



## Teaching and educational notes

## Critical thinking in accounting education: Status and call to action

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## ABSTRACT

For many years, accounting education research has highlighted the need for students to develop stronger critical thinking skills. This need has become even more imperative as the accounting profession continues to transition, and entry-level accountants are expected to demonstrate stronger critical thinking skills earlier in their careers. In this paper, we revisit the higher education literature to identify key recommendations for accounting education to simultaneously develop desired critical thinking skills and accounting technical knowledge. Based on existing research in higher education, we recommend that accounting educators apply a model of cognitive development—the reflective judgment model—to better understand students' thinking and to design and employ more effective learning activities. To encourage adoption of this approach, we summarize existing accounting education recommendations for improved critical thinking education. Although we believe that these recommendations are beneficial, we recognize that only limited accounting education research supports the ideas presented here. Accordingly, we propose calls to action for additional research in this area. Our students need for us to identify and adopt educational practices to generate graduates who have the critical thinking skills required by our rapidly-changing profession. To meet this need, researchers should actively engage in activities to fill the gap in empirical data about the development of students' critical thinking skills throughout the accounting curriculum. Also, accounting departments and faculty need to support both educational research and improved learning design.

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## 1. Introduction

There have been repeated calls for greater critical thinking ability among accounting graduates, and current changes in the profession require strong critical thinking earlier in an accountant's career (e.g., Gupta & Marshall, 2010). Despite these repeated calls, Pincus et al. (2017) point out that little educational progress has been made. To encourage and assist in a greater focus on critical thinking, professional organizations are providing competency frameworks and critical thinking resources (discussed below). Nevertheless, a continuing question is whether educational efforts are sufficient to meet the needs of students and the profession. Moreover, questions have arisen about whether critical thinking can be taught and about the effectiveness of education efforts (e.g., Rebele & St. Pierre, 2019).

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The purpose of this paper is to summarize what we do and do not know about critical thinking development in accounting education, highlight educational practices that are likely to be effective, recommend key areas for future research, and challenge accounting education to make greater progress. We also present “calls to action” to highlight essential areas for future research.

## 2. Critical thinking stakeholder expectations, definitions, and learning objectives

There is no single, agreed-upon definition of critical thinking within accounting education or the accounting profession more broadly.<sup>1</sup> However, a variety of definitions are available to accounting educators. In this section, we will explore definitions from accounting professional organizations, accreditation standards, and accounting education research.

### 2.1. Accounting profession qualifying requirements

A major source of information about desired critical thinking skills consists of the frameworks provided by professional organizations for certification of entry-level accountants. Below are four examples.

For the U.S. Certified Public Accountant (CPA) exam, the [AICPA \(2018a\)](#) identifies representative tasks that an entry-level CPA would need to perform within each of the four technical examination sections. Then, for each task, the AICPA associates the content of the task with a skill level that must be demonstrated on the exam. The AICPA defines skill levels using a modification of the well-known [Anderson et al. \(2001\)](#) version of Bloom’s taxonomy. The CPA exam does not test the highest skill level (Creation), and the two lowest levels (Remembering and Understanding) are generally viewed as requiring the demonstration of knowledge—but not critical thinking. Thus, only two skill levels of critical thinking—Evaluation and Analysis—are tested on the CPA exam.

For the Certified Management Accountant (CMA) exam, the IMA ([Institute of Management Accountants, 2020](#)) uses an approach similar to that of the AICPA. The exam content is described in terms of accounting subject areas. Each major topic is associated with a “coverage level” based on the cognitive skills that candidates must demonstrate. The IMA does not explicitly refer to an underlying taxonomy, but the verbs that the IMA uses to label the six cognitive skills correspond to the verbs in the original taxonomy published by [Bloom \(1956\)](#). The CMA exam tests all six skill levels, although the lowest two levels (Knowledge and Comprehension) do not require what we typically think of as critical thinking. The skills that require critical thinking include Application, Analysis, Synthesis, and Evaluation.

CPA Canada uses a different approach in the competency map for its Chartered Professional Accountant (CPA) exam. First, competencies are separated between two broad categories: technical and enabling ([CPA Canada, 2020](#)). The seven categories of enabling competencies empower accountants to fully demonstrate the technical competencies. Although each of the enabling competencies incorporates at least some descriptions that might be associated with “critical thinking,” the most closely related enabling competency is titled, “Solving Problems and Making Decisions.” The details of this competency are shown in [Table 1](#) and provide a useful decision-making model to describe what we typically think of as critical thinking for entry-level accountants.

The International Accounting Education Standards Board (IAESB) issues educational standards and other resources that are used by various IFAC (International Federation of Accountants) member bodies to define accountant entry-level and/or continuing professional development requirements. IAESB defines three overall categories of skills, including “professional skills” that must be integrated with technical knowledge to achieve professional competence. Professional skills are further broken down into four categories, including “intellectual skills” that are closely related to critical thinking, as shown in [Table 2](#). Like CPA Canada, the [IAESB \(2019\)](#) learning outcomes are organized according to a decision-making model.

### 2.2. Other professional accounting descriptions

Accounting educators have received guidance about critical thinking from many sources. Below are several examples from accounting professional organizations beyond professional examinations.

The AICPA’s Pre-certification Core Competency Framework ([2018b](#)) summarizes the skills-based competencies needed by entry-level accountants. This framework is intended for use by accounting educators and students and is divided into three broad competency categories: Accounting, Business, and Professional. The professional competency titled “decision-making” is most closely related to critical thinking. Also, critical thinking verbs such as assess, analyze, design, and evaluate are used when describing most of the accounting and business competencies. In other words, critical thinking is not seen as a stand-alone competency. Critical thinking skills are expected to be used in conjunction with technical knowledge.<sup>2</sup>

The IMA’s Management Accounting Competency Framework ([Institute of Management Accountants, 2019](#)) describes competencies to guide development for entry-level plus more experienced finance and accounting professionals. The framework includes six core domains of knowledge, skills, and abilities: Strategy, Planning and Performance; Reporting and Con-

<sup>1</sup> Common terms used in accounting include problem solving, decision making, analysis, professional judgment, and intellectual skills. For simplicity, this paper will use primarily the term critical thinking.

<sup>2</sup> One could argue that critical thinking is also needed in conjunction with most of the professional competencies. That topic will be addressed briefly later in this paper.

**Table 1**  
CPA Canada enabling competency: Solving problems and making decisions.<sup>1</sup>

<b>Definition:</b>	
CPAs draw on strong problem-solving and decision-making skills, including the ability to utilize technology and data analytics. CPAs capacity for analytical and integrative thought enables them to identify important issues, use evidence and analytics to thoroughly and objectively evaluate alternatives, apply appropriate decision criteria, and develop implementation and change-management plans. CPAs consider relevant factors that others do not recognize.	
<b>Components:</b>	
6.1 Issue identification	6.1.1 Identifies and articulates issues within areas of work responsibility
6.2 Analysis	6.1.2 Uses qualitative and quantitative techniques to clarify the nature of problems
	6.1.3 Demonstrates skepticism, objectivity, due care and persistence when identifying issues
	6.2.1 Maintains an objective and questioning mindset to avoid biased analyses
	6.2.2 Identifies patterns from data analysis
6.3 Recommendations	6.2.3 Questions the relevance and tests the quality of information and assumptions in own analyses
	6.2.4 Completes thorough quantitative and qualitative analyses to identify and evaluate potentially viable alternatives
	6.3.1 Uses evidence and judgment to recommend and justify solutions or conclusions
6.4 Implementation and change management	6.3.2 Articulates limitations to recommendations
	6.3.3 Applies decision criteria to choose among viable alternatives
	6.3.4 Ensures that decision criteria do not conflict with professional ethics and values
	6.4.1 Develops preliminary implementation plans within areas of work responsibility
	6.4.2 Identifies potential barriers to change

<sup>1</sup> CPA Canada (2020, pp. 15-16).

