Developing critical thinking: An examination of contemporary practices in accounting

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Abstract
Employers and professional bodies call for higher education accounting courses to emphasise the importance of critical thinking skills. This study provides an in-depth assessment of how critical thinking is currently taught and assessed across an entire accounting degree. Our study contributes to our understanding of how teaching and assessment can support students in developing their critical thinking. Using a case study approach, we identify resource restraints and disruptions to traditional forms of engagement as key challenges to developing critical thinking skills in accounting education. We conclude with suggestions for teaching practice, such as formative scaffolds and teacher-led discussions.

KEYWORDS
accounting education, critical thinking skills, student perceptions

JEL CLASSIFICATION
M41

1 | INTRODUCTION

This study aims to provide an in-depth exploration of the current practices of teaching and assessing critical thinking across an entire accounting degree at an Australian university. Critical thinking is a skill that is expected of business graduates and increasingly sought after by accounting firms (Braun, 2004; Bui & Porter, 2010; Butler et al., 2019; Kavanagh & Drennan, 2008; Pan & Perera, 2012). Graduates who have theoretical and technical knowledge but lack critical thinking as a graduate skill will face challenges in completing assigned work that requires independent judgement. The Future of Employment study by Frey and Osborne (2013) identifies accounting as an easily automated profession and notes that for accountants to remain employable, they...
need to develop skills that are not easily automated. Advances in technology mean that accounting is now less about number-crunching, and more about analysis and strategic advice, increasing the need for higher order skills development such as critical thinking throughout accounting degrees (Jackson, 2020). Technical skills alone are no longer sufficient for accounting students’ job readiness (De Lange et al., 2006).

In Australia, university study learning outcomes are required through the Higher Education Standards Framework (Threshold Standards) 2021 legislative instrument, administered by the Tertiary Education Quality and Standards Agency. Critical thinking is listed as a generic learning outcome in Part A, section 1.4 (d) as ‘skills in independent and critical thinking suitable for life-long learning’ (Higher Education Standards Framework (Threshold Standards), 2021, p. 6). With the introduction of the second edition of the Australian Qualifications Framework (AQF) in 2013, the discipline of accounting has moved to include critical thinking as a graduate skill in a measurable way, although the principle-based AQF standards leave it to the institutions to operationalise these learning outcomes in an effective manner (Australia Qualifications Framework Council, 2013). Inevitably, different institutions apply these standards in different ways; however, differences for the accounting discipline should be small, given the discipline is subject to accreditation guidelines by the professional accounting bodies: CPA Australia and Chartered Accountants of Australia and New Zealand (CAANZ).

Insights from an extensive literature review on developing critical thinking skills in students informed our study. We then use a case study approach to examine in detail how critical thinking is taught and assessed in an Australian accounting degree. We gain perspectives from students through a survey and from staff through a focus group. We find current practices of teaching and assessing critical thinking skills are deficient due to a lack of student engagement and resource restrictions that make it difficult to balance content delivery and skills development. However, there are practical avenues for improvement, such as incorporating formative scaffolds in the form of real-time feedback during teacher-led group discussions. Our findings offer implications for teaching practice and respond to Wolcott and Sargent's (2021) call for empirical evidence on developing critical thinking as a key skill for accounting graduates.

The structure of this paper is as follows. Section 2 reviews the relevant literature and Section 3 describes the research method. Section 4 presents a summary of the results followed by a discussion of our findings in Section 5. Finally, Section 6 concludes the paper.

2 | LITERATURE REVIEW

2.1 | Defining critical thinking

There is no universally agreed definition of ‘critical thinking’. Early studies (e.g., Wolcott & Lynch, 1997) introduced the concept of ‘reflective judgement’ which drives the development of ‘critical thinking’. They argue that ‘assignments have to be designed to elicit information about the cognitive complexity of reasoning and their assumptions about knowledge’ (Wolcott & Lynch, 1997, p. 68). In their review of critical thinking definitions, Griggs et al. (1998, p. 256) define critical thinking 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 sceptical, questioning attitude’. Wilkin (2017, p. 15) notes that most definitions ‘include concepts such as reasoning, judgment, procedural knowledge, meta-cognition, reflection, questioning and justification’. More recently, Wolcott and Sargent (2021) analysed existing definitions of critical thinking in the accounting profession. They concluded that while there is still no one definition, existing definitions are consistent.
2.2 | Teaching critical thinking skills

Bloom's taxonomy is often used as a starting point in discussions on how best to develop critical thinking skills in students. Critical thinking encompasses aspects of Analysis, Synthesis, and Evaluation – the higher levels of cognitive skills in the original taxonomy (Bloom, 1956). Thinking at these levels is not a standalone skill but more a family of processes, which requires a more integrated approach (Reinstein & Bayou, 1997). The levels of thinking in Bloom's taxonomy are incremental, and it is difficult to teach the higher levels without the student having mastered the preceding levels (Reinstein & Bayou, 1997).

Ruggiero (1991) notes the importance of teaching critical thinking across an entire curriculum and in every class, allowing students to assimilate knowledge (Wilkin, 2017). This approach sits well in a degree, as discipline and technical knowledge are developed over an entire program. Figure 1 shows a generalised structure for a standard accountancy degree. Following Ruggiero (1991), critical thinking should thus be integrated into each knowledge area.

Ennis (1985) theorised that Bloom's taxonomy did not provide adequate direction for developing critical thinking and proposed a typology of four instruction methods for teaching critical thinking: generic, infusion, immersion, and mixed (Ennis, 1989). A generic instruction method is undertaken if critical thinking is the main content and learning objective. Infusion is used if critical thinking is an explicit objective alongside other subject content, while immersion is used when there is no explicit critical thinking instruction. Finally, mixed is an approach whereby a specific section of the subject is devoted to critical thinking instruction. In their meta-analysis of 684 critical thinking instruction studies, Abrami et al. (2015) determine that critical thinking instruction does develop these skills in students, but find no significant effect from the type

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**Figure 1** Accounting degree map. *Note:* The units are drawn from both the Professional Accreditation Guidelines for Australian Accounting Degrees and also the CAANZ’s Accredited Tertiary Courses Listing (2018). There is considerable variability in the names and structure of degrees, and this illustration is meant only as a framework of knowledge areas across a degree program, in which critical thinking can be implemented.
of instruction based on Ennis’ (1989) classifications. It does not appear that one instruction method is superior to the others. However, using a different typology as the basis for analysis (a 3-category scheme of dialogue, authentic instruction, and mentoring), Abrami et al. (2015) find dialogue and authentic instruction to be the most effective means of teaching critical thinking, and a blend of these approaches combined with mentoring produce the highest effect size. They note that for dialogue, a teacher posing questions or teacher-led discussions are the most effective, and for authentic instruction, applied problem-solving and role-playing work best. In their study, the time spent on critical thinking instruction does not appear to significantly impact effectiveness, demonstrating that students benefit from even a modicum of guidance.

The literature provides some specific suggestions on how accounting educators can foster critical thinking through different teaching strategies and activities. Kurfiss (1989) and Wilkin (2017) highlight that it is important for instructors to identify the critical thinking elements to be addressed in a unit and clearly and explicitly communicate the objective of developing critical thinking skills to students. As a result, students are more likely to accept and actively participate in critical thinking exercises (Kurfiss, 1989). Wolcott (2000) also notes the importance of designing learning objectives to promote decision making over correct answers.

