



Teaching and Assessing Critical Thinking in Higher Education: A Cross-Disciplinary Study

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Abstract

Harnessing students' 21st-century skills has broadly been the core discussion of recent educational reform worldwide. Pertaining to this, soft skills have gained attention and become an increasingly important cornerstone of higher education discourse. Among these skills, critical thinking plays a crucial role across disciplines; however, research has examined its teaching and assessment practices from a single angle, overlooking the role of academic disciplines in shaping these aspects. Correspondingly, this qualitative study examines the potential differences in the teaching and assessment of critical thinking in two contrasting disciplines, namely Mathematics and English Studies. Data were collected through a qualitative survey questionnaire with fourteen professors of English Studies and Mathematics at École Normale Supérieure, Moulay Ismail University of Meknes. The findings reveal clear disciplinary differences in how critical thinking is conceptualized and enacted. While both disciplines highly value critical thinking, they understand and implement it differently. These differences relate to discipline-specific epistemologies and structural constraints. Consequently, this study's findings may provide a basis for further research into how discipline-specific epistemologies and structural constraints shape the teaching and assessment of critical thinking.

1. Introduction

Soft skills are becoming a top priority learning outcome in higher education in response to the demanding requirements and complexities of today's knowledge-based and economic societies (Reddy & Lakshmi, 2024). Critical thinking (CT) is one of the most important competencies, as employers ranked it among the top five skills (World Economic Forum, 2024). It has a significant role in both academic and professional environments; CT enables learners to manage their workload and achieve positive outcomes by evaluating information and identifying patterns (Abrami et al., 2015; Halpern, 2014). Furthermore, CT is critical for effective decision-making in real-world situations (Dwyer et al., 2012). Therefore, the development of CT has become at the heart of global educational agendas (UNESCO, 2022), given that learners are expected to develop it throughout their academic journey (Moore, 2016). Indeed, Moore (2011) noted that perhaps no issue in higher education on which there is greater consensus than the desirability of fostering students' ability to think critically. The Moroccan context is no exception. The integration of CT in education is unanimous (Strategic Vision, 2015). In fact, the indispensability of CT in higher education and the labor market reflects the significance of evaluating knowledge in this rapid technological era characterized by information abundance and artificial intelligence (Chen et al., 2024).

Notwithstanding this consensus regarding its importance, CT remains one of the most contested concepts in educational research. Scholars have proposed numerous definitions,

creating uncertainty about what CT entails and how it is understood and conceptualized (Moore, 2011, 2016). Case in point is the heated debate about whether CT should be understood as a general, transferable skill applicable across different contexts or as a discipline-specific competence embedded within particular domains of knowledge (Ennis, 1989; McPeck, 1992). While the former perspective rests on the premise that CT consists of universal reasoning abilities that can be transferred across contexts, the latter claims that critical thinking cannot be separated from disciplinary knowledge and practices. This lack of consensus is particularly relevant to the development of CT in higher education since the way CT is understood is often translated into curriculum design, teaching practices, and assessment approaches (Barnett, 2004; Barrie & Prosser, 2004). That is, the question of general versus discipline-specific exhibits direct implications for the instruction of CT. Research supports this line of reasoning as disciplinary cultures shape not only the nature of knowledge within a field but also the forms of thinking valued (Jones, 2007). Consequently, teaching and assessment practices related to CT are likely to vary across disciplinary contexts.

Teachers' beliefs undoubtedly exert a strong influence on classroom practices (Rouijel & Bouziane, 2020). To this end, understanding how academics conceptualize CT is crucial to understanding its enactment in higher education. However, despite the extensive literature on CT, relatively little attention has been devoted to the perspectives of the academic staff responsible for its development (Merabti & Benmhamed, 2024). Previous research suggests that university teachers have different understandings of CT, especially regarding its teaching and assessment (Allison, 2019). Furthermore, teachers' understanding is also closely associated with the disciplinary norms and epistemological cultures in which they apply such understanding. Therefore, different interpretations and pedagogical approaches across fields of study are expected (Brookfield, 2012; Hammer & Green, 2011; Ahern et al., 2012; Jones, 2007).