**Table 2**  
IAESB: Professional skills: Intellectual skills.<sup>1</sup>

<b>Definition:</b>	
Intellectual skills—Skills relating to the ability of a professional accountant to solve problems, to make decisions, adapt to change, and exercise professional judgment.	
<b>Learning outcomes:</b>	
(i)	Evaluate data and information from a variety of sources and perspectives through research, integration, and analysis.
(ii)	Apply critical thinking skills to solve problems, inform judgments, make decisions, and reach well-reasoned conclusions.
(iii)	Identify when it is appropriate to consult with specialists.
(iv)	Recommend solutions to unstructured, multifaceted problems.
(v)	Respond effectively to changing circumstances or new information to solve problems, inform judgments, make decisions, and reach well-reasoned conclusions.

<sup>1</sup> IAESB (2019, pp. 132 and 203). The definitions shown in this table reflect changes to the Handbook effective January 1, 2021.

trol; Technology and Analytics; Business Acumen and Operations; Leadership; and Professional Ethics and Values. As with the AICPA framework discussed above, characteristics of critical thinking are included in many of the competencies—however, one competency (“Decision Analysis” under Strategy, Planning and Performance) is most closely related to critical thinking.

### 2.3. AACSB accreditation standards

Another source of guidance about critical thinking consists of business and/or accounting accreditation standards. One of the major accounting accrediting organizations is AACSB International. Guidance for its Business Standard 4.3 requires accredited business programs to promote “a lifelong learning mindset in learners, including creativity, intellectual curiosity, and critical and analytical thinking” (AACSB International, 2020, 39). Additional guidance is provided in the accounting accreditation standards, which require the curriculum to include the following learning experiences related to critical thinking (AACSB International, 2018, 24):

- “The ability to identify issues and develop questions, apply appropriate analyses, interpret results, and communicate conclusions.”
- “The critical thinking and analytical skills that support professional skepticism, risk assessment, and assurance of accounting information.”

Additional requirements for accreditation of the master’s degree in accounting require the curriculum to include the following learning experiences for higher-level critical thinking (AACSB International, 2018, 25):

- “Advanced development of critical and analytical thinking skills in support of professional skepticism, as well as sound decision making and good judgment in uncertain circumstances.”
- “Integration of knowledge across fields and understanding of the accounting discipline from multiple perspectives.”
- “Approaches to framing problems and developing creative solutions to accounting issues using appropriate technology.”

Overall, the AACSB accreditation requirements do not provide detailed definitions for critical thinking. However, the requirements imply that a decision-making approach is a useful way to organize critical thinking learning outcomes.

#### 2.4. Surveys of students, educators, and practitioners

In addition to the preceding descriptions of critical thinking, accounting researchers have conducted studies to identify learning outcomes from relevant stakeholders. For example, (Baril et al., 1998) interviewed public accountants and found that they often define critical thinking in terms of the following “cognitive attributes and characteristics” that are similar to the descriptions from professional organizations and accreditors discussed earlier:

- Recognizes problem areas
- Recognizes when additional information is needed
- Fits details into the overall environment; sees the “Big Picture”
- Transfers knowledge from one situation to another
- Anticipates, thinks ahead, plans

Besides the above characteristics, interviewed public accountants included several “non-cognitive attitudes and behaviors” in their definitions of critical thinking (Baril et al., 1998):

- Exhibits initiative
- Exhibits curiosity
- Exhibits confidence
- Communicates clearly and articulately

Other studies have elicited the attitudes of additional stakeholders. For example, Crawford, et al. (2011) surveyed academics and practitioners about the skills that are most important for audit courses. Keneley and Jackling (2011) surveyed accounting students about their perceptions of the generic skills (including critical thinking) developed during an accounting program. In general, these types of studies tend to highlight the perceived importance of critical thinking as well as other skills—beyond accounting knowledge. Some accounting education studies have explored the types of soft/generic skills that are needed by accountants (e.g., Jones, 2010). These studies continue to highlight the need for critical thinking, and they also point out a range of other skills or attributes that might be related to critical thinking.

#### 2.5. Summary: Critical thinking definitions and learning objectives

This section of the paper briefly summarized critical thinking definitions from various stakeholder groups. Below are some general conclusions from this review:

- Although some critical thinking descriptions are more detailed than others, none of the definitions appear contradictory.
- All stakeholders highlight the need to demonstrate critical thinking skills in the context of technical knowledge that is relevant to an accountant’s work.
- Professional organizations tend to portray critical thinking as requiring accountants to demonstrate a decision-making process.

Based on the summary of definitions in this section, perhaps it is not necessary to expend significant effort to reach a fully agreed-upon definition of critical thinking for accounting. A practical approach for accounting educators is to help their students apply accounting technical knowledge within a decision-making process to address realistic workplace problems.<sup>3</sup> However, the lack of a fully agreed-upon definition—especially with respect to related but different skills such as communication, creativity, and self-management—can lead to confusion and ineffectiveness in accounting education. These observations lead to our first call to action for accounting educators:

**Call to Action 1:** Accounting educators should clarify the relationship of critical thinking to accounting technical knowledge and also to other significant competencies. This clarification should focus on identifying relevant teaching and learning implications for accounting courses and programs (and not merely on creating more complete definitions).

<sup>3</sup> See Smith (2014) for a detailed discussion of education and assessment difficulties when a single model is used for different types of problems. As discussed later in this paper, many of the difficulties discussed in Smith (2014) can be addressed by helping students develop more complex skills in a methodical way with significant amounts of practice on different types of problems.

### 3. Student learning experiences for critical thinking

Although not clearly defined in the literature, accounting education still includes numerous articles recommending specific student learning experiences to develop students' critical thinking. This section of the paper provides an overview of common recommendations, evaluates research support for the recommendations, and points to areas where additional research is needed.

#### 3.1. Framework for linking learning experiences to critical thinking development

To assist accounting researchers more clearly link their research and educational recommendations to the development of critical thinking skills, we provide in Fig. 1 a framework adapted from the AICPA faculty guide titled, "How to Help Your Students Become Better Critical Thinkers" (Wolcott, 2020). The framework is adapted from concepts in Marzano and Kendall (2007), which is the most recent revision of Bloom's taxonomy. The framework highlights the relationship between recommended learning experiences and accounting student development of critical thinking skills. The framework will also help researchers communicate more effectively with educators.

In Fig. 1, prior experiences (especially with similar learning activities), combined with the student's current level of knowledge and critical thinking skills, create a starting point when students are asked to engage in a new learning experience.<sup>4</sup> Students are not necessarily motivated to engage actively with the learning experience. In addition, students who decide to engage actively might or might not possess the metacognitive skills needed to adopt appropriate goals and strategies for engaging successfully. A student's performance during the learning experience will incorporate the student's prior knowledge and skills, combined with level of motivation and goals/strategies. It is important to remember that a given student might or might not attain and demonstrate the expected/desired knowledge and critical thinking skills. Upon completion, the student's new levels of knowledge and critical thinking skills become the starting point for future learning experiences.

Turner and Baskerville (2013) present a model of deep learning that depicts how students experience accounting. Their model includes four dimensions: relevance structure, conception of learning, approach to learning, and motivation. These dimensions are likely to be related to motivation and metacognition in Fig. 1. However, doubt exists about whether some/many of the models used in prior accounting research—such as learning styles and student perceptions—are supported and/or useful. Similarly, Stone and Shelley's (1997) study of expertise in accounting provided many recommendations that can be linked to Fig. 1. Later in the paper, we explore the most commonly-used models in the accounting critical thinking research.

#### 3.2. Criticisms of accounting education research

Most accounting education studies of critical thinking development involve some form of action research, in which educators implement a learning activity and examine the effects (e.g., Abbott & Palatnik, 2018). Gittings et al. (2020) conducted a literature review of accounting education action research from 1993 to 2018 involving experiential learning activities (ELAs). The learning activities included both individual and group/collaborative use of case studies, simulations, field trips, role plays, games, practical applications (e.g., Excel spreadsheets), and work placements. The ELA articles recommended that accounting educators should shift away from traditional lectures and rote memorization toward more active learning. ELAs are expected to increase student motivation and engagement which, in turn, should increase student learning. The most common benefits cited in the ELA studies included: technical knowledge and comprehension, student attitude and satisfaction, and authentic application of theory. Additional benefits cited in some studies included development of "transferrable skills" (such as problem solving and critical thinking), real-world awareness, and explicit employment or career preparation.