Doney et al. (2010, p. 300) suggest that accounting educators should always “create a climate of curiosity and questioning” and ‘engage in dialogue to develop divergent thinking’, which can be achieved by encouraging students to participate in discussions and exploring the merit of alternative views rather than giving students suggested answers dominated by instructors’ views. Kimmel (1995) also notes the importance of encouraging students to modify their judgements when new information is received. Independent thinking can be developed through these practices, which also improves subsequent classroom discussions and participation (Kurfiss, 1989). Feedback is also an important component of developing the ability to think critically (Doney et al., 2010).

Prior studies identify collaborative learning as an effective teaching strategy that can be effective in developing students’ critical thinking skills (Levant et al., 2016; Tan, 2019). Collaborative learning involves the use of small groups of students working together to process information (Nsor-Ambala, 2022). Loes and Pascarella (2017) investigated whether collaborative learning is effective in improving critical thinking skills and found that it is, but only for students who have lower academic ability and are White.

Scaffolding has been identified as an important component of developing critical thinking skills in students (Wilkin, 2017). Scaffolding draws on Vygotsky’s (1978) Zone of Proximal Development construct, which infers learners can develop skills through guidance and help. The general principle behind a scaffolded approach to learning is that students will be provided continuous support and assistance until they are capable of independently completing the tasks (Abraham & Jones, 2016). A scaffolded teaching approach is designed to promote a deeper learning experience (Nwosu & Vorster, 2021), and has been used in accounting by Abraham and Jones (2016) and Sin et al. (2007).

More recently, scholars have called for experiential learning (Kolb, 1984) to be used to develop critical thinking skills in accounting students (Butler et al., 2019; Chiang et al., 2021). Experiential learning is more immersive and requires a student to ‘participate in a concrete experience (Do), reflect on that experience and other information (Reflect), develop theories based on experiences and knowledge (Think), and formulate a conclusion or solve a problem (Apply)’ (Butler et al., 2019, p. 12).

2.3 Assessing critical thinking skills

Prior studies examine the effectiveness of using a variety of assessment items to develop and evaluate accounting students’ critical thinking skills. Camp and Schnader (2010) argue that
oral debate is a useful tool to develop and assess students' critical thinking skills. They provide suggestions on how debates can be used as an assessment item in the accounting curriculum. Kurfiss (1987), Gainen (1992), and Wolcott and Lynch (1997) demonstrate that written assessments are an effective way to assess students’ reasoning skills and ability to organise and articulate knowledge. This type of assessment can be implemented in different formats, ranging from a short-written critique to developing a financial plan (Cowen et al., 2011) or designing teaching materials. These can all be used to facilitate a student's ability to analyse and to develop skills of inquiry. Business simulations (Levant et al., 2016) and case studies (Tan, 2019) are other commonly used assessment items in accounting units for critical thinking as these require students to demonstrate their reflective thinking leading to decisions. This involves understanding the case or situation, identifying the issue or problems, obtaining the information needed, and then formulating a decision based on concomitant rationales and references collected (Boyce et al., 2001; Levant et al., 2016; Springer & Borthick, 2004).

Critical thinking requires an existing level of knowledge and designing learning activities that effectively teach and assess critical thinking is resource intensive (Rebele & St Pierre, 2019). Actual practices are likely to deviate from the ideation proposed in the literature due to resource constraints; however, no study has examined the current practices used across an entire degree, nor their effectiveness. An overview of the exploratory approach used to examine teaching practices employed in our case is provided in the next section.

3 | RESEARCH DESIGN

Our research employs a case study approach to garner an in-depth understanding of how critical thinking is currently taught and assessed within our unit of analysis – an Australian university with a professionally recognised undergraduate accounting program. It is generally accepted that case studies are an appropriate method for research of an exploratory nature (Lee et al., 2007; Patton, 2015; Yin, 2018) and that ‘the rich detail provided and examined by case studies increases the likelihood of generating novel theory and creative insights’ (Cooper & Morgan, 2008, p. 62). We explore how students and staff experience teaching and assessment of critical thinking by drawing on multiple sources of evidence within a real-life context (Saunders et al., 2016).

3.1 | Case study background

At the time this paper was written, the undergraduate degree at our case university consisted of eight core Bachelor of Business units, eight core Accountancy major units, four units for the Professional Accounting Extension which are required for entry into the profession, and four electives. The University’s Bachelor of Business (Accountancy) complied with the accreditation standards of CPA Australia, Chartered Accountants Australia and New Zealand (CAANZ), the Institute of Public Accountants (IPA), and the Association of Chartered Certified Accountants (ACCA). Accreditation by these professional bodies ensures a level of homogeneity across accounting degrees throughout Australia. Thus, students undertaking this course of study graduate with a nationally and internationally recognised qualification in accounting.

The case university's business faculty has previously undertaken a significant amount of work to gain triple accreditation from the European Quality Improvement System (EQUIS), the Association to Advance Collegiate Schools of Business (AACSBI), and the Association of MBAs (AMBA). This process necessitated the business faculty to systematically identify and

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2At the case university, students need to complete a total of 24 units of study to obtain their degree.
action their student learning goals and objectives. For instance, the AACSB (2021) requires an accredited accounting academic program to address, inter alia, ‘critical thinking and analytical skills that support professional scepticism, risk assessment, and assurance of accounting information’ (AACSB, 2021, p. 17). Therefore, the business faculty at our case university embedded critical thinking in the curriculum and in assessments through the following two Assurance of Learning Goals:

   HO 2.1: Investigate real world business issues and situations through the effective analysis, evaluation, and synthesis of theory and practice; and.

   HO 2.2: Exercise independent judgement and initiative in adapting and applying knowledge and skills for effective planning, problem solving, and decision making in diverse contexts.

An analysis of the learning goals and assessment items for each individual unit in the accounting degree at our case university shows that at least one of the on average four learning goals per unit addresses critical thinking, with an average of 33% of assessment marks per unit allocated against this capability.

   To compare the teaching and assessment practices of the accounting degree at our case university with the accounting degrees at other Australian universities, a research assistant was employed to collate data on learning objectives and assessment types sourced from 400 units across 30 universities with professionally accredited accounting undergraduate programs in Australia. The 2018 Accredited Tertiary Courses Listing was used to identify the units. The research assistant then sourced the assessment information from each university's webpage and the unit syllabuses.

   Verbs used to describe each learning outcome (where available) were recorded and classified into five categories according to the Bloom (1956) taxonomy of demonstrated learning: (i) Know; (ii) Comprehend; (iii) Analyse; (iv) Synthesise; and (v) Evaluate. As discussed in the literature review, the last three categories are considered demonstrations of critical thinking ability. While there is a wide variety of learning outcomes recorded across universities ranging from one to 12 outcomes, the average of four learning outcomes per unit aligns with the average for our case university. The extent to which critical thinking capabilities are captured in these learning outcomes is also similar: we recorded an average of eight verbs associated with critical thinking across Australian universities (7.9) and at our case university (8.1).

   The assistant also recorded the assessment items used for each unit. We identified 1196 individual assessments that were grouped into nine categories of the most commonly found assessment types after accounting for unspecific assignment item descriptors (164). The categories are: (i) test-based; (ii) written individual assessment; (iii) continuous forms of assessment; (iv) case studies; (v) technical assessments; (vi) groupwork assessment; (vii) reflective assessment; (viii) presentations; and (ix) other. Table 1 reports the number of assessment items per category. There are three assessment items in each unit at our case university, which matches the average across all universities of approximately three assessments per unit.