There is no dearth of research when it comes to exploring theoretical debates surrounding CT. However, there is still a paucity of studies investigating teachers' perceptions and operationalization of the concept in their teaching practices. As Rouijel and Bouziane (2020) observed, much attention is needed to educational realities, not to mention that limited research has investigated how teachers from different disciplinary cultures conceptualize, teach, and assess CT. This gap is particularly evident in the Moroccan higher education context, where little is known about how academics from different disciplines interpret and implement CT within their classrooms. To address this gap, the present study explores the perspectives of English and Mathematics professors at ENS Meknes in relation to the conceptualization, teaching, and assessment of CT. Most importantly, the study seeks to compare the two disciplines, characterized by distinct epistemological traditions, in order to gain a deeper understanding of how disciplinary cultures shape the meaning and practices related to CT in higher education. Accordingly, the study attempted to answer the following questions:

1. To what extent do understandings and conceptualization of critical thinking differ across the two disciplines?
2. How do professors teach and assess critical thinking within their disciplinary contexts?
3. What challenges do professors perceive in developing and assessing critical thinking in higher education?

2. Review of Literature

Defining Critical Thinking

Although its role and importance in higher education are unquestionable, there exists no agreed-upon definition of CT. Numerous researchers have advanced various definitions, emphasizing different dimensions of thinking; paradoxically, this interest has diluted the term's specific meaning (Tiruneh et al., 2016). Ennis (1987) provided one of the most cited definitions in the literature. He defined CT as "reasonable reflective thinking focused on deciding what to

believe or do” (p. 10). Likewise, Halpern (2014) conceptualized CT as using cognitive strategies that increase the likelihood of achieving desirable outcomes. Her framework identifies several core CT skills, including verbal reasoning, argument analysis, hypothesis testing, decision-making, and problem-solving (Halpern, 2014). The evaluative and normative aspects of CT are also emphasized in other definitions. For example, Paul (2004) stated that CT is the ability to evaluate beliefs, assumptions, and worldviews. In a similar fashion, Lipman (1988) regarded CT as self-correcting, criteria-based thinking that is sensitive to context. On their turn, Griggs et al. (1998) summarized CT as a “process of evaluating evidence for certain claims, determining whether presented conclusions logically follow from the evidence, and considering alternative explanations. Critical thinkers exhibit open-mindedness, tolerance of ambiguity, and a skeptical, questioning attitude” (p. 256). These definitions frame CT as a set of dispositions and components, including analysis, evaluation, inference, interpretation, problem-solving, and reasoned judgment. In simple terms, CT extends beyond mere acquisition and recall of facts.

The General versus Discipline-Specific Debate

At the heart of the fuzziness surrounding CT conceptualization lies the generalizability debate. The question of whether CT should be understood as a general transferable skill or as a discipline-specific competence remains unanswered. This debate is particularly relevant to the implementation of CT in higher education (Tiruneh et al., 2016). With regard to the generalist approach, CT is conceived as a set of generic skills applicable to a variety of contexts and disciplines. Ennis (1987) and Facione (1990) are fierce advocates of this perspective. According to them, assessing arguments, identifying assumptions, drawing conclusions, and recognizing flaws are transferable skills required in all contexts. Therefore, CT can be taught independently of disciplinary content through stand-alone courses or explicit instruction focused on generic thinking skills.

On the other hand, the understanding of CT as a discipline-specific notion holds that CT is inseparable from content knowledge. The most prominent advocate of this position is John McPeck, who argued that thinking is always about something and therefore cannot exist independently of a particular domain of knowledge. In other words, the reasoning needed in one discipline may be completely different from that required in another. Along these lines, McPeck (1992) claimed that CT necessitates direct engagement with the specific practices and norms of disciplines rather than the acquisition of abstract thinking skills. Taking a middle point, Davies (2013), Robinson (2011), and Tiruneh et al. (2016) contended that some skills are indeed transferable across contexts and that others are contextual; that is, both knowledge of domain content and explicit awareness of reasoning processes are necessary for successful CT instruction.

Disciplinary Culture and Critical Thinking

The question of whether CT should be understood as a general or discipline-specific skill becomes more palpable when discussed within the realms of disciplinary culture. Previous research has noted that CT conceptualization and instruction are shaped by context (Kadir, 2007), such as the epistemological norms, values, and practices that characterize academic disciplines. This tendency is hand in hand with Becher and Trowler’s (2001) assumption regarding academic disciplines. They argued that disciplines operate along distinct cultures, each possessing its own ways of constructing, validating, and communicating knowledge. These disciplinary cultures dictate teachers’ and students’ modes of learning as well as thinking (Berthiaume, 2008). In this sense, it is argued that CT cannot be adequately operationalized in isolation from the structure of the discipline in which it is embedded (Jones, 2007). Such a perspective has been empirically substantiated. Thonney and Montgomery (2019), for example, investigated teachers’ understanding of CT across disciplines through a qualitative study. Findings indicated that there is an agreement on the importance of CT; however, interpretation of CT and approaches to teach it and assess it vary considerably across

