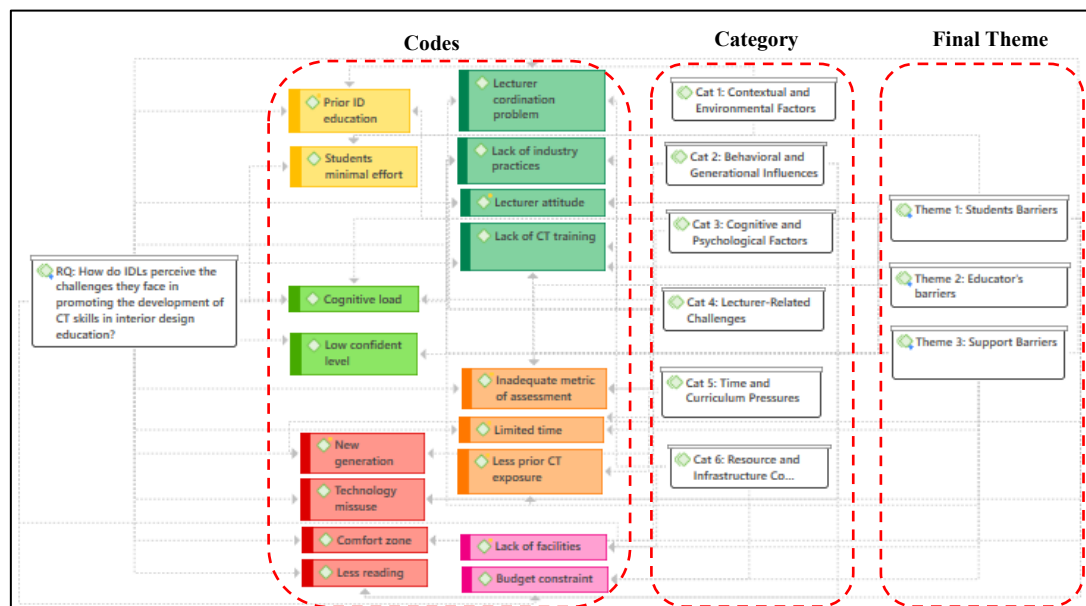


Fig. 1. The Themes, Categories, and Coding Diagram Generated in ATLAS.ti (version 23)

Source: Authors (2025)

Lecturers perceived that obstacles that hinder CT development in ID courses are mostly influenced by the student's barriers, followed by support barriers, and third is the educator's factors. The interview data revealed that most IDL encouraged the CT in the classroom using the immersive approach. According to Ennis (1989), they often use an immersive approach to promote CT, in which the concepts are taught implicitly rather than overtly, either as a stand-alone module or as one of the themes in a module. Al-Ghadouni (2021) asserted that this is the most popular and least effective immersion method. The least popular yet most successful strategy is the mixed approach.

Theme 1: Students Barriers

IDL highlights three (3) categories of barriers related to student factors: contextual and environmental factors, behavioural and generation influences, and cognitive and psychological aspects. Students' barriers are obstacles that come from the students' side. This study categorised students' barriers into three (3) categories, as illustrated in Figure 2. The first category is contextual and environmental, which involves the students' minimal effort and prior ID education. The second category is the behavioural and generation influences, consisting of technology abuse, new generation students, and students with less reading attitude. The third category is the cognitive and psychological factors influenced by students' lower confidence level and cognitive load.