   As shown in Table 1, 776 (64.9%) of the 1196 recorded assessment items are test-based items. The columns Year 1, Year 2, and Year 3 report the number of assessment types for first-, second-, and third-year units, respectively. Table 1 shows that test-based assessment items (e.g., mid-term quizzes or final exams) are the most frequently used assessment item in an accounting degree.
across Australian universities. This is most likely tied to the professional accreditation requirements for invigilated assessment. However, forms identified as effective in promoting critical thinking (see subsection 2.3) are less frequently used. For example, case studies are only used in 3.8% of all assessment items overall. In summary, the similarities in learning outcomes and assessment items suggest that the insights from our case study might be transferrable to other Australian universities supporting the appropriateness of the accounting degree at the case university as the unit of analysis.

### 3.2 Survey design and validation

We developed an online survey based on the prior literature (see Section 2) to collect student perspectives on the teaching and assessment of critical thinking. The original questionnaire is composed of questions that consider student perceptions of the importance and relevance of critical thinking as well as their perceptions of the discipline's practices of teaching and assessing critical thinking. The majority of our survey questions use seven-point Likert-scales in line with the literature (Colman et al., 1997; Finstad, 2010; Lewis, 1993; Preston & Colman, 2000; Symonds, 1924). We utilise an 11-point Likert scale for respondents to rate effectiveness of teaching strategies and assessments of critical thinking to allow for greater variation in responses. While some researchers suggest that seven-point Likert scales might be optimal to reflect expression of opinion, evidence suggests that there is no perceived difference between using seven-point versus 11-point Likert scales (Preston & Colman, 2000). In addition, several open-ended response questions were included to facilitate a deeper analysis of student perspectives.

Before we administered the survey to participants, the reliability and internal consistency of the survey items were estimated through a pilot study on eight academic staff. Further, following prior studies (e.g., Hancock et al., 2019), we calculate Cronbach's alpha as a measure of scale reliability. The closer the Cronbach's alpha value is to one, the more reliable the scale. We observe a Cronbach's alpha of 0.906 for all survey items, indicating the overall reliability of our survey. Our survey questions can be broadly divided into three sections: (i) importance of critical thinking skills; (ii) teaching critical thinking; and (iii) assessing critical thinking. We further calculate Cronbach's alpha for each section. Questions related to the importance of critical thinking skills demonstrate a Cronbach's alpha of 0.922, while questions related to teaching and assessing

### Table 1: Use of assessment item types in Australian accounting undergraduate degrees

<table>
<thead>
<tr>
<th>Assessment type</th>
<th>Occurrence</th>
<th>Year 1 (%)</th>
<th>Year 2 (%)</th>
<th>Year 3 (%)</th>
<th>Case university (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test-based assessments</td>
<td>776</td>
<td>64.9</td>
<td>67.8</td>
<td>64.4</td>
<td>61.1</td>
</tr>
<tr>
<td>Written individual assessment (e.g., essays or reports)</td>
<td>115</td>
<td>9.6</td>
<td>9.7</td>
<td>10.0</td>
<td>9.0</td>
</tr>
<tr>
<td>Attendance, participation (continuous forms of</td>
<td>111</td>
<td>9.3</td>
<td>10.4</td>
<td>8.8</td>
<td>8.3</td>
</tr>
<tr>
<td>assessment)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case studies/simulations</td>
<td>45</td>
<td>3.8</td>
<td>3.3</td>
<td>2.7</td>
<td>6.0</td>
</tr>
<tr>
<td>Technical assessments (e.g., practice sets or labs)</td>
<td>41</td>
<td>3.4</td>
<td>2.9</td>
<td>5.4</td>
<td>1.3</td>
</tr>
<tr>
<td>Groupwork assessments</td>
<td>32</td>
<td>2.7</td>
<td>1.5</td>
<td>1.8</td>
<td>5.6</td>
</tr>
<tr>
<td>Reflective assessments</td>
<td>30</td>
<td>2.5</td>
<td>2.4</td>
<td>2.5</td>
<td>2.7</td>
</tr>
<tr>
<td>Presentations/debates</td>
<td>27</td>
<td>2.3</td>
<td>0.9</td>
<td>3.2</td>
<td>3.0</td>
</tr>
<tr>
<td>Other forms</td>
<td>19</td>
<td>1.6</td>
<td>1.1</td>
<td>1.1</td>
<td>3.0</td>
</tr>
<tr>
<td>Total</td>
<td>1196</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Note: This table shows the adoption of different assessment types in undergraduate accounting degrees across Australia.
critical thinking skills have a Cronbach's alpha of 0.899 and 0.721, respectively. Together, the calculated Cronbach's alpha values are higher than the minimum required (0.70), suggesting that the reliability of the survey questions is acceptable (Hancock et al., 2019; Nunnally, 1978).

After pilot testing the survey instrument, the survey was distributed to students enrolled in accounting units during Semester 1, 2021. Students were invited to participate in the survey on a voluntary basis with an option to enter their names into a prize draw. We received 87 usable responses to the survey, consisting of 35.85% male students and 64.15% female students. Analysis of the demographic data reveals that the average age of respondents is 25 years, with ages ranging from 18 to 58 years, with the highest proportion of students aged between 21 and 30 years. The demographic statistics also show 62.26% of respondents are domestic students while 37.74% of the sample are international students. However, less than half (43.40%) of the total sample students speak English as their first language. Approximately 74% of respondents have been studying at university for three or more years and 83% of respondents are enrolled full-time. This study also collected information on whether the students are working in a position related to their degree, revealing that 37.74% of respondents are currently working (full-time or part-time) in a business-related position.

3.3 Focus group

To collect the perspectives of staff at the case university, and to provide triangulation of the student survey data (Shenton, 2004), two of the authors facilitated a 1-h focus group discussion with six university staff actively involved in the accounting undergraduate degree. Participants in the focus group included two permanent full-time academic staff members, two academic staff members with fixed-term positions, one sessional teaching staff member, and one learning advisor. Except for the learning advisor, all participants actively teach in the area of undergraduate accounting across all levels: first-year (two participants); second-year (two participants); and third-year (two participants); with one participant teaching a second-year equivalent elective. In addition, two individual follow-up discussions (30 min each) were conducted with two university staff who could not attend the focus group session. These two staff members taught in the largest core units in the accounting program, so their perspectives were considered necessary to generate a rich understanding (Shenton, 2004). Follow-up informal discussions provide the opportunity to consider further perspectives (Sumarwan et al., 2021).

Primary analysis was qualitative, with the transcribed data thematically analysed to identify common threads across teaching and assessment practices emerging from the focus group discussion. Leximancer software was used to auto-code the responses and delineate concepts. The use of text analysis tools such as Leximancer provide a ‘means of quantifying and displaying the conceptual structure of text’ to ‘explore interesting conceptual features’ (Leximancer, 2021, p. 3). It has been suggested that this tool can ensure validity and reliability by generating reproducible results (Dumay, 2014; Sotiriadou et al., 2014).

For the analysis, the transcribed responses were merged into one source document. Each participant was tagged in the file and identified as ‘Speaker’ using the Dialogue Tag function in the Text Processing Settings. To generate meaningful themes, the option to ‘Merge word variants’ was selected in the Text Processing Settings. Default Concept Seed Settings and Thesaurus Settings were used. Auto Concepts were screened for concepts that were conceptually equivalent. This screening process was cross-checked by examining the concept terms against the source document. These concepts were then merged (e.g., ‘assessment’ and ‘assignment’). Auto concepts that were identified due to speaking convention (such as ‘things’, or ‘guess’) were removed. The

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7Two participants teach across multiple units in the accounting undergraduate program.
The thesaurus was enriched by the User Defined Concepts: ‘collaboration’, ‘COVID’, ‘engagement’, and ‘frameworks’. Default settings for concept coding and project output were used.