disciplines. The study also revealed that not all aspects of CT were emphasized equally across disciplines, as is the case with “recognizing bias in evidence,” which was only mentioned in social sciences, business humanities, communications, and transitional studies. In a similar fashion, Jones (2007) studied the way CT is conceptualized and taught in history and economics. The study suggested that epistemic cultures shape the way CT is understood in that it has a fluid meaning. While CT is seen as problem solving in economics, it is understood as tolerance to ambiguity of the contested nature of knowledge. Accordingly, understanding CT requires attention not only to cognitive skills but also to the disciplinary contexts in which those skills are used. This perspective is particularly relevant when comparing fields such as English Studies and Mathematics, which represent markedly different traditions of knowledge production and validation.

Teaching and Assessing Critical Thinking

The teaching and assessment of CT are inextricably linked to the assumptions regarding its conceptualization (McPeck, 1992). That is, CT can be approached through explicit instruction if it is understood as a generic skill, but it should be taught within disciplinary knowledge if it is deemed a discipline-specific skill. Such a distinction was clearly highlighted by Ennis (1987), who differentiated between infusion and immersion approaches. The infusion approach is based on explicitly embedding the teaching of CT skills along with disciplinary courses. In this regard, students are aware of both content knowledge and thinking processes. In contrast, the immersion approach adopts an implicit perspective towards the teaching of CT. In other words, students are to develop CT naturally through engagement with the learning content and activities, without explicit instruction in CT itself. While both approaches have been widely adopted, research increasingly suggests that explicit attention to CT, combined with meaningful disciplinary engagement, may be particularly effective (Tiruneh et al., 2016).

As for assessment, the situation is no better. Despite the recognition of CT as an essential skill and a desired graduate outcome (Dwyer, 2023), assessing it remains challenging because of the diversity of interpretations associated with the concept. In fact, different frameworks have been put forward in an attempt to assess CT. Specifically, these frameworks aim to assess the ability to interpret information, evaluate evidence, and reach informed conclusions since they are vital across fields (Facione et al., 2020). As a matter of fact, assessing CT must consider the multifaceted nature of CT and avoid traditional tests that focus on factual knowledge and memorization (Hamjilani & Sulisworo, 2024).

Teachers’ Perceptions of Critical Thinking

Teachers implement institutional agendas and objectives of CT into actual classroom practices. In fact, the teaching and assessment of CT depend on how they understand CT. Therefore, examining teachers’ perceptions provides insights into the operationalization of CT in higher education. Research (e.g., Thonney & Montgomery, 2019) indicated that teachers hold diverse conceptions of CT, reflecting broader disciplinary assumptions regarding knowledge and learning. In this regard, Rouijel and Bouziane (2020) stated that “what makes investigating teachers’ perceptions of critical thinking more imperative is the complex nature of the concept of critical thinking itself” (p. 18). In addition, the conceptualization of CT is influenced by academics’ disciplinary backgrounds, resulting in different pedagogical and assessment practices (Jones, 2007, 2015). Such findings support the view that CT is not merely a cognitive construct but also a socially and disciplinarily situated practice. When applied to the Moroccan context, few studies have investigated how university teachers perceive CT across contrasting disciplinary contexts. Filling this gap is necessary as teachers’ understandings ultimately shape how CT is experienced by students. Therefore, the present study investigates how English and Mathematics professors conceptualize, teach, and assess CT, and how disciplinary cultures influence these practices.

3. **Methodology**

For the purposes of this study, a qualitative research design was deemed the most appropriate for exploring participants' understandings and practices of CT within ENS Meknes. Such a design has been shown to be suitable for examining complex educational phenomena and experiences (Creswell & Poth, 2018). Indeed, most of the previous research related to the understanding of CT and its enactment in different disciplines used qualitative approaches (e.g., Jones, 2015). As for data collection, an open-ended questionnaire was used. This data collection technique enabled participants to provide detailed answers at their convenience. Furthermore, unlike interviews, the instrument's written format allowed participants sufficient time to reflect on their understanding and practices related to CT.

Data were collected from a total sample of fourteen university teachers belonging to the École Normale Supérieure (ENS) of Meknes, Morocco. The participants were conveniently sampled: seven professors from the Department of English Studies and seven professors from the Department of Mathematics. These two disciplines were deliberately chosen to depict distinct disciplinary cultures (Jones, 2007, 2015), and to provide insights into the extent to which understandings and practices related to CT may vary across disciplinary contexts.