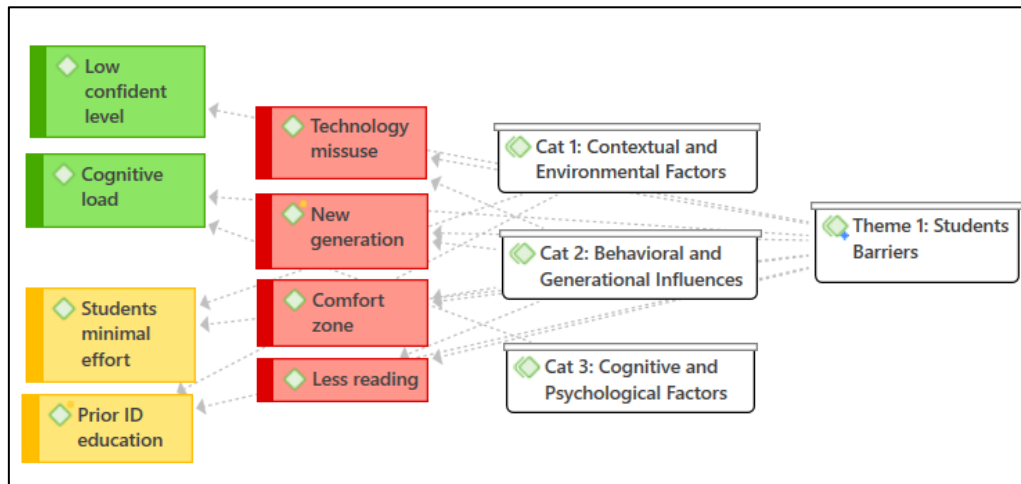


Fig. 2. The Categories and Coding Diagram of Students' Barriers Generated in ATLAS.ti (version 23)

Source: Authors (2025)

The contextual and environmental category discussed issues related to students' less effort and prior ID education. The lecturer mentioned that students have less enthusiasm to explore real-world experiences, even encouraged by their lecturers. IDL 05 and IDL 11 highlighted that students are reluctant to go beyond what is specifically necessary, such as going to locations for inspiration or going to outside events for a broader viewpoint. Singh et al., (2022) affirmed that constructivism emphasises the significance of both the practical application of knowledge production in the actual world and its authenticity in knowledge creation for individuals and society at large. It also emphasises the learners' active participation in knowledge construction. Their capacity to relate abstract concepts to real-world uses is weakened by this lack of inquiry and curiosity.

[...] It's like when we go to a restaurant, even if we've never designed a restaurant before, we look around and notice, "Oh, there's a counter here," or "Oh, this is over here." We understand the layout. Then, we can explore how to arrange things ourselves. Similarly, when we go to a hospital or clinic, we observe, "Oh, this is here." But that's the kind of thing students don't want to do much of these days [...] (IDL 05).

[...] so, we provided them with the links and told them to go, to register themselves... to travel using MRT or LRT since it's available. So, they could just go to get new ideas and gain new input. Besides reading, they could listen to people talk, see visuals, watch slides, see everything, observe works, and so on. But they don't want to [...] (IDL 11).

Another effort is that students seem to make less effort to participate in iterative design processes in the ID process, which are crucial for CT. Lecturers perceive students as not serious about learning but merely aim for grades. The same goes for Ismail (2023) study, which revealed the fixed mindset and focused only on getting grades. The iterative design is the steps that designers should review as they attempt to collect and sort information about a design challenge to revise, enhance, or modify potential solutions; designers follow these steps (Adams & Atman, 1999). The lack of this process will impede the CT and ID processes.

Then they feel it's hard, and they become lazy. They think they've done enough. They say, "We don't want to look at this anymore, don't want to see the 3D again; this isn't settled yet." That shows the critical thinking process hasn't happened yet (IDL 06).

Because if we look at it, when we ask the student for an A, they will just give an A. They won't... they won't... they won't give ABC. So, that is also one of the challenges for lecturers, but it's within the context of the student. (IDL 10).

The behavioural and generational barriers discussed are students' new generation, technological misuse and lack of reading. About seven (7) lecturers discussed the characteristics of the current generation of students that have become one of the barriers to CT development. They stressed that the new generation is different from the previous students' generation in terms of attitude, effort and mindset. They also noted that traditional strict teaching methods are less effective with today's students, who may struggle with mental health challenges like panic attacks. Furthermore, lecturers also observe that the current generation often lacks initiative, relying heavily on readily available information instead of trying to deepen their knowledge.