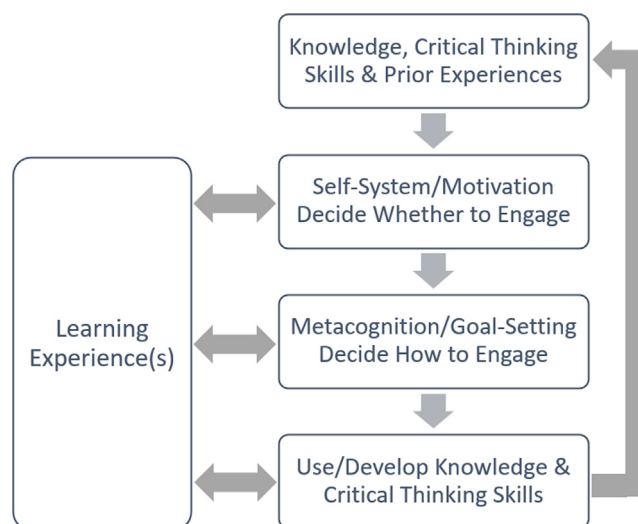
Among the 50 ELA studies examined, Gittings et al. (2020) found little empirical investigation of the nature of student learning. The most common data collected was via student surveys (39 studies), and far fewer studies examined student academic performance (9 studies). Academic performance was often measured using an assessment of a subsequent learning activity or course exam. However, control groups were rarely used, and details of the assessments were seldom provided. Overall, Gittings et al. (2020) concluded that little scientific evidence was provided about the effectiveness of learning in these studies.

Although most of the studies examined by Gittings, et al. (2020) did not focus on critical thinking skills, we have found that most accounting research on critical thinking provides very limited evidence about the efficacy of recommended teaching and learning methods. In the subsections below we highlight some of these studies to give the reader an understanding of the current state of critical thinking research in accounting.

#### 3.3. Examples of accounting critical thinking research

After broadly reviewing the body of critical thinking research studies in accounting, we compiled a sample of 11 studies from 1997 to 2019. These studies are briefly summarized in Table 3. Our intent is not to criticize these studies, but rather to use these studies as illustrations for identifying ways in which the body of accounting research can be strengthened.

<sup>4</sup> As discussed more fully later in this paper, critical thinking performance is often unstable, especially in new technical content areas or when responding to unfamiliar learning activities. Thus, the starting point for one learning activity might differ significantly from the starting point for another learning activity.



**Fig. 1.** Framework for linking learning experiences to critical thinking. Adapted from Figures 1.1, 1.2 and 2.7 in [Marzano and Kendall \(2007\)](#). Another version of this figure is included in the AICPA faculty guide for development of critical thinking ([Wolcott, 2020](#)).

One study in [Table 3](#) focuses primarily on a learning experience that can also be used to assess students' stages of cognitive development ([Wolcott & Lynch, 1997](#)). Several of the studies investigate whether specific learning experiences develop students' critical thinking skills within a single course ([Phillips, 2001](#); [Nelson, et al., 2003](#); [Leauby, et al., 2010](#); [Chen, et al., 2013](#); [Levant, et al., 2016](#); [Tan, 2019](#)). One study does not involve a learning experience; it tests the relationship between cognitive style and research participant answers to structured and unstructured accounting questions ([Jones & Wright, 2012](#)). One study examines the effects of a VITA work-like experience on students' tax problem solving performance ([Christensen & Woodland, 2016](#)). Finally, one study examines the effects of learning experiences (cognitive conflict tasks) in an early accounting course on students' later accounting course exam scores and cumulative GPA ([Sargent & Borthick, 2013](#)).

Based on our review, we agree with the criticisms of [Rebele and St. Pierre \(2015\)](#) and [Gittings et al. \(2020\)](#). Accounting education articles provide limited empirical findings, rely heavily on student perceptions, and offer little or no direct evidence about the development of critical thinking skills. In addition, many of the studies rely on student coursework and/or exam scores to measure critical thinking abilities.<sup>5</sup> Few studies provide evidence that their critical thinking measures are valid and reliable. While reviewing studies for this paper, we also became aware that accounting research has examined many different models/theories related to critical thinking. We believe that the proliferation of models is likely to make it difficult for average accounting faculty members to make sense out of the body of literature. The preceding discussion leads to our next two calls to action.

**Call to Action 2:** Accounting education researchers need to apply rigorous research methods to provide stronger empirical evidence about how students can obtain the critical thinking skills required for their future accounting careers.

**Call to Action 3:** Accounting education researchers should ensure that average accounting educators can clearly understand how recommended models and methods can lead to development of students' critical thinking skills.

#### 4. Cognitive models and critical thinking

This section of the paper provides an overview of the most common types of models/theories that are used in accounting research to study the development of critical thinking skills. In this section, we draw examples from the accounting research studies as well as the broader education literature.

##### 4.1. Cognitive style/learning style/cognitive learning style

Accounting critical thinking research studies have often cited various versions of cognitive style, also referred to as learning style or cognitive learning style. In this section, we will use the term "cognitive style" for simplicity. Below we provide an

<sup>5</sup> Our review also raised questions about some of the control variables. For example, students' grade-point averages (GPAs) may be positively correlated with critical thinking levels. So, using GPA as a control variable (e.g., [Jones & Davidson, 1995](#); [Phillips, 1998](#)) might be inappropriate in studies of critical thinking growth. To measure critical thinking growth, some studies have relied on change in GPA (e.g., [Sargent & Borthick, 2013](#)), which is likely to be less reliable than a more direct measure of critical thinking.



**Table 3**  
Examples of critical thinking accounting research studies.<sup>1</sup>

	Authors	Learning activity courses	Critical thinking learning activities	Critical thinking learning theories/models	Critical thinking measures	Other variables
1	Wolcott and Lynch (1997)	Third quarter introductory financial accounting, plus sample assignments used in 3 other accounting courses	Reflective thinking essay case assignment	King & Kitchener's reflective judgment model	Reflective judgment level, based on 2 independent assessments of student essay	None
2	Phillips (2001)	Introductory financial accounting (2 sections)	Decision-oriented accounting case	Schommer's (1990) epistemological beliefs	Survey of epistemological beliefs, analyzed to become 4 factors; Score on case Responses to 20 audit scenarios, including correct identification of argument validity and degree of certainty	Study strategies (LASSI); GPA
3	Nelson, Ratliff, Steinhoff, and Mitchell (2003)	Undergraduate students in an audit course	Training in formal and informal logic	Logic	Responses to 20 audit scenarios, including correct identification of argument validity and degree of certainty	Undergraduate students in an audit course with minimal (i.e., "superficial") training, Graduate students in a second audit course without training, and Auditing professionals
4	Davidson and Baldwin (2005)	Intermediate accounting	Textbook end-of-chapter materials	Bloom's taxonomy (1956 version)	End-of-chapter materials classified as application, analysis, synthesis, or evaluation	Time series data for 41 intermediate financial accounting textbooks published 1934 to 2004
5	Leauby, Szabat, and Maas (2010)	Introductory financial accounting; 1 section experimental plus 1 section control	Concept mapping activities (how to create a concept map; ratings of student-prepared concept maps; instructor-prepared concept maps)	Assimilation learning	3 examination scores, including multiple choice and essay questions tagged by textbook authors (e.g., "critical thinking"); Survey of students in experimental group	1 section of the course without concept mapping activities; math SAT scores; Intent to major in accounting; Gender; Participation in optional extra-credit project
6	Jones and Wright (2012)	None (voluntary student participants)	None (non-course set of structured and unstructured accounting questions)	Cognitive style/ Learning style	Average score on accounting questions classified as (1) structured or unstructured and (2) familiar or unfamiliar	Field dependency (Group Embedded Figures Test, or GEFT); GPA; Gender; Age
7	Chen, Jones, and Moreland (2013)	Principles of managerial accounting plus 3 advanced courses: Cost accounting, Intermediate accounting, and Financial statement analysis	Sections of the course were either traditional or online	None (however, arguments are based on Bloom's (1956) taxonomy, Marzano & Kendall's update of Bloom, and Commons' model of hierarchical complexity)	Level of course: principles vs. advanced; Advanced courses are assumed to require more critical thinking	Student perceptions of (1) traditional versus online course effectiveness and (2) expected course grade; Gender; Major (accounting or not); Age; GPA; Subject matter (financial vs. managerial)
8	Sargent and Borthick (2013)	Principles of accounting I and II (sophomore year): "Critical thinking courses"	Cognitive conflict learning experiences in each principles course: In groups, four to eight episodes of a business simulation	King & Kitchener's reflective judgment model (as described in Springer and Borthick, 2004)	Exam score in junior-level accounting course (accounting theory or cost accounting); Change in cumulative GPA from the end of the junior year first term to graduation	Number of "critical thinking courses" taken (0, 1, or 2); Prior academic achievement (GPA at beginning of junior-year); Background variables (credit hours enrolled, time since principles course, and age)
9	Levant, Coulmont, and Sandu (2016)	Business simulation course (master's or undergraduate) at 5 business schools or universities in 2 countries	Business simulation including multiple sessions, group work, workshops, management report, and presentation	Active learning; Cooperative learning	Pre and post student questionnaire of mastery of 11 soft skills; More than one of the 11 skills include possible descriptors of critical thinking	Ethno-cultural origin; Prior professional experience; Gender