The data were analyzed using thematic analysis following the six-phase framework proposed by Braun and Clarke (2006). In the first stage, the participants' responses were repeatedly read to become familiar with the data. The second stage revolved around generating initial codes. These codes were then grouped into categories and potential themes in the third step. Fourth, themes were reviewed and refined based on similarities, differences, and frequency of occurrence. Fifth, themes were labeled following the main defining concepts, as well as establishing connections between them. Finally, the findings were organized and interpreted in relation to the research questions and relevant literature. To ensure confidentiality, participants were assigned pseudonyms and are identified throughout the study using codes ranging from E1–E7 for English teachers and M1–M7 for Mathematics teachers.

4. **Results**

This section presents the major findings according to a question-answer analysis pattern. That is, each subsection answers a specific research question; the first outlines the differences between English and mathematics teachers in understanding and conceptualizing CT. The second part reports data related to how CT is developed and assessed across both disciplines. Finally, the third part accounts for the challenges teachers from both disciplines encounter in the teaching and assessment of CT.

To what extent do understandings and conceptualization of critical thinking differ across the two disciplines?

Participants from both disciplines regarded CT as a higher-order cognitive process that involves the ability to analyze, evaluate information, and reach informed and sound conclusions. Regardless of disciplinary affiliation, all teachers stated that CT is of paramount importance in higher education. Such importance was, for example, articulated by (E2) as “critical thinking is the only thing left for higher education professors to develop in their students after the revolution of AI.” Similarly, M6 claimed that “Mathematics is built on logic and reasoning; therefore, critical thinking is at the heart of the discipline.” Several English professors associated CT with evaluating information, distinguishing reliable from unreliable sources, and making informed decisions. One participant described CT as “a skill that allows students to analyze and assess information, discern fake from real, and be able to assess the information based on all related elements” (E3). Similarly, another participant emphasized the role of CT in navigating contemporary information environments: “Critical thinking is becoming more important than ever because students need to distinguish between reliable and unreliable information” (E5). Mathematics teachers, in their turn, stressed analysis and evaluation as key characteristics of CT, with more emphasis on logical reasoning and

justification. As (M2) put it, “Critical thinking means analyzing mathematical situations carefully and using logic to reach justified conclusions.” These responses depict a general and consensual understanding of CT as a process of reasoned inquiry and judgment.

Despite the considerable agreement regarding the significance of CT, notable disciplinary differences were clearly highlighted in how CT is manifested. In their responses, English professors emphasized interpretation, critical reading, argumentation, reflection, and the evaluation of various perspectives. A telling example, E7 explained that CT revolves around “identifying reasoning fallacies in other people’s arguments.” For Mathematics professors, on the contrary, CT is associated with problem solving and logical justification, namely logic and proof. Students were considered critical thinkers when they could explain procedures, justify solutions, construct proofs, and evaluate alternative approaches to mathematical problems.

How do professors teach and assess critical thinking within their disciplinary contexts?

When asked about the stage where students are expected to develop CT, the majority of respondents noted that CT is an incremental skill that develops gradually over time. That is, respondents argued that CT should be cultivated from the beginning of students’ academic programs and reinforced throughout their studies. As such, M3 commented that “the development should occur from the beginning rather than only in advanced courses.” In a similar fashion, M6 believed that “CT should be present from the first year and continue progressively,” as “it is part of the whole academic process” (E5). On the other hand, some participants from both disciplines maintained that CT is more relevant in advanced courses:

It becomes especially important in upper-level modules dealing with abstract algebra, topology, or advanced analysis. (M1)

Critical thinking should be developed at later stages in their BA and of course at the masters level. (E2)

As for the responsibility for developing CT, it is generally viewed as a shared obligation among stakeholders, including students, teachers, institutions, and educational policymakers. However, some differences between the two disciplines were noticed. English teachers tended to emphasize broader institutional and systemic responsibilities, as is the case with E6, who claimed that “everyone involved in the field is responsible for CT development; decision makers at the policy level, curriculum designers, educators, parents (when their primary concern is their children’s grades/ranking rather than the development of essential life skills), and students themselves.” On the other hand, the answers of Mathematics teachers leaned more towards the teacher as the main actor in creating learning experiences that encourage analytical thinking and reasoning. M5 put it straightforwardly: “Teachers have the main responsibility.”