[...]but lecturers can't give up because the way I teach can't be the same as in your time—being strict and stern, right? Now, that doesn't work. If you're too strict these days, they won't be able to handle it; they'll have a panic attack or something (IDL 04).

[...] This generation isn't like your time... during your time, things were fine. Back then, people were so proactive... if you told them to do something, they'd just do it well. It's different. Your generation was truly different... this generation is more like the 'online' generation (IDL 06).

Six (6) participants affirmed students' poor effort to read in order to obtain information and knowledge. IDL 01, 04, and 11 stressed that fewer students read and refer to quick information from the internet. Lecturers worried that the inaccuracy of data from the internet would direct them towards a superficial understanding of the subject matter. The study by Liu (2020) noted that students' pre-existing knowledge

about education-related topics significantly impacted their comprehension of texts, leading to poor CT and peer dialogue.

Students often find it hard to understand because their way of learning is different now. Back then, we loved reading. Students today don't want to; they feel like reading is a waste of time. They prefer everything to be on a website now (IDL 04).

For example, I noticed that our students don't read much... so when they don't read much, they can't relate one aspect to another (IDL 12).

IDL is also concerned about students' overreliance on technology, particularly computers, which has diminished physical effort and CT. In the past, lecturers IDL 03 mentioned that creating physical models fostered hands-on understanding. However, now, students rely entirely on digital tools, often neglecting deeper engagement. While technology offers significant advantages, such as instant access to information, students are criticised for not utilising these tools effectively to enhance learning. Concurrently to the statement by Deutsch (2020) that architecture students frequently abuse the internet to find information, images, and ideas that support their previous notions. This reliance on convenience highlights a perceived decline in initiative and effort, emphasising the need for educators to encourage a balanced integration of traditional methods and technological advancements.

The current generation has many shortcomings; for example, they have become lazy. Those who are diligent are less inclined to make the effort to gain knowledge because everything is just at their fingertips. As a result, they lack initiative. They tend to think, "It's okay, I'll look it up later, it's fine, this is just a small thing," and they take things lightly (IDL 07).

[...] Then, you have your phone in your hand, right? Just Google what the subject matter is what the terms we ask for are. That's the way technology should be used—they should embrace it. But instead, they don't use what they already have [...] IDL 10

The third category, under students' barriers, is related to cognitive and psychological factors. Those barriers include cognitive load and low confidence levels. IDL 10 emphasised that due to high cognitive load, students may turn to surface-level processing techniques when their cognitive load is high. Lecturers confessed that they needed to concentrate on finishing the syllabus fast rather than delving deeply into the subject matter, thus impeding the CT ability among students. The study by Fadhlullah & Ahmad (2017) suggested that lecturers should prioritise completing the syllabus as required by the university and placing greater emphasis on developing students' CT skills in the classroom. CT must be practised consistently, as this approach helps students learn to think critically, interpret, analyse, and evaluate the information they encounter. In addition, lecturers highlighted that students face challenges in managing time and balancing academic demands. Packed schedules with continuous classes limit opportunities for self-learning and reflection. Time management is a common struggle, compounded by a heavy syllabus that often pushes students to focus on completing tasks for submission rather than achieving deep understanding.

[...] they are not given enough time for their own self-learning. Morning classes... afternoon classes... evening classes... (IDL 06).

[...] but when it comes to students, it's about time... maybe it's the issue of time. During our time, we had studio sessions on Mondays and Thursdays, and they also had other subjects. So even though there is a two-day gap between Monday and Thursday for them to fulfil the lecturer's requirements for the

next day, within that period, they still have other classes. And with this busyness and time constraints, along with poor time management, they tend to struggle with managing their time effectively (IDL 10).