(continued on next page)

Table 3 (continued)

	Authors	Learning activity courses	Critical thinking learning activities	Critical thinking learning theories/models	Critical thinking measures	Other variables
10	Christensen and Woodland (2016)	Students in upper-division accounting courses at 7 universities	Participation in VITA program	Situated learning	Issue identification scores in tax scenarios; Student survey pre and post	Students who did not participate in VITA; Traditional versus nontraditional age; Intent to pursue a tax career; Self-reported GPA; Number of tax courses taken; Score on scale of deontological beliefs; Score on scale of risk preference; Score on scale of perceived fairness of federal income tax; Past VITA participation None
11	Tan (2019)	Case-based advanced management accounting course	Structured collaborative learning	None (however, one or more theories/models might be embedded in some of the citations)	Survey: Student perceptions of changes in knowledge and skills (including 7 questions on critical thinking) from a post-test and a retrospective pre-test	

<sup>1</sup> This table is not intended to be a complete review of studies. Instead, we selected a sample of prior accounting critical thinking research.

overview of several accounting studies and then discuss the usefulness of cognitive style for future accounting education research.

As shown in Table 1, Jones and Wright (2012) measured cognitive style using the Group Embedded Figures Test (GEFT) developed by Witkin, et al. (1971). The GEFT measures students' visual perceptual differentiation, which is expected to influence performance on structured/unstructured and familiar/unfamiliar learning tasks. Accordingly, Jones and Wright examined the relationship of GEFT to student scores on accounting questions classified as structured or unstructured and familiar or unfamiliar. As they pointed out, disagreement exists about whether the GEFT measures cognitive style (i.e., mode of learning) versus cognitive ability (i.e., competency). Researchers in other fields have referred to GEFT as a measure of learning style (e.g., Dyer & Osborne, 1996). However, Jones and Wright argued that the distinction was unimportant in their study because the goal was to predict performance. Jones and Wright seem to view cognitive style as a student trait that affects critical thinking performance, but they do not provide evidence that can assist accounting educators in their design of teaching and learning activities for critical thinking development.

Other accounting researchers have applied different measures of cognitive style. These include the Felder-Solomon Index of Learning Styles, or ILS, (e.g., Honn & Ugrin, 2012) and the Myers-Briggs Type Indicator, or MBTI, (e.g., Ramsay, et al., 2000; Kovar et al., 2003; and Abdolmohammadi et al., 2009). Still other accounting education studies have provided literature reviews of the effect of cognitive style on student learning (e.g., Bryant & Hunton, 2000; Duff, 2004). Most of these studies recommend that accounting educators consider students' cognitive styles as they design learning activities.

After summarizing relevant theoretical models and measures, Duff (2009) illustrates how student characteristics including cognitive style influence a student's approach to learning. Duff points out that cognitive style is sometimes seen as a permanent trait, in which educators must adapt to the trait. Other times, cognitive style is seen as a changeable process, in which educators can proactively design learning activities to change students' cognitive styles. This distinction is similar to the controversy discussed earlier about the GEFT as a measure of cognitive style. One of the major questions in this area of research is whether cognitive style is a stable trait that cannot be influenced by educators.

In recent years, researchers have investigated the cognitive styles literature. Following increasing concerns that recommendations about cognitive styles are not supported by research, Cuevas (2015) conducted a major literature review that included the measures previously used in accounting education research. He pointed out that existing research—including K-12 and higher education—did not support the use of cognitive/learning styles to design learning activities. In particular, he concluded, "Just because someone self-reports that they prefer to learn a certain way does not mean that they will learn all concepts best if they are presented in that fashion, regardless of the specific content. Instead, the nature of the subject matter should determine how it is best taught and how it is best learned" (p. 23).

The preceding discussion raises questions about whether it is currently useful for accounting educators to focus on cognitive styles, learning styles, and/or cognitive learning styles. This leads to our next call to action.



**Call to Action 4:** Before conducting additional studies involving cognitive styles, learning styles, or cognitive learning styles, accounting education researchers should consider whether these concepts and measures are useful based on research conducted in other disciplines.

#### 4.2. Cognitive complexity

An ongoing idea in accounting education is that the accounting profession needs to attract individuals with high levels of cognitive complexity—which generally means the ability to simultaneously manage multiple mental abstractions. For example, we expect accountants to demonstrate critical thinking by simultaneously analyzing information from different sources and from different perspectives and to respond appropriately to uncertain and changing conditions. Unlike the cognitive style literature, which typically views people dichotomously, the cognitive complexity literature typically views people as existing along a continuum from concrete to abstract.

Measures used for cognitive complexity include the Paragraph Completion Test (Hunt, et al., 1978), which has been used in several accounting studies (e.g., Amernic & Beechy, 1984; Jones & Davidson, 1995; Jones & Davidson, 2007). Some accounting studies have controlled for cognitive complexity using students' grade-point average as a proxy (e.g., Jones & Wright, 2010).

A question that arises when evaluating these studies is how to measure the complexity of student learning activities. Although the concept of cognitive complexity assumes a continuum in the ability to handle complicated problems, many of the accounting studies of cognitive complexity have focused on dichotomous classifications of the learning activities, such as structured versus unstructured, directed versus undirected, or familiar versus unfamiliar. More refined characterizations have been provided by some accounting studies. For example, Weil, et al. (2001) describe critical thinking elements for cases classified as basic, intermediate, and advanced. Ramburuth and Mladenovic (2004) use the SOLO Taxonomy (Biggs & Collis, 1982) to describe five increasing levels of complexity.

Recently, the AICPA issued a faculty guide for critical thinking (Wolcott, 2020, Figure 19), which used the Pathways Vision Model (Pathways Commission, 2013) to define areas of complexity for accounting problems. The guide also used the reflective judgment model (discussed later in this paper) to identify the four most common levels of complexity that are likely to exist for students at different points in the accounting curriculum.

The preceding discussion highlights the idea that the complexity of learning activities can influence the ability of students to develop critical thinking. This leads to our next call to action.

**Call to Action 5:** Accounting education researchers should investigate ways to measure the complexity of learning activities to provide accounting educators with advice about the best design of learning activities for development of critical thinking skills at different points in the curriculum.

#### 4.3. Cognitive load theory

A recent line of accounting education research has extended investigations of cognitive complexity to the effects of giving students appropriate learning challenges for promoting critical thinking development. Cognitive load theory (CLT) (e.g., Paas et al., 2010) addresses the tendency of people to become overwhelmed when required to simultaneously address multiple interactive information elements. Students are most likely to become overwhelmed when they are learning new knowledge while also needing to apply critical thinking skills. Accounting researchers have argued that students should be exposed to appropriately increasing amounts of complexity so that they can develop the skills to address realistic accounting issues (e.g., Halabi et al., 2005; Johnson and Slayter, 2012; Mostyn, 2012; Phillips et al., 2012; Johnson & Sargent, 2014; Phillips & Nagy, 2014; Phillips, 2017; Borthick & Schneider, 2018; Sithole, 2018; Wynder, 2018).