Fundamental to this study was the question of teaching approaches adapted to develop CT. Strikingly, it is at this level that disciplinary differences were noticeable. English teachers reported the use of student-centered strategies to promote CT, such as debates, critical reading, project work, discussions, as well as reflective writing in the form of reports. As such, one of the participants explained that he encourages students to “analyze texts, challenge ideas, and justify their answers through discussion and written reports” (E4). Another participant accentuated the use of authentic materials: “News articles, reports, and controversial topics provide opportunities for students to practice critical thinking” (E6). Conversely, Mathematics professors relied on problem-based activities, proof construction, reasoning questions, guided examples, and inquiry-based learning. For instance, one of the professors claimed that “students develop CT in their attempt to explain why a solution works rather than simply produce an answer” (M3). Similarly, M7 argued that “problem-solving tasks encourage students to evaluate different approaches and justify their reasoning.” Overall, the results suggest that while both groups sought to develop students’ analytical abilities, their pedagogical approaches were aligned with disciplinary knowledge structures.

Concerning assessment, English professors championed Authentic and Performance-Based Assessment; that is, assessment techniques that provide ample opportunities for students to analyze texts, evaluate information, identify fallacies, compare perspectives, and formulate well-supported opinions. Examples of these assessments include essays, projects, presentations, classroom discussions, and authentic tasks. Needless to say, “Critical thinking cannot be assessed through memorization-based examinations. Students need opportunities to demonstrate how they think” (E2), especially in “Authentic tasks that allow students to apply critical thinking to practical problems,” as it was articulated by (E7). As for Mathematics professors, the emphasis was on assessing reasoning processes. In other words, students have to demonstrate and explain procedures, and justify solutions rather than just reaching the final answer. Following this, M5 believed that “Students should be assessed on how they arrive at their conclusions, not only whether the answer is correct.” Along similar lines, M1 noted that “The reasoning process is often more important than the final solution.” All in all, despite disciplinary differences in assessment formats, teachers from both disciplines agreed that CT cannot be assessed through memorization or reproduction of information alone.

What challenges do professors perceive in developing and assessing critical thinking in higher education?

When asked about the challenges in developing and assessing CT, the majority of participants reported a lack of adequate learning environments. In fact, several professors argued that students need more opportunities for collaborative learning and discussion-based activities. Furthermore, even with the presence of resources, some respondents argued that factors such as large classes and limited instructional time restrict opportunities for meaningful engagement, as articulated by E6: “Class size, work overload, time constraints, and providing timely feedback hinder the development of CT.” One participant specifically referred to “heavy syllabi as reducing opportunities for discussion and exploration” (E5). Another challenge that was particularly present among Mathematics participants was the difficulty of changing students’ mindsets regarding the nature of mathematics. M2 and M3 put it as follows:

Many students expect Mathematics to be procedural and fixed. Encouraging them to think critically and tolerate ambiguity can be difficult. (M2)

Changing students’ perception that Mathematics is only about formulas. (M3)

These findings indicate that although professors strongly value CT, institutional, curricular, and pedagogical constraints continue to present significant challenges. Throughout this section, the findings revealed strong support for CT among professors from both disciplines. Nevertheless, they also pinpointed the influence of disciplinary cultures on how CT is understood, taught, and assessed, as well as the practical challenges that continue to affect its implementation in higher education.

5. Discussion

The present study aimed at exploring how English and Mathematics teachers conceptualize, teach, and assess CT in higher education. The findings reveal general agreement on the importance of CT, along with clear disciplinary variations in how it is understood and, most importantly, how it is manifested in faculty teaching and assessment. As such, the study contributes to the ongoing debate related to the nature of CT and the influence of disciplinary cultures.

One of the most important insights of this study lies in the fact that CT is far from a universal construct and more of a discipline-mediated skill. Professors from both English and Mathematics identified analysis, evaluation, and judgment as central features of CT; however, the meaning attached to these concepts differs across contexts. Accordingly, the consensus regarding the importance of CT in higher education may jeopardize the impact of epistemological differences on what constitutes legitimate thinking. The results, therefore, challenge simplified conceptualizations of CT as a general and transferable skill. That is, even

the use of a common lexical discourse for CT, its operationalization in actual classroom practices, remains different in significant ways. For English professors, CT was synonymous with the ability to analyze, interpret, criticize, and examine multiple perspectives. As for Mathematics professors, logic, proof, and justification through formal reasoning and demonstration were the main characteristics of CT. To this end, the results suggest that CT is not a simple cognitive construct, but a disciplinary one whose meaning is shaped by the epistemological assumptions and disciplinary cultures of particular academic communities. Accordingly, the findings are in tandem with McPeck's (1992) argument regarding the interdependence of CT and the domain in which it occurs. More importantly, however, the results indicate that the generalizability debate is overly simplistic, as it appears that CT comprises general cognitive processes that acquire different meanings and interpretations across disciplinary contexts (Davies, 2013; Tiruneh et al., 2016). Taken together, the ability to think critically may be perceived as general, but disciplinary standards dictate what is critical and how to evaluate it.