Furthermore, students' low confidence level impedes the acquisition of these skills. Lecturers stressed students' passive behaviour, reluctance to speak, lack of confidence in expressing their thoughts, shyness, personality traits, and tendency to follow instructions without exploring beyond CT and participation. Lecturers expressed that they face challenges in fostering engagement and encouraging students to contribute actively to class discussions. Likewise, the study by Dwee et al. (2016) discovered that, generally, students were passive in their learning process. They discovered that some interactions between lecturers and students mostly engaged with their lecturers first.

[...] In terms of critical thinking, how should I put this... students these days find it difficult. They don't talk much. They're quite passive, aren't they [...] (IDL 12)

[...] Students are afraid to speak. We don't get responses from them. It's very difficult for them to have the courage to express what they feel (IDL 13).

Yeah, of course, it's about personality, character, or traits. Some of them are usually shy. They're simply not... maybe not in the mood to give suggestions (IDL 15).

I think everyone faces this kind of challenge in teaching, especially in Malaysia. It's because when we say A, they immediately look for A. They don't go beyond that. One reason, I think, is... perhaps, shyness (IDL 09).

Overall, lecturers emphasised students' characteristics, attitudes, and efforts, which impeded their CT abilities in the ID course. Other than effort by faculty, students also must pay attention to their role in developing the ability to think critically. This is crucial since, without their effort, everything would be a waste.

Theme 2: Support Barriers

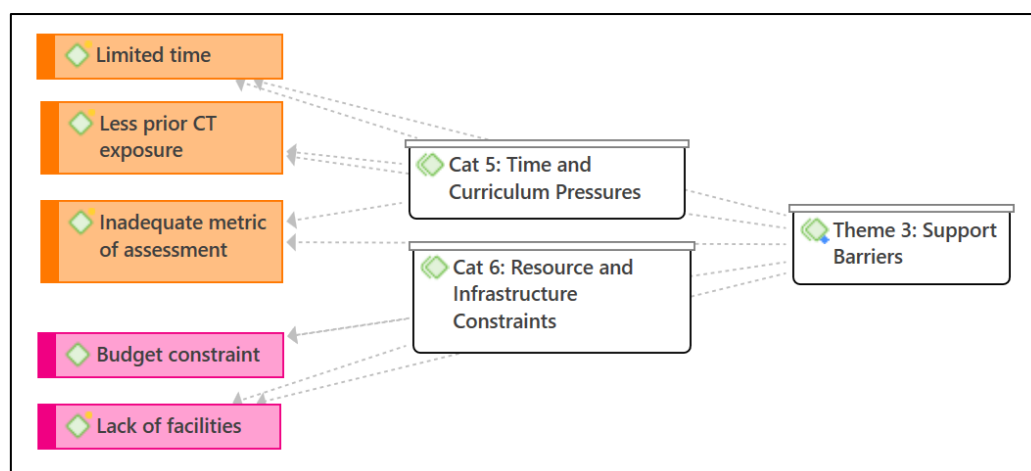


Fig. 3. The Categories and Coding Diagram of Support Barriers Generated in ATLAS.ti (version 23)

Source: Authors (2025)

The second theme from the interview data is that the support barriers involve 1) the resources and infrastructure constraints and 2) time and curriculum pressures, as displayed in Figure 3. Several participants (IDL 01, 02, 05, 12) identified time constraints within the ID course as a significant barrier to fostering CT skills among students. They noted that the 14-week academic session cannot develop these skills effectively. Moreover, IDL 02 emphasised that the student-to-lecturer ratio in the ID studio limits the time lecturers can dedicate to each student, allowing them to cover only the basics rather than promoting a deeper understanding.

But we don't have enough time to teach within 3 years... so what we focus on is just their skills, like drawing and so on... but the critical thinking (CT) is not there (IDL 01).

[...] Perhaps, in terms of requirements... the boards have basically... er... already provided guidelines... in terms of 15 students per lecturer, right? Because that has actually been proven through studies... okay... but if there's one lecturer for 30 students, that's already double, meaning [...] (IDL 02)

This limitation forces educators to prioritise certain aspects of the curriculum over others, often at the expense of in-depth CT exercises. Similar to the study by Fadhlullah and Ahmad (2017), instructors who are pressured to meet deadlines and cover the syllabus within the allotted time often leave little room to develop students' CT skills.