Cognitive load theory highlights a major stumbling block in accounting course design—student preparedness, or lack of preparedness—when entering a course. Accounting educators are already aware that a lack of prerequisite knowledge or skills is an issue in accounting courses. However, accounting educators may not know how they can appropriately address this problem. Instead of filtering out unprepared students, Sargent (2013) examined methods for ensuring that students have prerequisite knowledge and problem-solving skills for intermediate accounting. The study explored the use of prerequisite testing and remediation activities. Although Sargent focused primarily on students' ability to know and apply technical knowledge, the ideas in her paper also apply to critical thinking. Students who lack prerequisite critical thinking skills are at a disadvantage compared to other students as they progress through the accounting curriculum. Most importantly, the methods employed by Sargent avoided slowing down the learning process for students who already possessed prerequisite knowledge and skills.

Another interesting research study about cognitive load examined the long-term effects of learning activities that are specifically designed to enhance students' cognitive skills. In Sargent and Borthick (2013), students in accounting principles courses were given "cognitive conflict tasks" designed to challenge—but not overwhelm—their cognitive abilities. Students who had experienced the cognitive conflict tasks performed better than other students in later accounting courses and in their cumulative GPA. This is one of the few accounting education studies to examine student performance over a time period beyond one course. It also demonstrates that students' critical thinking can be enhanced through deliberate educational design.

The preceding discussion highlights several promising research studies that have focused on adjusting the cognitive load of assignments to improve student critical thinking development. This leads to our next two calls to action.

**Call to Action 6:** Accounting education researchers should investigate the effectiveness of methods for identifying and filling in the gaps in student learning for technical knowledge, critical thinking, and other desired skills.

**Call to Action 7:** Accounting education researchers should more thoroughly study and identify effective educational design for development of students' critical thinking skills throughout the accounting curriculum.

#### 4.4. Bloom's taxonomy

Many accounting educators have learned about either the original or revised versions of Bloom's taxonomy (Bloom, 1956; Anderson et al., 2001). Bloom's taxonomy is widely used in textbooks and can be a useful tool for encouraging both faculty and students to focus on critical thinking. It is also the most widely-referenced model in accounting education.

Unfortunately, confusion often exists about whether the verbs in Bloom's taxonomy form a hierarchy from less complex to more complex thinking. The newest update of Blooms's taxonomy refutes the idea that different verbs are tied to different cognitive levels (see summary in Marzano & Kendall, 2007, 8–10). Students are often confused because different faculty members have different ideas about what each verb means and may use the same verb in conjunction with different levels of complexity, hindering student development (e.g., Hess et al., 2009). For example, some accounting educators might use the verb "analyze" when they want students to make a correct calculation and record an accounting entry. Other accounting educators might use the verb "analyze" when they want students to evaluate multiple sources of information and perspectives. To further complicate student learning, professors in other disciplines might use the verb "analyze" in still other ways. Students are often confused by differences in professor expectations, especially if the student lacks cognitive complexity and believes that a given verb can have only one meaning.

Accounting educators often assert that their use of the verbs in Bloom's taxonomy provides a way to scaffold development of critical thinking skills, often referred to as "higher levels of student learning" (e.g., Betts, 2008; Herbert, et al., 2014). Other accounting studies have used the verbs in Bloom's taxonomy to provide evidence about the "lower" versus "higher" expectations of different accounting courses and textbooks (e.g., Davidson & Baldwin, 2005; Lakshmi, 2013; Yap, et al., 2014).

One way to reduce student confusion about the meaning of the verbs in Bloom's taxonomy is to explicitly provide students with guidance about how the verbs are being used.<sup>6</sup> For example, the AICPA and IMA competency frameworks discussed earlier in this paper each provide specific verb descriptions for accounting. A more complete description is contained in the CPA Canada competency map (Table 1). Similarly, Kidwell, et al. (2013) provided detailed descriptions of learning objectives for accounting ethics education. The AICPA faculty guide for critical thinking includes both a decision-making model and a critical thinking skills rubric for different stages of cognitive complexity (Wolcott, 2020, Figures 2 and 20).

The preceding discussion highlights possible gaps between accounting educator and student understanding of critical thinking expectations. This leads to our next two calls to action.

**Call to Action 8:** Accounting education researchers should provide evidence about the correspondence among faculty members' and students' understandings of the verbs used in accounting learning objectives and learning activities for critical thinking.

**Call to Action 9:** Accounting education researchers should provide evidence to help students with varying degrees of cognitive complexity more accurately recognize educational expectations across the accounting curriculum.

#### 4.5. Epistemological beliefs/assumptions about knowledge

In addition to cognitive complexity, epistemological beliefs have been examined in accounting education research to study critical thinking development. Epistemological beliefs refer to an individual's assumptions about the nature of knowledge and learning. These beliefs are likely to affect all of the components of the critical thinking learning framework in Fig. 1. Specifically, epistemological beliefs influence students' existing critical thinking skills, their motivation for engaging in learning activities, and the goals they set when engaging in a new learning activity. For example, a student who does not believe that uncertainty exists will look only for single, correct answers and is unlikely to develop critical thinking skills. For an overview of the relationship of epistemological beliefs to learning, see Hofer and Pintrich (1997).

A small number of accounting research studies have examined students' epistemological assumptions. Phillips (2001) studied the relationship between Schommer's (1990) epistemological beliefs and students' performance on a decision-oriented accounting case. Phillips provided explicit theoretical links between student beliefs and student study strategies as well as specific critical thinking skills.

Wolcott and Lynch (1997) used King and Kitchener's reflective judgment model to examine the epistemological beliefs of student thinking in an introductory accounting course. Students were asked carefully-designed questions to elicit their thinking about an open-ended accounting case, and two independent raters assessed the underlying epistemological beliefs

<sup>6</sup> Herbert, et al., 2014, recommended using a Community of Practice to ensure that assessments of student work is standardized. However, this approach would not necessarily ensure that all classroom faculty use verbs consistently or that students understand the verbs in the intended manner.

used by the students. This study was aimed primarily at demonstrating an assessment method, so no additional empirical results were provided.

Research in both accounting and other disciplines has demonstrated that students' epistemological beliefs affect how they address unstructured problems—i.e., those calling for critical thinking skills. One of the key questions is which model best explains student critical thinking development and can help educators create effective learning activities. In the next section, we discuss models of cognitive development, including the reflective judgment model and the strong support for its use in accounting education.

## 5. Cognitive development

The previous two sections of this paper approached critical thinking in the way that most accounting educators are likely to address this topic. First, educators identify learning objectives for their courses, and then they identify learning methods to be used. However, this typical approach to accounting education overlooks a crucial factor: How do critical thinking skills develop? Many accounting studies have recognized that critical thinking skills are likely to develop in some type of sequence. Yet, beyond referencing structured versus unstructured problems or the verbs in Bloom's taxonomy, few accounting researchers have provided specific learning activities for different cognitive levels. In addition, few studies have examined critical thinking development comprehensively across the accounting curriculum.

Over the past century, numerous educational models have attempted to describe how critical thinking skills develop, and researchers continue to learn more about the process. In this section, we describe what is currently known about how accounting educators can encourage greater critical thinking development.

A useful resource for accounting educators and researchers is the most recent edition of *How College Affects Students, Volume 3* (Mayhew, et al., 2016). This series of books (preceded by volumes 1 and 2, Pascarella & Terenzini, 1991, 2005) summarizes the collective findings of education research. One chapter is devoted specifically to cognitive and intellectual development. Over time, the chapters on this topic have added new models that become relevant and removed models that are no longer viewed as relevant or significant. In the most recent volume, the authors describe various models of "postformal reasoning," including the models of Perry (1970), Baxter Magolda (1992), Kegan (1994), and King and Kitchener (1994). Each of these models describe peoples' underlying epistemological beliefs/assumptions, which are associated with how people learn and make decisions. The authors conclude that the reflective judgment model is the "best known and most extensively studied" model of cognitive and intellectual development (Mayhew et al., 2016, p. 108; based on Pascarella & Terenzini, 1991, p. 123).