Throughout the findings, it appears that the concept of disciplinary culture provides a useful framework for understanding the differences identified in this study. Becher and Trowler (2001) claimed that disciplines are best understood as 'academic tribes' characterized by different traditions, values, norms, and ways of constructing knowledge. From this perspective, the differences noticed between English and Mathematics professors translate epistemological cultures rather than simple pedagogical preferences. Indeed, the responses of English professors reflect a disciplinary culture in which knowledge is viewed as interpretive, contested, and open to multiple readings. In this case, CT is particularly evident in the act of questioning claims, assessing ideas, comparing evidence, identifying biases, and formulating arguments. Such a tendency explains the emphasis on pedagogical activities, such as critical reading, reading reports, debates, and reflections, which mirror the intellectual practices through which knowledge is produced and validated within the humanities. Mathematics professors, on the other hand, tended to follow a disciplinary culture deeply rooted in certainty, rigor, and formal validation. Consequently, dispositions, such as demonstration and reasoning, are top priorities for mathematics teachers; students are to demonstrate criticality by constructing coherent logical arguments. These findings are congruent with Jones' (2007) argument that CT is not merely a set of isolated cognitive skills but is embedded within disciplinary knowledge structures. They also support Moore's (2011, 2016) claim that academics frequently employ the term "critical thinking" to describe different intellectual practices depending on their disciplinary backgrounds. Rather than indicating conceptual confusion, the diversity of understandings observed in this study may therefore reflect the legitimate epistemological differences that exist between disciplines. Indeed, "This kind of wisdom from the disciplines leads one to think that the future of critical thinking in our institutions lies not in any efforts to skate around difference but, instead, to embrace it" (Moore, 2011, p. 273). This perspective challenges the assumption that a single definition or model of CT can adequately capture the intellectual demands of all academic disciplines.

As for pedagogical practices, the findings subscribe to the discipline-specific aspects of the CT debate. Throughout the analysis of results, it was clearly pronounced that teaching and assessment are not neutral activities but expressions of disciplinary culture, which is congruent with Jones' (2015) results. This means that CT can be taught within disciplinary content rather than through implicit instruction. In other words, students acquire CT skills by being immersed in the practices adopted in their disciplines. Consequently, disciplinary culture influences not only how professors define CT but also how they seek to cultivate it. The same holds true for assessment practices. Although both were against traditional assessments, they differed in the assessment approaches and techniques used to test CT, suggesting that assessment criteria are also shaped by disciplinary norms. That is, what counts as valid in one discipline may not be the same in another. These findings align perfectly with Allison's (2019) study, which advocates discipline-embedded approaches to CT instruction.

6. Conclusion and Implications

Starting from the premise that the teaching and assessment of critical thinking is contextually bound, the study explored how professors in English Studies and Mathematics understand, teach, and assess critical thinking within ENS Meknes. Data from the open-ended questionnaires indicate that, despite the unanimous agreement regarding the indispensability of CT skills in both disciplines, differences emerge in how they are conceptualized, implemented, and assessed. The findings clearly show that CT is far from a generic and context-independent skill. In fact, the way participants defined and explained their reported practices mirrors the underlying aspects of disciplinary cultures and assumptions of their disciplines. Accordingly, the study supports a contextualized view of CT. Furthermore, the study sheds light on the challenges educators encounter in teaching and assessing CT associated with limited instructional time, large classes, and the nature of the discipline itself, as is the case with mathematics. Importantly, these different perspectives do not undermine the significance of critical thinking as a graduate attribute. On the contrary, they provide a landscape for better incorporating and cultivating this competency across academic fields.