Prior exposure to the CT process is vital in encouraging the CT skills of students. However, according to data analysis, many other lecturers (IDL 01, 05, 07, 09, 12) mentioned that insufficient exposure becomes a barrier to developing the CT process. The current curriculum lacks dedicated subjects or modules specifically teaching CT skills. Without structured and intentional exposure to these processes, students struggle to develop the ability to think critically. Abrami et al. (2008) asserted that implicit training without directly emphasising CT is ineffective for improving skills and dispositions. Instead, learners need explicit instruction integrated with the core-subject training.

I'm not trying to blame anyone, but I do want to place some blame... on the schools... because the conditioning we get from school—primary school, secondary school—doesn't teach us to be critical... we're not taught to ask questions [...]. (IDL 01).

One (1) of the biggest concerns while creating programmes to improve pupils' CT abilities is assessment (Reed, 1998). This study revealed that lecturers face difficulties in evaluating CT, at last often relying on outcomes rather than processes. That is, rubrics may pass students without verifying true competence. A need for assessment methods that prioritise thought processes, analysis, and context-specific skills over superficial presentations is emphasised. Finken and Ennis (1993) proposed the model that can be used to evaluate CT: performance assessment, essay testing of CT, multiple-choice with written rationale, and open-ended assessment.

You assign a project, and in the end, you just look at the scheme. That's not critical thinking. For example, in the end, if they design a café, you look at the scheme; if they design an office, you look at the scheme. Where is the evidence that you taught them space planning? (IDL 05).

We assign marks, but we assess based on how they articulate their thinking. So, when they explain to us the process of how they arrived at their ideas—that's what critical thinking is. (IDL 07).

Participants (IDL 14 and IDL 17) discussed how financial limitations might hinder students' CT. Students must enter the world to expand their knowledge and develop their CT skills. However, the funding

is quite tight, which occasionally delays students' exposure to activities and prevents them from developing more CT skills. The design school's facilities are subpar, as is the learning environment, which includes limitations on studio use, as noted by IDL 02. He stated that the studio setting cultivates the unconscious mind, which may support students' development of CT skills. Meanwhile, IDL 05, 12 and 14 mentioned that the facilities provided did not foster an atmosphere that encouraged CT.

In conclusion, there were several barriers that students had to overcome to improve their CT abilities; these may have been caused by the instructors, the students themselves, the frequency of scientific meetings, or the facilities offered by the school (Amin & Adiansyah, 2018).

Theme 3: Educators Barriers

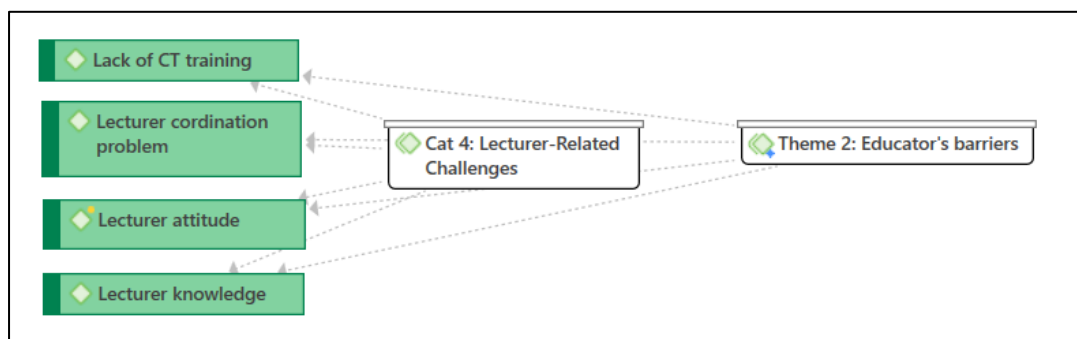


Fig. 4. The Categories and Coding Diagram of Educator's Barriers Generated in ATLAS.ti (Version 23)