One of the questions raised in accounting education is whether it is possible to "teach" critical thinking (Rebele & St. Pierre, 2019). Do people simply "have" or "not have" critical thinking skills? Based on meta-analyses of higher education research conducted during the 1990s and 2000s (Mayhew et al., 2016, Chapter 3), students in higher education generally develop higher levels of critical thinking compared to individuals who do not attend college (after controlling for a variety of factors). However, the researchers also point out that the average amount of development, while significant, is not as large as many stakeholders would like. These findings are consistent with the criticisms of accounting education stakeholders, such as employers, who would like entry-level accounts to exhibit stronger critical thinking.

Below we describe common themes from the cognitive development literature. We then introduce the reflective judgment model in more detail and provide information about how accounting educators and researchers can use it to design more effective critical thinking learning activities and to study student progress.

### 5.1. Common themes of cognitive development

In the education literature, critical thinking development is typically referred to as cognitive development—i.e., the process by which growth and experiences affect peoples' thought processes.<sup>7</sup> There are many well-known models of cognitive development, and several of these models have previously been introduced to accounting education. There are several common themes across the various models (Wolcott et al., 2002, 92):

- "Critical thinking skills can be arrayed cognitively from less complex to more complex."
- "Students must develop less complex skills before they can develop more complex skills."
- "Most college students operate at cognitive levels that are too low for adequate critical thinking performance."
- "Critical thinking skills develop slowly (if they do develop)."
- "Cross-curricular educational efforts, and educational efforts over time, are needed to give students sufficient time and practice for development of critical thinking skills."

<sup>7</sup> Most models of cognitive and intellectual development describe development beginning in infancy and continuing through childhood, adolescence, and adulthood. In this paper, we focus only on the adulthood aspects of development.

In recent years, research has increasingly shown that critical thinking development is dynamic; the growth and demonstration of skills depend upon peoples' experiences (as envisioned in Fig. 1). The following quote is particularly relevant: "Skills do not spring up fully grown from preformed rules or logical structures. They are built up gradually through the practice of real activities in real contexts, and they are gradually extended to new contexts through this same constructive process" (Fischer & Bidell, 2006, p. 321). In other words, people do not simply "have" or "not have" critical thinking skills. The skills are learned through repeated activities that are developmentally appropriate. Students and accountants exhibit different levels of critical thinking because of differences in their past experiences.

A major issue among the themes listed above is that critical thinking skills develop slowly. Accordingly, it might not be possible to reliably measure critical thinking development over short periods—even, perhaps, over periods that may exceed a year.

The preceding discussion highlights key knowledge about cognitive development from educational research. However, little research in this area has been conducted in accounting education. This leads to our next call to action.

**Call to Action 10:** Accounting education researchers should explore the common themes from the cognitive development literature and identify ways in which the themes apply to accounting students and influence their long-term critical thinking development.

## 6. Reflective judgment model

In this section, we describe the reflective judgment model (King & Kitchener, 1994). This model has recently been used in AICPA accounting education resources, and we explore ideas and recommendations for using it in accounting education.

The reflective judgment model consists of seven stages of cognitive development, based on qualitatively different reasoning strategies associated with peoples' underlying epistemological beliefs/assumptions. The reasoning strategies match closely the critical thinking abilities demanded by the accounting profession, as described earlier in this paper. According to King and Kitchener (1994, 19), the epistemological assumptions "not only affect how individuals will approach the task of defending a judgment but also how they will respond in learning environments designed to teach these skills."

The first two stages of the reflective judgment model correspond to childhood. Thus, we will ignore the childhood stages and use Levels 1, 2, 3, 4, and 5 when referring to the five stages of adult development.<sup>8</sup> These five levels are shown in Table 4, along with descriptive labels and epistemological beliefs that define each level. Based on the descriptions of critical thinking discussed earlier in this paper, it is our opinion that employers and professional organizations would like students to operate at reflective judgment Level 4 at the time they enter the accounting workplace.

### 6.1. Student levels of reflective judgment

King and Kitchener (1994) reported meta-data for research in higher education that measured students' stages of reflective judgment (Table 5). Unfortunately, the data suggest that students' critical thinking is significantly lower than desired. The average for undergraduate seniors (both traditional-aged and non-traditional-aged) is approximately Level 2, while master's/early doctoral students are at approximately Level 2.6. Even advanced doctoral students average only Level 3.3. These data suggest a large gap between accounting workplace expectation of Level 4 and average accounting student performance.

A natural question is whether the reflective judgment levels for accounting students is similar to the data in Table 5. During 2010, the first author of this paper conducted a research study for the CA School of Business (CASB). CASB operated a profession-sponsored pre-certification program for Chartered Accountants (CA) throughout Western Canada.<sup>9</sup> Students in the program had completed undergraduate accounting requirements to become a CA and were required to complete the pre-certification program before taking the final uniform CA exam. During the first week of the first module of the program, CASB randomly selected 200 students for an assessment project. The students, who had attended a variety of different undergraduate programs, completed a case assignment that was given to all students in the module. The first author of this paper provided detailed assessment guidance, including examples, and then calibrated assessments with an outside consulting company. Each paper was rated by two consultants, and discrepancies in ratings were reconciled. One student paper was not ratable, so data are reported for the remaining 199 papers. Table 6 presents the percent of papers rated at each cognitive level.

The weighted average level for CASB students was 1.9, which corresponds with the average for college seniors reported by King and Kitchener (Table 5). These data lead to the same conclusions as the data previously discussed. Only 5% of the student papers in this study demonstrated the level of critical thinking expected for entry-level accountants in the workplace. Most students demonstrated significantly weaker skills. Because no subsequent assessments were performed, an unanswered question is the proportion of subjects who were able to achieve the desired reflective judgment Level 4 by the time they completed the CASB program.

The preceding evidence suggests that most accounting students are not sufficiently challenged and supported to achieve the critical thinking demands of the accounting profession. This might occur because accounting faculty lack memory or

<sup>8</sup> In other words, we will use Levels 1, 2, 3, 4 and 5 when referring to King and Kitchener's Stages 3, 4, 5, 6 and 7. Development during adolescence, especially Stage 3, often overlaps with adult development.

<sup>9</sup> The CA, CMA, and CGA (Certified General Accountant) designations throughout Canada merged during 2013 to create the Charter Professional Accountant (CPA). Accordingly, CASB no longer exists as an organization.

**Table 4**  
Key student beliefs: Reflective judgment model.<sup>1</sup>

Level 1 Little/no critical thinking "Confused fact-finder"	Level 2 Partial critical thinking "Biased jumper"	Level 3 Emergent critical thinking "Perpetual analyzer"	Level 4 Competent critical thinking "Pragmatic performer"	Level 5 Expert critical thinking "Strategic Revisioner"
All problems are "black and white"; the student's job is to find the correct answer as provided by experts	Open-ended <sup>2</sup> problems cannot be solved by anyone, including "experts"; it is sufficient to stack up arguments to support one's own position	Supporting one conclusion denies the legitimacy of other viewpoints (except within a specific context)	Open-ended problems can be solved in a tentative and pragmatic way based on available information; no generalized principles or procedures exist for further investigation/ improvement	The goal is to construct knowledge, to move toward better conclusions or greater confidence in conclusions as problems are addressed over time

<sup>1</sup> Levels 1, 2, 3, 4, and 5 in this table correspond to adulthood reflective judgment stages 3, 4, 5, 6, and 7 (King & Kitchener, 1994). The content of this table, including the descriptive labels, is adapted from Wolcott and Lynch (2002), Wolcott (2016), and Wolcott (2020).

<sup>2</sup> Note: Springer and Borthick (2007) and Sargent and Borthick (2013) refer to open-ended tasks as cognitive conflict tasks.

**Table 5**  
Average reflective judgment scores.<sup>1</sup>

Educational level	Average RJI score <sup>2</sup>	SD	n
College (traditional-aged students):			
Freshman	1.63	0.53	329
Senior	1.99	0.67	369
College (nontraditional-aged students):			
Freshman	1.57	0.42	78
Senior	1.98	0.74	46
Graduate:			
Master's/early doctoral	2.62	0.81	126
Advanced doctoral	3.27	0.89	70

<sup>1</sup> Data are adapted from King and Kitchener (1994, p. 161). Levels 1, 2, 3, 4, and 5 in this table correspond to reflective judgment stages 3, 4, 5, 6, and 7. The data in this table are adjusted to reflect the numerical difference.

