



How to help your
students become
better critical thinkers

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Introduction

This guide introduces techniques that accounting faculty can use to help students become better critical thinkers. It is intended for faculty who are starting their journey to promote better critical thinking. You will learn:

- The three most common “stages” of critical thinking among undergraduate and master-level students,
- Why students at each stage address critical thinking tasks in a specific way,
- Teaching and learning methods for helping students advance systematically from each stage of critical thinking to the next, and
- Recommendations for accounting program coordination of critical thinking development.

Chapter 1: Critical thinking for accountants

If you are reading this guide, you are probably already aware of the increasing calls for critical thinking in accounting programs. These calls are caused partly by the importance of critical thinking for all college graduates. For example, employers have listed “Critical Thinking/Problem Solving” as the most important competency for career readiness.¹ Yet, employers on average believe that only 56.8% of college graduates are proficient. Similarly, there is a belief among both accounting employers and academics that our evolving profession will require more critical thinking in the future than in the past. Yet over the past 30 years, few accounting curriculum changes have occurred to promote stronger critical thinking.²

This guide provides detailed advice for developing the critical thinking in undergraduate and master-level accounting courses. It incorporates the AICPA exam blueprint, the Pathways Vision Model, and the cognitive development literature. The guide also provides resources that faculty can use in their classrooms, including models of critical thinking, assessment rubrics, and suggestions for designing short critical thinking learning activities.

1.1 Critical thinking definitions

There is no universally accepted definition of critical thinking. Because different accountants and educators are likely to have different ideas about the definition, this guide provides several useful definitions. Consider sharing one or more of these definitions with your students.

1.1.1 Critical thinking in the CPA Exam Blueprint

One way to define critical thinking is to rely on the skills tested on the CPA exam. The CPA exam now includes the following four types of critical thinking skills based on the revised Bloom’s Taxonomy of Educational Objectives.

Skill levels

Evaluation	The examination or assessment of problems, and use of judgment to draw conclusions.
Analysis	The examination and study of the interrelationships of separate areas in order to identify causes and find evidence to support inferences.
Application	The use or demonstration of knowledge, concepts or techniques
Remembering and understanding	The perception and comprehension of the significance of an area utilizing knowledge gained.

Source: p. 2, *Uniform CPA Examination® Blueprints*, AICPA, effective July 1, 2018. Based on skills in Anderson, et al, 2001, *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives (Complete Edition)*, New York: Longman.

¹ National Association of Colleges and Employers (NACE), *Job Outlook 2019*, pp. 33-34.

² For a summary, see Pincus, K. V., D. E. Stout, J. E. Sorensen, K. D. Stocks, and R. A. Lawson, 2017, Forces for Change in Higher Education and Implications for the Accounting Academy, *Journal of Accounting Education*.

1.1.2 Definition per *Foundation for Critical Thinking*

Below is a more comprehensive definition of critical thinking.

A brief definition

Critical thinking is the art of analyzing and evaluating thinking with a view to improving it.

The result:

A well-cultivated critical thinker:

- raises vital questions and problems, formulating them clearly and precisely;
- gathers and assesses relevant information, using abstract ideas to interpret it effectively
- comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards;
- thinks open-mindedly within alternative systems of thought, recognizing and assessing, as need be, their assumptions, implications, and practical consequences; and
- communicates effectively with others in figuring out solutions to complex problems.

Critical thinking is, in short, self-directed, self-disciplined, self-monitored, and self-corrective thinking. It requires rigorous standards of excellence and mindful command of their use. It entails effective communication and problem-solving abilities, and a commitment to overcoming our native egocentrism and sociocentrism.

Source: *The Foundation for Critical Thinking*, available [here](#) [accessed July 19, 2019].

Based on this definition, critical thinking involves more than simply applying a set of skills to a problem. It also includes adopting and developing a mindset that is consistent with many of the accounting profession's principles such as objectivity, due care, professional skepticism, and continuous improvement. As discussed in the next chapter, student mindsets are often a major hindrance to critical thinking. However, there are well-known patterns in mindset (including "beliefs about knowledge") that educators can use to design more effective critical thinking learning activities.

The above definition of critical thinking also refers to communicating effectively with others to reach solutions/conclusions (e.g., through listening, observing, reading, and speaking). Another key aspect of communication not explicitly cited in the above definition is the effective presentation of analyses and conclusions to an audience through writing and speaking.

1.1.3 Pathways Vision Model

Accounting has traditionally been viewed as a "mechanical, black-or-white, right-or-wrong process" as shown on the left side of Figure 1. In contrast, students need to learn about the critical role that accounting plays in supporting a prosperous society, as shown in the Pathways Vision Model on the right side of Figure 1. Notice that the **Pathways Vision Model** incorporates critical thinking as a key component of accounting judgments, usefulness for decision making and consequences.

Figure 1: Pathways Vision Model



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As illustrated in Figure 1, accounting education needs to shift from the traditional view to a more realistic, complex view of accounting. The first course in accounting can play an especially important role in setting accounting student expectations. If the first accounting course is taught in the traditional way, then students who are attracted to a mechanical, black-or-white discipline are more likely to choose accounting as a major. Such students are also likely to resist shifting away from the traditional view in later accounting courses.