These results have several implications for the teaching and assessment of CT in higher education. First, since the findings revealed that academic disciplines guide the perspectives through which CT is understood and translated into classroom practices at the ENS Meknes, the development of CT should be designed with disciplinary contexts in mind. That is, a one-size-fits-all approach to teaching and assessing CT across different disciplines may overlook the distinctive characteristics of academic disciplines. For instance, teachers in English Studies should create more opportunities for students to analyze, judge, and interpret ideas, as well as construct and defend arguments through meaningful and authentic activities. In Mathematics, teachers can focus more on activities that engage students in explaining reasoning, justifying solution processes, and evaluating the validity of mathematical arguments, rather than focusing only on the correct answer. More importantly, assessment in both disciplines should allow students to demonstrate how they reached a conclusion and why their reasoning is justified. This calls for improved institutional conditions that can support effective engagement with higher-order thinking. In other words, the development of CT cannot be addressed solely by asking individual teachers to adopt new strategies. Institutions should also provide practical support for the integration of critical thinking into existing courses by reviewing where and how it is addressed across programs, identifying opportunities for progressive development across different stages of study, supporting performance-based assessment designs, and creating more opportunities for professional development that focuses on concrete discipline-sensitive practices, such as designing open-ended reasoning tasks, developing assessment criteria for critical thinking, facilitating discussion in large classes, and adapting critical-thinking activities to existing course content.

7. Limitations and Future Research

This study has attempted to explore the ways in which professors at ENS Meknes understand and develop CT skills in English Studies and Mathematics. The findings, however, should be considered in light of some limitations. Given the convenience sampling used in the study and the relatively small sample size involved, drawn from two disciplinary contexts at a single higher education institution, its findings can neither be generalizable nor transferable to other disciplines and higher education settings. However, they provide context-specific insights into how CT is used in developed English Studies and Mathematics at the institution under study. Furthermore, the use of an open-ended questionnaire did not provide the research with enough opportunities to follow up on some of the answers, as is the case with semi-structured interviews. Nevertheless, the consistency of the questions across participants facilitated comparison between the two disciplinary groups. It is also worth noting that relying exclusively on self-reported data may not fully reflect actual classroom practices. For example, participants may emphasize practices they value without being necessarily translated into classroom

settings. This could have been examined by the adoption of classroom observations and examination of assessment materials. Therefore, future studies could replicate this study by including a large number of professors from different academic disciplines and institutions. Most importantly, future research could employ a mixed-methods or multi-method qualitative design combining open-ended questionnaires with semi-structured interviews, classroom observations, and analysis of assessment tasks and student work, allowing researchers to examine the relationship between espoused theory and actual pedagogical and assessment practices. Such an approach will certainly yield an in-depth understanding of the development of CT skills in higher education.

8. References

- Abrami, P. C., Bernard, R. M., Borokhovski, E., Waddington, D. I., Wade, C. A., & Persson, T. (2015). Strategies for teaching students to think critically: A meta-analysis. *Review of Educational Research*, 85(2), 275-314.
- Ahern, A., O'Connor, T., McRuaric, G., McNamara, M., & O'Donnell, D. (2012). Critical thinking in the university curriculum—the impact on engineering education. *European Journal of Engineering Education*, 37(2), 125-132.
- Allison, J. (2019). *Critical thinking across the disciplines: understanding and application* (Doctoral dissertation, University of Plymouth).
- Barnett, R. (2004). Learning for an unknown future. *Higher Education Research & Development*, 23(3), 247–260.
- Barrie, S., & Prosser, M. (2004). Generic graduate attributes: Citizens for an uncertain future. *Higher Education Research & Development*, 23(3), 243–246.
- Becher, T., & Trowler, P. (2001). *Academic tribes and territories*. McGraw-Hill Education.
- Berthiaume, D. (2008). Teaching in the disciplines. In H. Fry, S. Ketteridge, & S. Marshall (Eds.), *A handbook for teaching and learning in higher education* (pp. 233-243). Routledge.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.
- Brookfield, S. D. (2012). Critical theory and transformative learning. *The handbook of transformative learning: Theory, research, and practice*, 131-146.
- Chen, W., Hu, H., Lyu, Q., & Zheng, L. (2024). Using peer feedback to improve critical thinking in computer-supported collaborative argumentation: An exploratory study. *Journal of Computer Assisted Learning*, 40(6), 3390-3405.
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE Publications.
- Davies, M. (2013). Critical thinking and the disciplines reconsidered. *Higher Education Research & Development*, 32(4), 529-544.
- Dwyer, C. P. (2023). An evaluative review of barriers to critical thinking in educational and real-world settings. *Journal of Intelligence*, 11(6), 105. <https://doi.org/10.3390/jintelligence11060105>
- Dwyer, C. P., Hogan, M. J., & Stewart, I. (2012). An evaluation of argument mapping as a method of enhancing critical thinking performance in e-learning environments. *Metacognition and Learning*, 7(3), 219–244. doi:10.1007/s11409-012-9092-1.