Source: Authors (2025)

The third theme that contributes to the development of CT in ID courses is related to educator factors. The categories and coding related to this theme are illustrated in Figure 4. This includes the coordination problem among lecturers, lecturer's lack of knowledge, attitude and lack of CT training might all be barriers to learning these abilities. The lecturers admitted that they face difficulties working with some of their colleagues. This is leading to challenges in ensuring a cohesive learning experience for students. Instead of working together to accomplish a common objective, they are observed to place more emphasis on individual contributions (footprints). Lecturers also emphasise that different "schools of thought" among lecturers cause disparities in teaching methods, hindering a unified approach to instruction. A lack of shared vision in achieving educational outcomes creates barriers to effective collaboration.

So stages to me, certain education mungkin ada mungkin tak ada. Kalau refer pada UiTM, ada a bit kelam kabut sikit because everybody wants to aa..aasay dia punya foot prints. So..that's the problem yang kita ada la. In term of lecturers punya....apa ni..punya stands tu.. This is the point yang kita tak

boleh work together as a team and ajar diorang daripada stages yang patut diorang faham sampai the level of higher level. (IDL 05)

[...] Tapi challenges nya adalah bila kita nak buat macam tu tapi ada certain certain pensyarah dia tak se...seiring lah cara kita berfikir kan.? Jadi itu akan membantutkanlah..dia..tak pun dalam cerita lain (IDL 08).

[...] satu lagi dekat sini..dia pensyarah- pensyarah dia sangat... sangat concern sebab dia orang punya school of taught masing masing (IDL 11).

Another barrier among educators is the lack of exposure to CT training among lecturers. The researcher noticed that most participants did not attend any programme or training related to CT at faculty. They mentioned that they had not even once attended that kind of training. Most of them responded that their current way of thinking was from their observation and prior experience. Essalih et al. (2022). The findings suggested that educators have minimal familiarity with the concept of CT. Many appear to lack a clear and comprehensive understanding of CT, which is crucial for cultivating students' CT skills and competencies.

[...] basically, there's nothing direct...direct, there's nothing direct...but through my reading... Observation. (DIL 03).

There isn't... I used to teach at a private university college, so I know how the process works and what else is different, right? (IDL 10)

[...] I didn't sign up for a course for critical thinking, but. I think postgraduate studies are very helpful for critical thinking (IDL 15).

The lecturer also mentioned that lack of industry experience among lecturers impedes them from being more critical people. They also mentioned that lecturers should grab the opportunity to take a sabbatical in the industry to improve their knowledge and experience and thus develop their CT abilities. The study by Bibi and Hanif (2023) revealed that factors such as teaching experience, qualifications, job status, and training in CT were reported to be significant predictors of CT knowledge. This lack of knowledge poses a risk to both the prospective teachers and their students.

That's why if you look, some of the lecturers don't dare to step forward because they only know the theory... if it's their student, it's okay because students are considered to know nothing... but try to speak in front of professionals... dare to speak..? Not brave enough to speak.. why "Experience... they lack experience... and their level of confidence is not there (IDL 02).

Those people... if you don't understand, you don't know... you go back and meet industry people, you ask. Because we are limited in the university... in terms of resources and even various lecturers, not many do anything... those who do are the ones who practise, right? So, lecturers should go out... and my suggestion is that lecturers should go out for practicals every two (2) years or every three (3) years (IDL 10).

Lecturers' attitudes, such as egoism and less effort in critique sessions, are among the barriers that impede students from thinking critically. Participant IDL 10 explained that he did encourage students to meet industry experts to gain further related knowledge. However, he expresses his disappointment when some lecturers feel that effort is something that downgrades the credibility of a lecturer without knowledge.