<sup>2</sup> Data in this table are based on scores using a reflective judgment interview (RJI), which is conducted by a certified interviewer and rated by 2 certified raters. For details, see King and Kitchener (1994).

**Table 6**  
Percent of beginning CASB students demonstrating each cognitive level.<sup>1</sup>

Level <sup>2</sup>	Percent
1	33%
2	52%
3	10%
4	5%

<sup>1</sup> The report for this study was internal to CASB and is not publicly available. However, the authors of this paper received permission to share these summary results.

<sup>2</sup> Levels 1, 2, 3, 4, and 5 in this table correspond to reflective judgment stages 3, 4, 5, 6, and 7. Level 5 is not shown because none of the CASB students demonstrated that level.

appreciation of their own developmental experiences, and their own developmental progress might have differed considerably from their students'. In addition, many accounting faculty receive little or no education training, especially in cognitive development. If faculty members want their students to develop critical thinking skills, they may simply guess at the types of learning activities and feedback their students need. As stated by Kurfiss (1988, 4), professors might assign critical thinking tasks, but leave skill development to students' "ingenuity, good fortune, and native ability."

Fortunately, the cognitive development literature provides numerous suggestions for appropriate critical thinking learning experiences. We next summarize these recommendations.

## 6.2. Using the reflective judgment model for accounting education

Because the reflective judgment model focuses on students' epistemological beliefs, accounting educators can apply these beliefs to develop more appropriate learning activities. For example, students at Level 1 who believe there is a single correct answer to all problems need to learn about the existence of uncertainty. Students at Level 2 who believe it is sufficient simply to argue for one's own opinion must learn the necessity of analyzing problems from multiple viewpoints. Students at Level 3, who believe that reaching a conclusion denies the validity of other possible conclusions, need to learn how to prioritize issues for reaching a conclusion within a given situation.



One of the major attributes of the reflective judgment model is that each level in the model lays the foundation for the next-higher level. The educational goal is to teach not only critical thinking skills, but to explicitly help students shift their current epistemological beliefs from their current level to the next-higher level. Numerous recommendations already exist for using the reflective judgment model in accounting education. [Table 7](#) summarizes the studies and resources.

The recommendations in [Table 7](#) can be summarized as follows. To improve student development of critical thinking skills, faculty should: (1) learn to recognize major characteristics of their students' current thinking, (2) design teaching and learning experiences to explicitly help students progress from their current thinking to the next higher level, and (3) provide students with resources and feedback to help them make progress. See [Nicol and MacFarlane-Dick \(2006\)](#) for the principles of effective formative feedback.

Accounting faculty naturally want students to learn and develop from the activities in their courses. However, critical thinking skills tend to develop slowly, and performance tends to be unstable as students learn new skills. The first author of this paper has often observed students in her classrooms begin to demonstrate stronger skills over a series of short case assignments, and then revert to their beginning level when similar skills are called for on the final exam. This observation is not uncommon, and faculty may become discouraged if they do not see measurable improvements after exerting considerable effort to teach critical thinking skills.

Unfortunately, critical thinking development does not occur neatly level-by-level. According to dynamic skill theory ([Fischer & Pruyne, 2003](#); [Fischer & Bidell, 2006](#)), performance at any given time is affected not only by the student's experiences with similar learning activities, but also by many factors including emotions and the degree of support for high performance. Student performance tends to be especially unstable when learning a new skill until the student gains enough experience that the new skill becomes automatic. To increase the likelihood of development, effective learning activities should (1) build on previous experiences, (2) provide developmentally appropriate opportunities for the individual to practice skills, and (3) lay a foundation for further development.

[Smith \(2014\)](#) recommended that business schools should teach decision making/problem solving skills in a stand-alone course, with knowledge and skills developed repeatedly throughout the program, including non-course activities. An alternative approach is for a program to adopt a common thinking model that is used throughout the curriculum, with additional layers of complexity added as students develop stronger skills. The latter approach is likely to appeal to programs that do not have room in the curriculum for another course. More importantly, a one-time or sporadic approach is less likely to be successful compared to an approach of repeated incremental development throughout the curriculum.

**Table 7**  
Recommendations for using the reflective judgment model in accounting education.

Study/resource	Recommendations
<a href="#">Kimmel (1995)</a>	Recommends learning objectives and teaching activities for cognitive skills in different accounting courses based on <a href="#">Kurfiss (1988)</a> and research conducted by <a href="#">Kitchener (1986)</a> ; this model preceded the reflective judgment model
<a href="#">Wolcott and Lynch (1997)</a>	Assess students' cognitive levels in introductory financial accounting using a reflective thinking essay assignment adapted from the reflective judgment interview; recommend using students' levels to improve coursework design
<a href="#">Wolcott (1998)</a>	Recommends focusing on reflective judgment Level 1 development in introductory accounting courses by introducing students to accounting ambiguities
<a href="#">Baril, Wolcott, Bayes, Cunningham, Fordham, and St. Pierre (1999)</a>	Summarize recommendations for critical thinking education from cognitive development studies in accounting, including incremental development, ideas for learning activities, and critical thinking measures
<a href="#">Wolcott (2000)</a>	Uses reflective judgment levels to create learning objectives for different course levels; recommends use of a problem-solving model to design coursework
<a href="#">Rama, Ravenscroft, Wolcott, and Zlotkowski (2000)</a>	Identify the Reflective Judgment Interview as a method for analyzing students' problem-solving approaches and discuss the impact of cognitive level on educational design for service-learning.
<a href="#">Wolcott et al. (2002)</a>	Provide guidance to improve the design of future research students of critical thinking in accounting; summarize the cognitive development models used in previous research, including the reflective judgment model
<a href="#">Wolcott and Lynch (2002)</a>	AAA faculty toolkit for using the Steps for Better Thinking model (adapted from the reflective judgment model) for design of accounting learning activities and assessment of student performance (including classroom examples)
<a href="#">Wolcott (2005)</a>	Uses the reflective judgment model to design rubrics for assessing student critical thinking competency
<a href="#">Springer and Borthick (2004)</a>	Design a business simulation for introductory accounting
<a href="#">Springer and Borthick (2007)</a>	Design cognitive conflict tasks for Introductory accounting student development of critical thinking
<a href="#">Wolcott (2011)</a>	Recommends significantly increasing the accounting education focus on critical thinking; provides a summary of models used in accounting education; provides suggested learning activities for reflective judgments levels 1, 2, 3, and 4; Discusses objections to the teaching of critical thinking in accounting
<a href="#">Sargent and Borthick (2013)</a>	Find stronger long-term critical thinking for students who experienced cognitive conflict tasks versus students who did not
<a href="#">Wolcott (2020)</a>	AICPA faculty guide for using the reflective judgment model in accounting education, including educational objectives, scaffolding of student learning, complexity of assignments for different cognitive levels, critical thinking model, and assessment rubric



As highlighted in this section, the reflective judgment model may provide useful guidance for accounting educators. This leads to our next call to action.

**Call to Action 11:** Accounting education researchers should investigate the claims made in the reflective judgment model literature, especially the long-term effects of deliberate and repeated critical thinking development learning activities in accounting education.

### 6.3. Drawbacks of the reflective judgment model for accounting education

Although the reflective judgment model is widely known among educational experts, it is not well known among accounting faculty members. In addition, the educational recommendations arising from the reflective judgment model can seem intimidating to accounting educators; it requires accounting faculty members to consider aspects of student thinking such as “epistemological beliefs.” It is much easier for accounting educators to simply continue teaching the way they have always done. However, we have seen more than twenty years of recommendations for accounting educators to focus more appropriately on critical thinking in their courses—and we have seen little, if any, improvement.