- Ennis, R. (1987). A taxonomy of critical thinking abilities and dispositions. In J. Baron & R. Sternberg (Eds.), *Teaching thinking skills: Theory and practice*. New York: W.H. Freeman.
- Ennis, R. H. (1989). Critical thinking and subject specificity: Clarification and needed research. *Educational Researcher*, 18, 4–10.
- Facione, P. A. (1990). Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction. Research findings and recommendations. ERIC Document Reproduction Service No. ED315423.
- Facione, P. A., Facione, N. C., & Gittens, C. A. (2020). What the critical thinking data tell us about our reasoning. *Environment*, 42, 305-313.
- Griggs, R. A., Jackson, S. L., Marek, P., & Christopher, A. N. (1998). Critical thinking in introductory psychology texts and supplements. *Teaching of Psychology*, 25(4), 254-266.
- Halpern, D. F. (2014). *Thought and Knowledge: An Introduction to Critical Thinking* (5th ed.). New York: Psychology Press.
- Hamjilani, A.-R., & Sulisworo, D. (2024). Exploring methods for assessing critical thinking: Insights from qualitative study. *Qomaruna*, 1–9. <https://doi.org/10.62048/qjms.v1i2.38>
- Hammer, S. J., & Green, W. (2011). Critical thinking in a first year management unit: The relationship between disciplinary learning, academic literacy and learning progression. *Higher Education Research & Development*, 30(3), 303-315.
- Jones, A. (2007). Multiplicities or manna from heaven? Critical thinking and the disciplinary context. *Australian Journal of Education*, 51(2), 84–103.
- Jones, A. (2015). A disciplined approach to critical thinking. In M. Davies & R. Barnett (Eds.), *The Palgrave handbook of critical thinking in higher education* (pp. 169-182). Palgrave Macmillan US.
- Kadir, A. A. (2007). Critical thinking: A family resemblance in conceptions. *Education and Human Development*, 1(2), 1-11.
- Lipman, M. (1988). Critical Thinking: What Can It Be? *Educational Leadership* 46 (1), 38–43.
- McPeck, J. (1992). Thoughts on subject specificity. In S. Norris (Ed.), *The generalizability of critical thinking: Multiple perspectives on an educational ideal* (pp. 198–205). Teachers College Press.
- Merabti, M., & Benmhamed, M. (2024). Investigating Moroccan EFL University Professors' Understanding of Critical Thinking Skills. *Studies in Humanities and Education*, 5(2), 37–51.
- Moore, T. (2011). Critical thinking and disciplinary thinking: A continuing debate. *Higher Education Research & Development*, 30(3), 261–274. doi:10.1080/07294360.2010.501328.
- Moore, T. J. (2016). On the teaching of critical thinking in English for academic purposes. In R. Breeze & C. M. Guinda (Eds.), *Essential competencies for English-medium university teaching* (pp. 19-35). Cham: Springer International Publishing.
- Paul, R. (2004). The State of Critical Thinking Today: The Need for a Substantive Concept of Critical Thinking. <http://www.criticalthinking.org/pages/the-state-of-critical-thinking-today/523>.

- Reddy, K.V., Lakshmi, G.S. (2024). Practicing Critical Thinking: Issues and Challenges. In: Reddy, K.V., Lakshmi, G.S. (eds.) *Critical Thinking for Professional and Language Education*. Springer, Cham. https://doi.org/10.1007/978-3-031-37951-2_5
- Robinson, S. R. (2011). Teaching logic and teaching critical thinking: revisiting McPeck. *Higher Education Research & Development*, 30(3), 275–287.
- Rouijel, E., & Bouziane, A. (2020). Moroccan middle-school, secondary and tertiary EFL teaching staff perceptions and instruction of critical thinking. *Journal on English Language Teaching*.
- Royaume du Maroc, Conseil Supérieur de l'éducation et de la Formation et de la Recherche Scientifique. (2015). Vision Stratégique de la Réforme: Pour une École de l'Équité, de la Qualité et de la Promotion.
- Thonney, T., & Montgomery, J. C. (2019). Defining critical thinking across disciplines: An analysis of community college faculty perspectives. *College Teaching*, 67(3), 169-176.
- Tiruneh, D. T., Weldeslassie, A. G., Kassa, A., Tefera, Z., De Cock, M., & Elen, J. (2016). Systematic design of a learning environment for domain-specific and domain-general critical thinking skills. *Educational technology research and development*, 64(3), 481-505.
- UNESCO. (2022). *Transforming higher education: Global collaboration on visioning and action*. UNESCO.
- World Economic Forum. (2024). *The future of jobs report 2024*. World Economic Forum. <https://www.weforum.org/reports/the-future-of-jobs-report-2024>