The major themes in the topical map represented by the coloured ‘bubbles’ are identified based on frequency and co-occurrence of the concepts. The size of the concept dots (not the theme bubbles) is an indicator of connectivity in the map. The size of a ‘bubble’ represents the pervasiveness of the theme, and the distance between the ‘bubbles’ (or ‘clusters’) reflects the strength of association between the themes (using 50% Concept Visibility, 33% Theme Size, and 0° Rotation). Given the stochastic nature of the map, thesaurus iterations vary between 6–7 iterations, but a stable map can be reproduced with the original auto and user-defined concepts. The stability of the emerging map has also been tested by re-clustering the map. The themes remain unchanged after re-clustering.

4 | RESULTS

In the following subsections, we describe the results relating to the student survey, that is, student perspectives (subsection 4.1), and the staff focus group, that is, staff perspectives (subsection 4.2).

4.1 | Student perspectives

The order in which we report the survey results corresponds with the order of the three main sections of the student survey: (i) importance of critical thinking skills and traits; (ii) teaching practices used in developing critical thinking skills; and (iii) assessment practices to support the development of critical thinking skills.

4.1.1 | Student perspectives on the importance of critical thinking

The first section of the survey sought students’ perceptions of the importance of critical thinking skills. Specifically, students were asked how relevant critical thinking skills are to complete their accounting degree, for their future career/employability, and in their personal life. These questions are rated on a scale of 1–7, with 7 being the most important/relevant. Results show that slightly more than 90% of students recognise critical thinking skills will be relevant for their career (i.e., 48.28% rated ‘strongly agree’ and 42.53% rated ‘agree’). Approximately 78% of students perceive critical thinking skills as ‘helpful’ in their personal life.

Students were then asked to rank the importance of the following critical thinking traits drawn from Pascarella and Terenzini (1991, pp. 114–115):

- Reason objectively and draw conclusions from various types of data.
- Process and utilise new information.
- Make reasonable decisions in the face of imperfect information.
- Evaluate new ideas and techniques efficiently.
- Evaluate arguments and claims critically.

Table 2 Panel A reports the means and standard deviations for the perceived importance of different critical thinking traits, along with the scale intercorrelations. Table 2 shows that students ranked ‘process and utilise new information’ as the most important critical thinking trait to complete their degree (mean = 6.25) and ‘make reasonable decisions in the face of imperfect information’ as the least important critical thinking skill trait (mean = 5.89).
### TABLE 2 The importance of critical thinking traits

#### Panel A: Descriptive statistics and correlations

<table>
<thead>
<tr>
<th>Critical thinking trait</th>
<th>Mean</th>
<th>SD</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process and utilise new information (I)</td>
<td>6.25</td>
<td>1.04</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reason objectively and draw conclusions from various types of data (II)</td>
<td>6.17</td>
<td>1.10</td>
<td>0.76***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluate new ideas and techniques efficiently (III)</td>
<td>5.90</td>
<td>1.14</td>
<td>0.64***</td>
<td>0.79***</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluate arguments and claims critically (IV)</td>
<td>5.91</td>
<td>1.19</td>
<td>0.66***</td>
<td>0.69***</td>
<td>0.78***</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Make reasonable decisions in the face of imperfect information (V)</td>
<td>5.89</td>
<td>1.22</td>
<td>0.68***</td>
<td>0.74***</td>
<td>0.72***</td>
<td>0.63***</td>
<td>1</td>
</tr>
</tbody>
</table>

#### Panel B: MANOVA results

<table>
<thead>
<tr>
<th>Critical thinking trait</th>
<th>Male F</th>
<th>Partial $\eta^2$</th>
<th>Age F</th>
<th>Partial $\eta^2$</th>
<th>International student F</th>
<th>Partial $\eta^2$</th>
<th>Non-English speaker F</th>
<th>Position related to their degree F</th>
<th>Partial $\eta^2$</th>
<th>Full-time student F</th>
<th>Partial $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(I)</td>
<td>1.04</td>
<td>0.02</td>
<td>0.30</td>
<td>0.12</td>
<td>9.74***</td>
<td>0.16</td>
<td>12.68***</td>
<td>9.48***</td>
<td>0.01</td>
<td>1.26</td>
<td>0.07</td>
</tr>
<tr>
<td>(II)</td>
<td>0.08</td>
<td>0.00</td>
<td>0.60</td>
<td>0.21</td>
<td>13.27***</td>
<td>0.21</td>
<td>9.11***</td>
<td>14.20***</td>
<td>0.02</td>
<td>1.80</td>
<td>0.10</td>
</tr>
<tr>
<td>(III)</td>
<td>0.01</td>
<td>0.00</td>
<td>0.46</td>
<td>0.17</td>
<td>12.34***</td>
<td>0.20</td>
<td>9.94***</td>
<td>13.07***</td>
<td>0.06</td>
<td>2.12</td>
<td>0.12</td>
</tr>
<tr>
<td>(IV)</td>
<td>0.20</td>
<td>0.00</td>
<td>0.86</td>
<td>0.28</td>
<td>11.89***</td>
<td>0.19</td>
<td>3.10</td>
<td>11.83***</td>
<td>0.04</td>
<td>1.06</td>
<td>0.06</td>
</tr>
<tr>
<td>(V)</td>
<td>0.63</td>
<td>0.01</td>
<td>0.68</td>
<td>0.23</td>
<td>9.94***</td>
<td>0.16</td>
<td>3.66</td>
<td>9.64***</td>
<td>0.03</td>
<td>0.53</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Note: (A) This table reports students’ perception regarding the importance of several critical thinking traits drawn from Pascarella and Terenzini (1991, pp. 114–115). The scores are rated on a scale of 1–7, with 7 being the most important/relevant. This table also reports the scale intercorrelations and coefficient alpha between different critical thinking traits. ***Correlation is significant at the 0.01 level (two-tailed). (B) This table reports MANOVA tests using the five critical thinking traits as dependent variables and various demographics. Critical thinking traits include: Process and utilise new information (I); Reason objectively and draw conclusions from various types of data (II); Evaluate new ideas and techniques efficiently (III); Evaluate arguments and claims critically (IV); and Make reasonable decisions in the face of imperfect information (V). *** $p<0.01$. 

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Further, we conducted a series of MANOVA tests using the five critical thinking traits as dependent variables and the demographic information collected as the fixed factor one at a time. Results are reported in Table 2 Panel B. Specifically, we test if students' perceptions differ between the following seven groups: (i) gender; (ii) age; (iii) international students versus domestic students; (iv) English-speakers versus non-English speakers; (v) whether the student works in a position related to the degree; (vi) year of degree; and (vii) full-time versus part-time students. The between-subjects effects reveal no significant differences in the perceptions of students toward the importance of different critical thinking traits based on gender, age, year of degree, and enrolment mode (i.e., full-time vs. part-time). However, we find international students and students who work in a position related to their business degree rate all five critical thinking traits significantly higher than their comparison group. For students from a non-English background, processing new information, objective reasoning, and efficient evaluation rate significantly higher.

4.1.2 Student perspectives on critical thinking teaching practices

The second section of the survey sought students' perceptions on how effectively critical thinking is currently taught. Students were instructed to rate the statement: ‘I have been taught critical thinking in my subject at university’ on a seven-point Likert-type scale, where 7 = Strongly agree and 1 = Strongly disagree. Results show the majority of students agree they have been taught critical thinking (46.75% rate ‘agree’ and 11.69% rate ‘strongly agree’).