In addition to the preceding concerns, it can be difficult and time-consuming for faculty to use the reflective judgment model to assess critical thinking. The traditional method (King & Kitchener, 1994) involves a time-consuming and costly process. The AICPA critical thinking guide (Wolcott, 2020) provides a rubric based on reflective judgment levels that faculty can use to assess critical thinking, and the guide suggests simplified methods for classroom purposes that may lack the validity and reliability needed for research studies. However, no data to date have been collected and examined using the resources in the AICPA guide. In addition, even a valid rubric may provide poor data because faculty who lack training may provide unreliable assessments and poor-quality feedback. Accounting education has virtually no evidence about the consistency or reliability of accounting faculty grading and feedback quality on critical thinking learning activities. Nevertheless, one accounting study (Phillips & Wolcott, 2014) provides evidence that the mere placement of feedback can affect students' abilities to respond appropriately to feedback. A possible reason for inadequate accounting student development of critical thinking is that accounting faculty members provide inconsistent and developmentally-inappropriate learning experiences and feedback.<sup>10</sup>

This weakness is not unique to the reflective judgment model. Accounting faculty members often assess student performance and provide feedback based on their own perceptions and biases, which might differ significantly from any learning model.

This section has highlighted several drawbacks to use of the reflective judgment model in accounting education. This leads to our next two calls to action.

**Call to Action 12:** Accounting education researchers should investigate the short- versus long-term effects of deliberate and repeated developmentally appropriate critical thinking learning activities and feedback.

**Call to Action 13:** Accounting education researchers should investigate the quality of assessment methods, including rubrics, and the appropriateness of feedback given to students on their learning efforts.

## 7. Obstacles to critical thinking development

One way to consider the empirical evidence about the inadequacy of critical thinking development in accounting is to give up, and to assume that the needed development is not possible. Yet, the available empirical evidence in accounting education suggests that few of the major recommendations for critical thinking development have been implemented and tested in accounting education. In this section, we discuss several obstacles that seem to impair progress.

### 7.1. Should critical thinking be combined with technical accounting knowledge?

The preceding recommendations for critical thinking development imply that accounting students should learn and develop critical thinking skills within the accounting domain. Students who learn critical thinking skills in another discipline are likely to drop to a lower level of performance when asked to address an accounting problem. Even within the discipline, students might not transfer skills learned in one accounting course to another accounting course. Faculty can increase the likelihood of student transfer by using similar language and models to support development. If students encounter obvious connections across courses—such as the same critical thinking model or a similar rubric—they are more likely to build on prior experiences.

Notice that the recommendations in this paper might, in some cases, reduce pressure on faculty who are trying to achieve more than is reasonable within the span of a single course. For example, introductory accounting courses might support greater student development of critical thinking by focusing on uncertainties related to course topics—instead of focusing on more complex critical thinking tasks. As discussed by Wolcott (1998), this change would not require a significant time commitment in introductory courses, and it would better prepare students for higher-level thinking in later courses.

<sup>10</sup> See Herbert, et al., 2014, for suggestions for increasing faculty assessment consistency.

Although [Rebele and St. Pierre \(2019\)](#) have a valid argument that accounting courses are overloaded with technical content, it is possible that incremental development of critical thinking might not be as time-consuming as faculty believe. In addition, learning activities such as cases that address realistic accounting problems encourage deeper learning of technical content because students cannot simply memorize the answers; they must create their own meaning (e.g., [Schwartz & Fischer, 2003](#)). After all, what is the value of memorized technical knowledge if students are unable to use it outside of well-defined textbook scenarios?

This section has highlighted possible reasons why accounting education has not focused more heavily on critical thinking development. This leads to our next call to action.

**Call to Action 14:** Accounting education researchers should study whether the learning of accounting technical knowledge is harmed or improved when combined with appropriately-designed critical thinking skills training.

### 7.2. *What are the cross-curricular implications of critical thinking development?*

Many of the recommendations in this paper require students to be exposed to appropriately designed, increasingly complex learning tasks as they proceed through the accounting curriculum. A major roadblock to these recommendations is that accounting programs might need greater coordination of efforts among faculty than typically occurs. In addition, faculty are likely to resist modifying their current practices in the absence of strong empirical evidence supporting the recommended changes.

As argued by [Young and Warren \(2011, 862\)](#), "...introducing critical thinking exercises in Introductory accounting courses and sustaining these exercises through upper-division courses will give students the maximum amount of time and opportunity for their critical thinking skills to develop. Further, if the definition of critical thinking is transferring knowledge from one situation to another, then students must be presented with multiple opportunities to evaluate new and unfamiliar scenarios in order to practice and develop this skill."

The higher education literature provides at least some overall evidence about critical thinking development (e.g., [Mayhew, et al., 2016](#)). However, little evidence exists within accounting education beyond short-term individual learning experiences. A few accounting studies examine the effects of developmentally-designed critical thinking learning experiences on student performance later in the program (e.g., [Sargent & Borthick, 2013](#)). Larger-scale research projects are rare (for an exception, see [Stone & Shelley, 1997](#)). [Pincus \(1997\)](#) provides a useful discussion about research methods for longer-term studies.

This section has highlighted the need for curricular-wide critical thinking efforts. This leads to our next call to action.

**Call to Action 15:** Accounting education researchers should examine the effects of coordinated cross-curricular critical thinking efforts, including both short-term and long-term studies of effectiveness.

### 7.3. *Does it help or hinder critical thinking to simultaneously focus on other soft skills?*

In this paper, we have focused primarily on the cognitive development literature in identifying recommendations for critical thinking. However, it is likely that a broader perspective—taking into account other "soft" skills such as self-management, creativity, communication, and metacognition—might be essential to critical thinking development (e.g., [Kimmel, 1995](#); [Marzano & Kendall, 2007](#); [Schleifer & Dull, 2009](#)). These observations lead to our next call to action.

**Call to Action 16:** Accounting education researchers should further explore the relationships between different sets of skills to identify effective and efficient ways to develop critical thinking in combination with other desirable professional skills.

### 7.4. *How can accounting faculty be supported in their efforts to develop critical thinking?*

Throughout this paper, we have identified areas where accounting faculty might be mistaken or simply lack knowledge about how students develop critical thinking skills. For example, prior studies have found a disconnect between faculty beliefs regarding their focus on critical thinking and the likely effectiveness of learning activities (see summary in [Rebele & St. Pierre, 2019](#)). Few (if any) studies have examined the combination of faculty beliefs about critical thinking development compared to actual student development.

A related problem is that accounting textbooks tend to focus on lower-level cognitive skills (e.g., [Gupta & Marshall, 2010](#)). Because of this, faculty may need to develop many of their own assignments and test questions if they wish to help their students develop stronger critical thinking skills. Hopefully, more accounting textbooks in the future will provide better resources. In the meantime, we suggest that groups of faculty work together to develop materials and to engage in discussions to improve their ability to support student development. Faculty can also use the new critical thinking resources under development by the AICPA (e.g., [Wolcott, 2020](#)).

A major restriction on faculty members' efforts is the disincentive from educational institution rewards for faculty. In general, faculty are rewarded more for research unrelated to education than for either education research or improvements in actual educational activities.

This section has highlighted possible barriers to faculty buy-in for a greater focus on critical thinking. This leads to our next two calls to action.

**Call to Action 17:** Accounting education researchers should explore the connections between faculty pre-existing beliefs, the learning activities they employ, and actual student critical thinking development.

**Call to Action 18:** Accounting education researchers should examine the effects of faculty development programs and faculty promotion and tenure criteria on their incentives to redesign courses for better critical thinking development. These studies should also examine ways for faculty to collaborate.

## 8. Final thoughts

Although there have been repeated calls for greater critical thinking among accounting graduates, we can point to only limited research on this topic within the field of accounting. Existing research in accounting continues to confirm that students generally do not demonstrate the required levels of critical thinking. In addition, the recommendations in this paper call for greater effort and coordination among accounting faculty members—who may have little or no incentives to exert the effort needed to implement these recommendations.

We have presented eighteen recommendations in this paper as calls to action. With the accounting profession evolving at a rapid pace, changes to accounting education are essential. If accounting educators and researchers care about the long-term value of the profession, they cannot continue to delay. Higher-level critical thinking skills will enable tomorrow's accounting graduates to contribute more quickly to their organizations and ensure that the profession maintains relevance and value.

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