There are lecturers who don't want to do it. Because when we critique, the students can actually handle it... but it's the lecturer who doesn't want to. That is the challenge I face – we want to do it, but there are colleagues or even superiors who feel that it's not relevant. This is a huge challenge, I think (IDL 07).

In the context of a studio, we need to diversify our methods; for example, like I asked them to meet industry people, meet other academicians outside of our field... but some lecturers don't agree because why... they are afraid... afraid of what... like for example we, ourselves, have a lack of knowledge in the process and solution... but we will be frustrated when this is all that's produced? It's like that. Why? It's also our fault, the lecturer's fault, because they don't monitor and follow up on the student's progress (IDL 10).

In summary, an educator's knowledge of the subject matter, industry experience and CT training is vital in fostering CT in ID courses. Halpern (2003) asserted that educators play a crucial role in programme achievement as their instruction to students significantly influences educational outcomes.

CONCLUSION

The study discovered multifaceted barriers to encouraging CT skills in ID courses. In particular, significant barriers were identified as the students' prior experiences, lack of effort, and diversions. Furthermore, cognitive difficulties such as a heavy workload and a lack of confidence make it challenging to effectively engage with CT skill development. These challenges suggest that many students lack the foundational preparation and motivation required to effectively engage with CT, which can impede their learning process. According to Treado (2018), the disposition of CT is shaped by an individual's internal motivations when solving problems, evaluating ideas, and making decisions.

Numerous challenges related to educators were identified as key obstacles. Significant concerns include coordination difficulties among lecturers, attitudes, limited understanding of CT, and ineffective assessment methods. These challenges emphasise the importance of enhanced professional development and collaboration among educators to support the integration of CT. Additionally, time limitations and insufficient prior exposure to CT concepts further complicate the process of incorporating these skills into an already rigorous curriculum. According to Fadhlullah and Ahmad (2017), the instructor plays a crucial role in fostering CT among students in the classroom. Consequently, educators must thoroughly understand the subject matter and adeptly structure their instructional approaches. The way information is communicated to students can significantly impact their ability to engage in CT.

Key resource-related challenges included inadequate facilities, a lack of CT-specific training for lecturers, limited Wi-Fi access, and budget constraints. These limitations hinder educators' capacity to provide effective CT education and restrict students' access to the tools and environments necessary for developing these skills. Moreover, these challenges indicate the need for enhanced institutional support, improved infrastructure, and optimised curriculum planning to overcome these barriers and support the development of CT skills in students. In addition, faculty require resources and administrative support to develop successful interventions for students to acquire CT skills. Thus, college and university administrations must fully support and encourage faculty in their efforts to train students. A "diagnose, intervene, assess progress, and improve" model should continually improve student CT ability and the process, as faculty may not perceive these initiatives as crucial enough (Goldsmith, 2013).

Taking a comprehensive strategy is essential to overcoming these obstacles. Teachers should undergo specialised training to improve their comprehension and instruction of CT skills. Institutions must invest in modernising their infrastructure, including financial and technical assistance, to provide an enabling environment. At the same time, curriculum changes should also concentrate on lowering cognitive load and boosting students' self-esteem and drive. CT education may remain effective and current via teacher collaboration and adherence to industry standards.

In conclusion, resolving these interconnected obstacles is necessary to effectively integrate CT capabilities into IDE. It is feasible to create a learning environment that encourages CT and gets students ready for the challenges of professional practice by placing a high priority on coordinated efforts between students, teachers, and institutions.

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CONFLICT OF INTEREST STATEMENT

The authors declare no financial, professional, or personal conflicts of interest that could influence the research presented in this manuscript.

AUTHORS' CONTRIBUTIONS

Author Norhayati Kassim wrote the manuscript under the consultation and supervision of authors Nur Maizura Ahmad Noorhani, Nor Lisa Sulaiman, Ibrahim Nazem Mahmoud Ghadi, and Zulkefli Zainal Ariffin, who provided critical feedback and helped shape the research, analysis, and manuscript. All authors discussed the results and contributed to the final manuscript.

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