Students were then asked to identify teaching strategies their lecturers had used from a list of effective teaching methods derived from the literature (e.g., Doney et al., 2010; Kimmel, 1995; Tan, 2019; Wilkin, 2017; Wolcott, 2000). Results show students came across the teaching strategies in all (7.79%) or most of their studies (66.23%). We also asked students to rate the effectiveness of each teaching strategy on an 11-point Likert-type scale where 0 = extremely ineffective and 10 = extremely effective. We report the means and standard deviations for students' rating of teaching strategies relative to their perceived effectiveness, along with the scale intercorrelations. Table 3 Panel A shows that while there is no universal agreement on what teaching strategy would be most effective in developing critical thinking skills, students evaluate ‘encouraging idea sharing and collaboration’ (mean = 6.93) and ‘communicating clearly about the importance of critical thinking to accounting’ (mean = 6.91) as the most effective teaching strategies and ascribe the lowest value to ‘creating a climate of curiosity and questioning’ (mean = 5.86).

Multivariate analysis of variance (MANOVA) tests were conducted using the different teaching strategies as dependent variables and the demographic information collected as the fixed factor. The MANOVA results reported in Table 3 Panel B show no differences of opinion on the effectiveness of teaching strategies based on gender, age, and enrolment mode (i.e., full-time vs. part-time). However, international students and students whose first language is not English recognise certain teaching strategies are more effective to help develop their critical thinking skills, including: (i) ‘provided us feedback on our assessments that require critical thinking skills’; (ii) ‘communicated clearly about the importance of critical thinking to accounting’; (iii) ‘designed learning objectives that focus on the decision-making process rather than content’; and (iv) ‘encouraged us to ‘brainstorm’ ideas and questions’. Interestingly, students who are in the third year or above and those who work in a business-degree related position prefer a teamwork environment and consider ‘share our ideas and to collaborate and think through problems together’ as the most effective teaching strategies.

Students were asked to leave comments on the teaching strategies used by their lecturers and tutors to teach critical thinking. Several students identified a lack of examples demonstrating critical thinking. For example, one student noted:
<table>
<thead>
<tr>
<th>Teaching strategies</th>
<th>Mean</th>
<th>SD</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
<th>IX</th>
<th>X</th>
<th>XI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provided us feedback on our assessments that require critical thinking skills (I)</td>
<td>6.58</td>
<td>2.07</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explicitly identified the particular critical thinking elements addressed in the unit (II)</td>
<td>6.60</td>
<td>2.18</td>
<td>0.59***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicated clearly about the importance of critical thinking to accounting (III)</td>
<td>6.91</td>
<td>2.05</td>
<td>0.31***</td>
<td>0.36***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encouraged us to modify judgements in light of new information (IV)</td>
<td>6.87</td>
<td>1.96</td>
<td>0.63***</td>
<td>0.46***</td>
<td>0.49***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encouraged us to share our ideas and to collaborate and think through problems together (V)</td>
<td>6.93</td>
<td>1.84</td>
<td>0.45***</td>
<td>0.56***</td>
<td>0.29**</td>
<td>0.41***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Designed learning objectives that focus on the decision-making process rather than content (VI)</td>
<td>6.33</td>
<td>2.04</td>
<td>0.39***</td>
<td>0.35***</td>
<td>0.42***</td>
<td>0.53***</td>
<td>0.42***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engaged in dialogue to develop divergent thinking (welcomes divergent views from students) (VII)</td>
<td>6.28</td>
<td>2.01</td>
<td>0.46***</td>
<td>0.54***</td>
<td>0.41***</td>
<td>0.38***</td>
<td>0.44***</td>
<td>0.47***</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required evaluation of interventions (VIII)</td>
<td>6.09</td>
<td>2.12</td>
<td>0.41***</td>
<td>0.46***</td>
<td>0.47***</td>
<td>0.61***</td>
<td>0.49***</td>
<td>0.49***</td>
<td>0.51***</td>
<td>1</td>
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<td></td>
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<tr>
<td>Asked us to explain our answers (IX)</td>
<td>6.51</td>
<td>2.00</td>
<td>0.39***</td>
<td>0.36***</td>
<td>0.42***</td>
<td>0.45***</td>
<td>0.34***</td>
<td>0.48***</td>
<td>0.34***</td>
<td>0.46***</td>
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<td></td>
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<tr>
<td>Encouraged us to ‘brainstorm’ ideas and questions (X)</td>
<td>6.22</td>
<td>2.21</td>
<td>0.50***</td>
<td>0.41***</td>
<td>0.34***</td>
<td>0.61***</td>
<td>0.55***</td>
<td>0.53***</td>
<td>0.43***</td>
<td>0.55***</td>
<td>0.68***</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Created a climate of curiosity and questioning (XI)</td>
<td>5.86</td>
<td>2.06</td>
<td>0.30***</td>
<td>0.34***</td>
<td>0.26**</td>
<td>0.34***</td>
<td>0.37***</td>
<td>0.47***</td>
<td>0.49***</td>
<td>0.33***</td>
<td>0.37***</td>
<td>0.59***</td>
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</table>
### Panel B: MANOVA results

<table>
<thead>
<tr>
<th>Teaching strategies</th>
<th>Male $F$</th>
<th>Partial $\eta^2$</th>
<th>Age $F$</th>
<th>Partial $\eta^2$</th>
<th>International student $F$</th>
<th>Partial $\eta^2$</th>
<th>Non-English speaker $F$</th>
<th>Partial $\eta^2$</th>
<th>Position related to their degree $F$</th>
<th>Partial $\eta^2$</th>
<th>Year of degree $F$</th>
<th>Partial $\eta^2$</th>
<th>Full-time student $F$</th>
<th>Partial $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(I)</td>
<td>0.85</td>
<td>0.02</td>
<td>0.83</td>
<td>0.27</td>
<td>9.10***</td>
<td>0.17</td>
<td>11.17***</td>
<td>0.14</td>
<td>0.44</td>
<td>0.01</td>
<td>0.25</td>
<td>0.02</td>
<td>0.25</td>
<td>0.01</td>
</tr>
<tr>
<td>(II)</td>
<td>0.13</td>
<td>0.00</td>
<td>0.33</td>
<td>0.13</td>
<td>0.00</td>
<td>0.00</td>
<td>0.56</td>
<td>0.01</td>
<td>0.67</td>
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<td>1.29</td>
<td>0.08</td>
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<td>0.00</td>
</tr>
<tr>
<td>(III)</td>
<td>0.00</td>
<td>0.00</td>
<td>1.22</td>
<td>0.36</td>
<td>14.40***</td>
<td>0.00</td>
<td>1.88</td>
<td>0.04</td>
<td>0.28</td>
<td>0.01</td>
<td>2.19</td>
<td>0.16</td>
<td>0.15</td>
<td>0.00</td>
</tr>
<tr>
<td>(IV)</td>
<td>1.39</td>
<td>0.03</td>
<td>0.70</td>
<td>0.24</td>
<td>0.00</td>
<td>0.00</td>
<td>0.63</td>
<td>0.01</td>
<td>0.02</td>
<td>0.00</td>
<td>0.70</td>
<td>0.05</td>
<td>0.41</td>
<td>0.01</td>
</tr>
<tr>
<td>(V)</td>
<td>2.03</td>
<td>0.04</td>
<td>1.49</td>
<td>0.40</td>
<td>0.00</td>
<td>0.00</td>
<td>0.29</td>
<td>0.01</td>
<td>12.34***</td>
<td>0.08</td>
<td>11.82***</td>
<td>0.05</td>
<td>0.13</td>
<td>0.00</td>
</tr>
<tr>
<td>(VI)</td>
<td>0.30</td>
<td>0.01</td>
<td>0.49</td>
<td>0.18</td>
<td>14.09***</td>
<td>0.11</td>
<td>0.25</td>
<td>0.01</td>
<td>0.23</td>
<td>0.01</td>
<td>0.78</td>
<td>0.05</td>
<td>0.89</td>
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<td>(VII)</td>
<td>0.02</td>
<td>0.00</td>
<td>0.77</td>
<td>0.26</td>
<td>1.51</td>
<td>0.03</td>
<td>0.56</td>
<td>0.01</td>
<td>0.00</td>
<td>0.00</td>
<td>0.37</td>
<td>0.02</td>
<td>0.60</td>
<td>0.01</td>
</tr>
<tr>
<td>(VIII)</td>
<td>0.36</td>
<td>0.01</td>
<td>1.17</td>
<td>0.35</td>
<td>0.57</td>
<td>0.01</td>
<td>0.52</td>
<td>0.01</td>
<td>0.93</td>
<td>0.02</td>
<td>0.66</td>
<td>0.04</td>
<td>1.50</td>
<td>0.03</td>
</tr>
<tr>
<td>(IX)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.73</td>
<td>0.25</td>
<td>2.09</td>
<td>0.08</td>
<td>1.50</td>
<td>0.03</td>
<td>0.12</td>
<td>0.00</td>
<td>0.70</td>
<td>0.04</td>
<td>0.11</td>
<td>0.00</td>
</tr>
<tr>
<td>(X)</td>
<td>0.11</td>
<td>0.00</td>
<td>1.28</td>
<td>0.37</td>
<td>11.13***</td>
<td>0.14</td>
<td>14.06***</td>
<td>0.16</td>
<td>1.37</td>
<td>0.03</td>
<td>0.83</td>
<td>0.05</td>
<td>0.78</td>
<td>0.02</td>
</tr>
<tr>
<td>(XI)</td>
<td>0.12</td>
<td>0.00</td>
<td>1.19</td>
<td>0.35</td>
<td>1.47</td>
<td>0.03</td>
<td>5.17</td>
<td>0.10</td>
<td>1.56</td>
<td>0.03</td>
<td>0.68</td>
<td>0.04</td>
<td>1.24</td>
<td>0.03</td>
</tr>
</tbody>
</table>

**Note:**
- (A) This table reports students’ perception regarding the effectiveness of teaching strategies used to develop critical thinking skills. The scores are rated on a scale of 1–11, with 11 being the most effective. This table also reports the scale intercorrelations and coefficient alpha between different critical thinking teaching strategies. *** Correlation is significant at the 0.01 level (two-tailed); ** Correlation is significant at the 0.05 level (two-tailed).
- (B) This table reports MANOVA tests using the teaching strategies as dependent variables and various demographics. Teaching strategies include: Provided us feedback on our assessments that require critical thinking skills (I); Explicitly identified the particular critical thinking elements addressed in the unit (II); Communicated clearly about the importance of critical thinking to accounting (III); Encouraged us to modify judgements in light of new information (IV); Encouraged us to share our ideas and to collaborate and think through problems together (V); Designed learning objectives that focus on the decision-making process rather than content (VI); Engaged in dialogue to develop divergent thinking (welcomes divergent views from students) (VII); Required evaluation of interventions (VIII); Asked us to explain our answers (IX); Encouraged us to ‘brainstorm’ ideas and questions (X); and Created a climate of curiosity and questioning (XI).

***$p < 0.01$.**
If there was a way where they could give us an example or show us how the thinking process goes or what [makes] the expectation clear about what they want from the students I would understand it a bit better.

Students also suggested being provided with ‘answers’ and ‘prompts’ to help them develop critical thinking. These suggestions indicate the importance of scaffolds when students are developing critical thinking.

Interestingly, there were several comments on the importance of in-class discussions and interactions:

I found that group discussions for very specific questions were best as it tested out learning. With big picture questions a class discussion with prompts from the tutor was better because it gave better support when thinking and answering the questions.

However, students also identified a lack of engagement as an impediment to effectively learning critical thinking through class discussions:

I hate being [one of] the only few students who participate in tutorial discussions. If peer students don't engage in discussions, then it is difficult to share ideas.

4.1.3 Student perspectives on critical thinking assessment practices

The next section of the survey sought students' perceptions on how critical thinking is assessed in their units. First, students were asked to rate the statement: 'I have been assessed on critical thinking in my subject at university' on a seven-point Likert-type scale from 7 = Strongly agree to 1 = Strongly disagree. The results show that most students agree that their critical thinking has been assessed (52.70% rate ‘agree’ and 18.92% rate ‘strongly agree’). We then asked students to rate the effectiveness of items that assess critical thinking, identified from the literature, including case studies, debates, group assignments on complex ‘real-world’ problems, simulations, and individual research reports (Boyce et al., 2001; Camp & Schnader, 2010; Cowen et al., 2011; Gainen, 1992; Kurfiss, 1987; Levant et al., 2016; Springer & Borthick, 2004; Wolcott & Lynch, 1997). Table 4 Panel A demonstrates that each assessment type receives a very similar score in terms of the mean score. Still, case studies rank the highest while debates/presentations rank as the least effective in assessing critical thinking skills.8

We conducted MANOVA tests using the different assessment items as dependent variables and the demographic information collected as the fixed factor. The MANOVA results reported in Table 4 Panel B show students' perceptions on the effectiveness of assessment items do not differ based on gender, age, and enrolment mode (i.e., full-time vs. part-time). We find that both international students and non-English speaker students consider case studies as the most effective means to assess their critical thinking skills. Students who work in a business-related position prefer 'group/team assignment on complex real-world problems', which is similar to their preferences for teaching strategies that foster a group work environment. Lastly, students in the third year or above perceive 'case studies', ‘group assignments on complex ‘real-world’ problems’, and ‘simulations’ as the most effective means to test their critical thinking ability.

Students were invited to further explain their responses in qualitative comments; however, there were fewer comments regarding assessment. Students noted that group work is very effective, but ‘it is only successful when every member is an active participant and is educated

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8As discussed in the research method section, students were asked to rate the effectiveness of each assessment item on a 11-point Likert-type scale where 0 = extremely ineffective and 11 = extremely effective.
**TABLE 4** The effectiveness of assessment items used to assess critical thinking skills

panel A: Descriptive statistics and correlations

<table>
<thead>
<tr>
<th>Assessment items</th>
<th>Mean</th>
<th>SD</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case studies (I)</td>
<td>6.8</td>
<td>1.64</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debates/presentations (II)</td>
<td>5.94</td>
<td>2.16</td>
<td>0.27**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group/team assignment on complex real-world problems (III)</td>
<td>6.46</td>
<td>2.25</td>
<td>0.36***</td>
<td>0.33***</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simulations focusing on the evaluation of outcomes (IV)</td>
<td>6.25</td>
<td>1.85</td>
<td>0.26**</td>
<td>0.47***</td>
<td>0.31***</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Independent projects such as critiquing a piece of research against criteria or developing a financial plan (V)</td>
<td>6.57</td>
<td>1.66</td>
<td>0.31***</td>
<td>0.42***</td>
<td>0.13</td>
<td>0.56***</td>
<td>1</td>
</tr>
</tbody>
</table>

Panel B: MANOVA results

<table>
<thead>
<tr>
<th>Assessment items</th>
<th>Male</th>
<th>Partial $\eta^2$</th>
<th>Age</th>
<th>Partial $\eta^2$</th>
<th>International student</th>
<th>Partial $\eta^2$</th>
<th>Non-English speaker</th>
<th>Partial $\eta^2$</th>
<th>Position related to their degree</th>
<th>Partial $\eta^2$</th>
<th>Year of degree</th>
<th>Partial $\eta^2$</th>
<th>Full-time student</th>
<th>Partial $\eta^2$</th>
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<td>0.45</td>
<td>0.01</td>
<td>0.39</td>
<td>0.16</td>
<td>11.38***</td>
<td>0.03</td>
<td>11.03***</td>
<td>0.07</td>
<td>1.00</td>
<td>0.02</td>
<td>11.14***</td>
<td>0.01</td>
<td>0.03</td>
<td>0.00</td>
</tr>
<tr>
<td>(II)</td>
<td>0.04</td>
<td>0.00</td>
<td>1.62</td>
<td>0.43</td>
<td>1.24</td>
<td>0.03</td>
<td>0.05</td>
<td>0.00</td>
<td>0.04</td>
<td>0.00</td>
<td>0.47</td>
<td>0.03</td>
<td>0.59</td>
<td>0.01</td>
</tr>
<tr>
<td>(III)</td>
<td>0.26</td>
<td>0.01</td>
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<td>0.14</td>
<td>0.73</td>
<td>0.02</td>
<td>4.02</td>
<td>0.08</td>
<td>11.24***</td>
<td>0.09</td>
<td>14.64***</td>
<td>0.04</td>
<td>0.05</td>
<td>0.00</td>
</tr>
<tr>
<td>(IV)</td>
<td>0.46</td>
<td>0.01</td>
<td>1.45</td>
<td>0.41</td>
<td>0.36</td>
<td>0.01</td>
<td>2.47</td>
<td>0.05</td>
<td>0.20</td>
<td>0.00</td>
<td>9.37***</td>
<td>0.03</td>
<td>2.37</td>
<td>0.11</td>
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<tr>
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<td>0.18</td>
<td>0.00</td>
<td>0.73</td>
<td>0.26</td>
<td>2.06</td>
<td>0.17</td>
<td>0.36</td>
<td>0.01</td>
<td>0.00</td>
<td>0.00</td>
<td>0.23</td>
<td>0.02</td>
<td>2.34</td>
<td>0.05</td>
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</tbody>
</table>

Note: (A) This table reports students’ perception regarding the effectiveness of assessment items used to assess critical thinking skills. The scores are rated on a scale of 1–11, with 11 being the most effective. This table also reports the scale intercorrelations and coefficient alpha between different critical thinking assessment items. **Correlation is significant at the 0.05 level (two-tailed); ***Correlation is significant at the 0.01 level (two-tailed). (B) This table reports MANOVA tests using assessment items as dependent variables and various demographics. Assessment items include: Case studies (I); Debates/presentations (II); Group/team assignment on complex real-world problems (III); Simulations focusing on the evaluation of outcomes (IV); and Independent projects such as critiquing a piece of research against criteria or developing a financial plan (V). ***$p < 0.01$. 
on the topics’. Another noted that ‘too much collaboration can sometimes be confronting for new students’.

One student shared the following insightful comment on how critical thinking is assessed:

> I noticed that sometimes the critical thinking learning outcome is linked to assessment like quizzes or multiple-choice questions. Not sure if multiple-choice questions can really test critical thinking though.

While almost 70% of respondents feel that the way critical thinking is taught in their degree has helped them to complete assessments that test critical thinking, many believe they did not receive sufficient support to help them develop their critical thinking skills. This was often noted as not enough feedback:

> I barely received comments regarding the critical thinking skills unfortunately.

But there were also issues noted around timely support:

> I always find that any feedback I do ask for comes very near the end of each semester or there is no chance to get any.

In particular, online learning was listed as a key barrier to receiving support:

> Emails are slightly tedious, especially during the entirely online period of study, and therefore sometimes there is unintentional miscommunication between the teacher and student.

Asked to identify the most effective learning activity to develop their critical thinking skills, several students pointed to case studies as they ‘[...] are often linked to real world scenarios and require a higher level of judgement’. Students also identified group discussions as being useful for developing their critical thinking skills as they ‘help me evaluate what I know and what I need to focus on learning’. Debates, teamwork, presentations, and sharing answers with the class were all put forward as additional effective learning strategies. Only one student found ‘solo assignments’ to be effective.

Lastly, we sought students’ feedback on how the university could improve the way it teaches critical thinking skills. Students generally were very forthcoming with ideas for improvement. These ranged from different teaching strategies, such as increasing case studies and group discussions, to having a standalone workshop on critical thinking:

> Maybe critical thinking workshops and seminars should be introduced in our first-year units as it would be too late for us to develop these skills when we come to the second- and third-year assessments.

There were several suggestions for ‘critical thinking to be taught early in the degree’ and for the case university to “provide students with a framework on how to approach critical thinking questions.”

### 4.2 Staff perspectives

The automatically generated Leximancer concept map (Figure 2) shows the themed responses from staff. As expected, staff take a student-centric view when developing critical thinking skills:
teaching students critical thinking [1] emerges as the dominant theme with ‘students’ comprising the most relevant concept. In addition to the frequently mentioned concepts such as ‘students’, ‘critical thinking’, and ‘teaching’, the linked theme Challenges [2] relates to the concepts of ‘time’, ‘class’, and ‘content’.

Developing critical thinking is viewed by staff as interlinked with providing timely and individualised Feedback [3]:

I would use the term ‘develop’ rather than ‘teach’ critical thinking. You can’t give someone a slide to memorize that will allow them to critically think […] Ok, some geniuses, yes. For most people it is going to be an element of feedback on how they performed on a critical thinking task, which can be informal or formal.

Providing Feedback [3] was mainly discussed in conjunction with Assessment marking [4]. The strongest co-occurrence involves the concept ‘individual’ feedback and ‘assessment’ (60% likelihood, untabulated). The perceived challenge was described as a ‘timing’ and ‘logistics’ issue. The concept ‘time’ co-occurred 50% with ‘marking’ (untabulated). There is a perceived lack of resources and insufficient policy support to provide adequate feedback for the development of critical thinking, a concern shared especially by staff with large class sizes:

I know the issue [is] about the number of minutes per assignment. [It] is crazy. I've got 180 individual comments to do in 2 minutes per individual. It takes you more than that time to actually read what they've written. They're writing 250 words even
if they're writing 150 words and you've got to give feedback, you can't do it in 2 minutes. When you give feedback, 2 minutes is just not sensible.

Another resource-based challenge is to strike a balance between skill development and content delivery in their respective unit contexts [5]. One staff member noted:

There is an exceptionally strong emphasis on content, not process, not actually walking people through how do you do this and letting people do it and giving them feedback on it. All of the forces are pushing us to [deliver asynchronously], the mass numbers, the accreditation volume, whereas actually if you really wanted to teach critical thinking, you would be stripping content out.

Staff teaching in the second- and third-year of the degree suggested that critical thinking is a skill best developed ‘earlier in the degree’ be it in a dedicated subject or as part of the curriculum for first-year units, while one staff member involved in a first-year unit commented:

I don't understand how you can teach critical thinking in a first-year subject where you don't have a common knowledge base to even begin to assess critical thinking on.

The themes, Engagement [6] and Online Environment [7], branch off the concept ‘class’. These themes relate to the shift to online teaching in response to the COVID-19 pandemic. Staff related this sudden move to an observed drop in student engagement, noting that traditional ways to engage students were less effective in an online environment: ‘what's happened in our world is that with Zoom, there's just no engagement. There's very little engagement’. It is noteworthy that this topic has emerged in the discussions with staff and in the student survey responses. Prior research also suggests that engagement is linked to improved critical thinking skills (Carini et al., 2006).

Our data also shows that Collaboration [8] with industry or with colleagues, while being viewed as important, is not directly linked to developing critical thinking skills. While team-based teaching is mentioned as a potential way to overcome resource restrictions, others felt there is a lack of interest for collaboration among colleagues:

What do I do? Stand on a soapbox with a megaphone and tell everyone about it? I mean, it's sort of like that anyone's even at all that interested.

5 | DISCUSSION

This paper explores the teaching and assessment of critical thinking within an accounting degree through an in-depth analysis of student and staff perceptions. When the perspectives of students and staff are viewed together, several commonalities are revealed, with four key implications for teaching practice. First, we suggest that developing critical thinking is a process best supported by a scaffolded approach (Section 5.1). Second, student engagement is a necessary pre-condition to allow for effective development of critical thinking skills (subsection 5.2). Third, a greater focus on skills development and feedback is needed but impeded by institutional resource restrictions (subsection 5.3). Fourth, critical thinking skills development differs between international and domestic students (subsection 5.4).
5.1 | Scaffolding

Both students and staff recognise the importance of developing critical thinking. Staff and students both recognise the importance of the skill for all careers:

Oh, I think it is critically important for accounting graduates, whether they would eventually become an accountant or work in a different career path.

There is also agreement that critical thinking needs to be introduced early in a degree, with staff noting it would need to be at a very basic level. Responses demonstrate that students understand the need for the skill to be developed over time, so they are able to apply it independently in capstone units. Likewise, student responses also indicate a preference for a scaffolded approach. Consistent with Vygotsky (1978), students ask for examples and practice in class to develop their critical thinking:

I found that group discussions for very specific questions were best as it tested out learning. With big picture questions and a class discussion with prompts from the tutor was better because it gave better support when thinking and answering the questions.

Scaffolding is similar to an infusion approach that incorporates critical thinking instruction alongside normal subject content (Ennis, 1989) and relies on a dialogue approach potentially in the form of teacher-led discussions (Abrami et al., 2015).

5.2 | Engagement

Overall, students and staff both identified collaborative learning activities that the literature suggests are most effective for developing critical thinking, such as debates (Camp & Schnader, 2010), roleplays (Abrami et al., 2015), and case studies (Boyce et al., 2001; Tan, 2019). It is important to note that many students valued group discussions, which is a far less resource intensive approach to teaching critical thinking.

Both staff and students noted the significant challenge of student engagement. Students, on the one hand, perceived issues with how the class was structured, with comments such as ‘tutorials seem to be too driven by student enthusiasm’ and ‘some tutors are really great at keeping their audience engaged’. Staff, on the other hand, saw lack of attendance as a barrier to engagement, along with the shift to online learning. Given the links between engagement and improved critical thinking skills (Carini et al., 2006), it would be beneficial to create an environment where students feel comfortable sharing. One staff member noted that ‘given the chance, students are ready contributors if not a little shy and need some encouragement, especially in group settings’.

5.3 | Trade-off between content delivery, feedback, and skills development

Feedback was also raised by staff and students as a challenge. Students noted they did not receive sufficient feedback on their critical thinking, while staff note the challenge of resourcing feedback. Developing critical thinking through feedback should be prioritised, especially for first-year students (Brinkworth et al., 2008). Real time feedback given during teacher-led group discussions was appreciated by students and this requires little resourcing and works as a formative scaffold.

Another consideration that staff and students identified revolves around the delivery of content versus skills development. Staff are concerned that students overly focus on content and having solutions:
I think they come to university with a view to learning content rather than thinking skills.

While students do indeed seek examples and solutions, this appears to stem from a need for direction and guidance that shows how to think critically. There is strong evidence of students requiring support when developing critical thinking:

Probably help us go through the whole procedure of critical thinking [once in a while] just so the students [don't] get the wrong idea and then get the whole answer wrong.

5.4 | Understand the difficulties and challenges encountered by international students

International students may encounter challenges in developing their critical thinking skills because of their cultural background and previous learning experience in another country. Prior studies find that international students, particularly those from Asian countries, tend to adopt passive learning and rely heavily on memorisation (e.g., Durkin, 2008; Shaheen, 2016), leading to poorer academic performance (Huang, 2008). Thus, it is crucial to understand international students' cultural background and mental models when developing their critical thinking skills. While it is encouraging to see international students recognise the importance and relevance of critical thinking skills, some find it difficult to understand what critical thinking is and what is required. It is therefore not surprising that international students would like their instructors to explain or demonstrate clearly what critical thinking is and what they are expected to do (e.g., by making assessment criteria clearer to students). Language can also be a factor that poses difficulties for international students to express their arguments and opinions in English, which hinders them from demonstrating their ability to think critically. Studies suggest that international students first need to develop skills in English before they can develop their way of thinking (Shaheen, 2016). Learning designers and student language advisers should play an important role and work closely with unit coordinators in improving international students' academic skills as well as critical thinking skills.

6 | CONCLUSION

Job readiness is no longer defined by the ability to command technical skills and subject knowledge. The ability to logically process information, to objectively weigh counterevidence, and to arrive at an informed conclusion will allow students to navigate new job tasks and deal with situations under uncertainty. Critical thinking is of growing importance to all graduates (not only to accounting degree holders) in times of mass misinformation and heightened uncertainty. Teaching students how to think instead of what to think should be the hallmark of liberal university education.

Based on a case study approach, we analyse how critical thinking is currently taught and assessed across a whole accounting degree to develop insights and themes from current practice. We find evidence that while critical thinking is taught, there is significant room for improvement. Students require more scaffolds for learning critical thinking from their first year at university. Using examples and process guidance early in their degree would support students to develop critical thinking particularly those from non-English speaking backgrounds. Our findings show that international students would benefit from more feedback and more explicit process guidance.
Many students would like their classes to be more engaging. In an engaging class, students see value in group discussions and case studies for developing their critical thinking. Our findings also suggest that students realise the importance of receiving timely and individual feedback to improve. Staff perspectives, however, reveal many challenges when seeking to develop critical thinking in their students, in particular the ability to provide feedback to students on their critical thinking in assessments. Subject to resource restraints, staff need to balance content delivery and skill development meticulously. Under these circumstances, in-class discussions could be an efficient way to deliver feedback. Nevertheless, these discussions need to be supported by a common knowledge base.

This study has several implications for future research. First, our analysis is based on a case study approach that explores how critical thinking is currently taught and assessed. Future research in this area could examine the efficacy of the teaching and assessment strategies proposed in this study to improve critical thinking skills in accounting students. Second, our sample of survey respondents is homogenous as we source responses from the undergraduate accounting degree at a single university. However, to enhance the robustness of our findings, we have triangulated the results with the perspectives of staff. It would be valuable to gain additional insights from other disciplines or different case studies to examine the applicability of our findings to a broader context. Third, in our study, we treat international students as a homogenous group. Further research could delve into the broad diversity of cultural backgrounds of accounting students to identify how these differences affect their ability to develop critical thinking skills.

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DATA AVAILABILITY STATEMENT
Griffith Ethics Approval Number GU ref no: 2019/491. The data sets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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