Although the accounting profession has always required critical thinking as shown in the Pathways Vision Model, **accountants today are expected to develop and demonstrate critical thinking skills more quickly than in the past.** Much of the mechanical work of accounting has disappeared, and accountants are called on to engage in value-added activities earlier in their careers. Overall, there is less available work time

for accountants to shift away from the traditional view. Because critical thinking skills tend to develop slowly, it is better to introduce accounting more realistically and to expand students' critical thinking abilities throughout the accounting program.

1.2 Teaching and learning model for critical thinking

You can use any of the definitions and models introduced above to help your students understand and practice critical thinking. However, it may be even more helpful to provide students with a critical thinking model that they can relate directly to their assignments. One approach is to give students a model of critical thinking and to reinforce its use across multiple assignments, grading criteria, and so on.

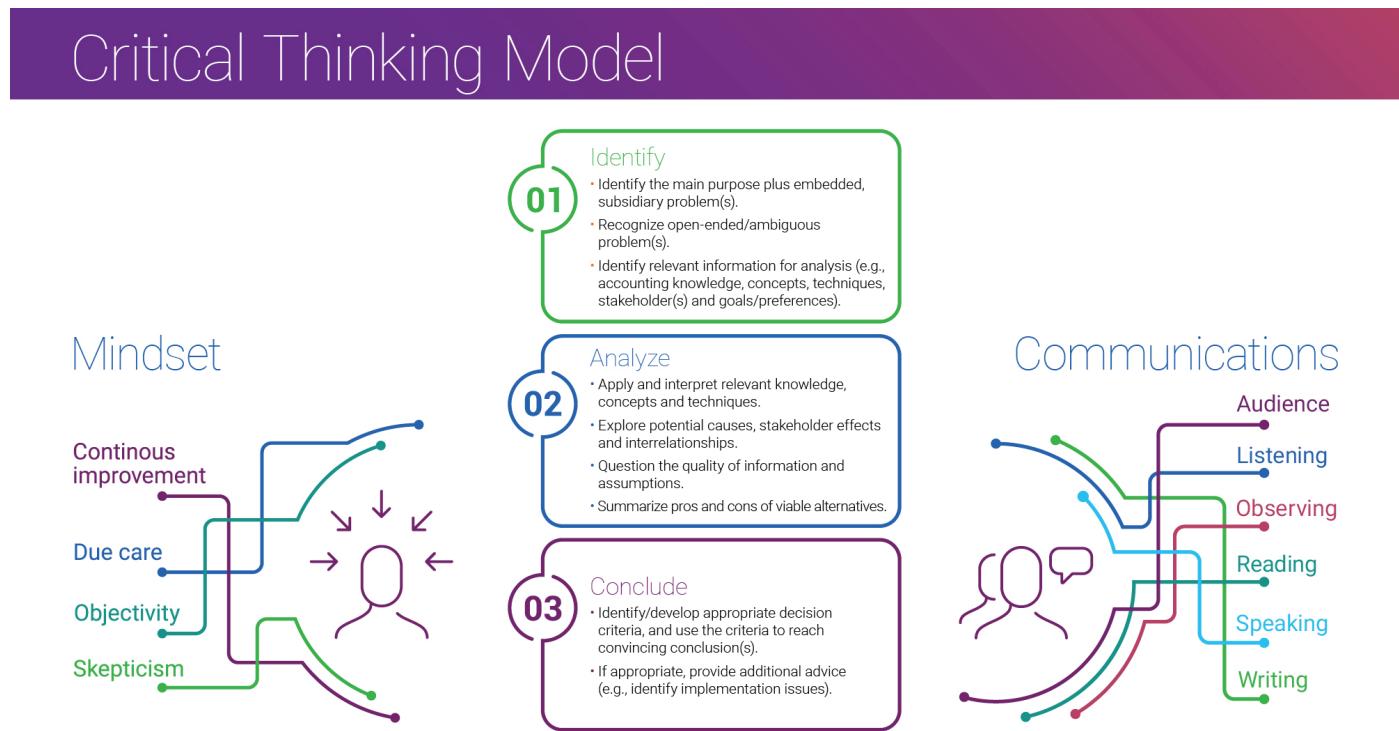
Drawing on the ideas presented earlier in this chapter, you might use the model shown in Figure 2. Or, consider experimenting with different models and approaches until you find one that works well for you and your students.

If your accounting program adopts a critical thinking model for use throughout the curriculum, then faculty in introductory courses can focus on the simple parts of the model, while faculty in later courses can help students learn the more complex aspects.

1.3 Other possible models/definitions for critical thinking

Instead of relying on the critical thinking definitions/models presented in this guide, your accounting program or business school might provide you with appropriate resources. If so, it might be best to adopt those resources to increase program emphasis on a common set of skills and to facilitate program assessment. In general, students will develop critical thinking skills more readily when multiple courses support the same set of skills – as long as the skills are not too far above student abilities (see Chapter 2).

Figure 2: Critical Thinking Model



Chapter 2: Critical thinking and stages of cognitive development

Considerable research in higher education indicates that most college students graduate with only some critical thinking skills. If accounting students are like those in other disciplines, this means that our graduates lack the critical thinking skills required by the profession.

You can think of the educational goal as helping accounting students close the gap between their current critical thinking skills and the abilities they will need for professional success. How can we do this?

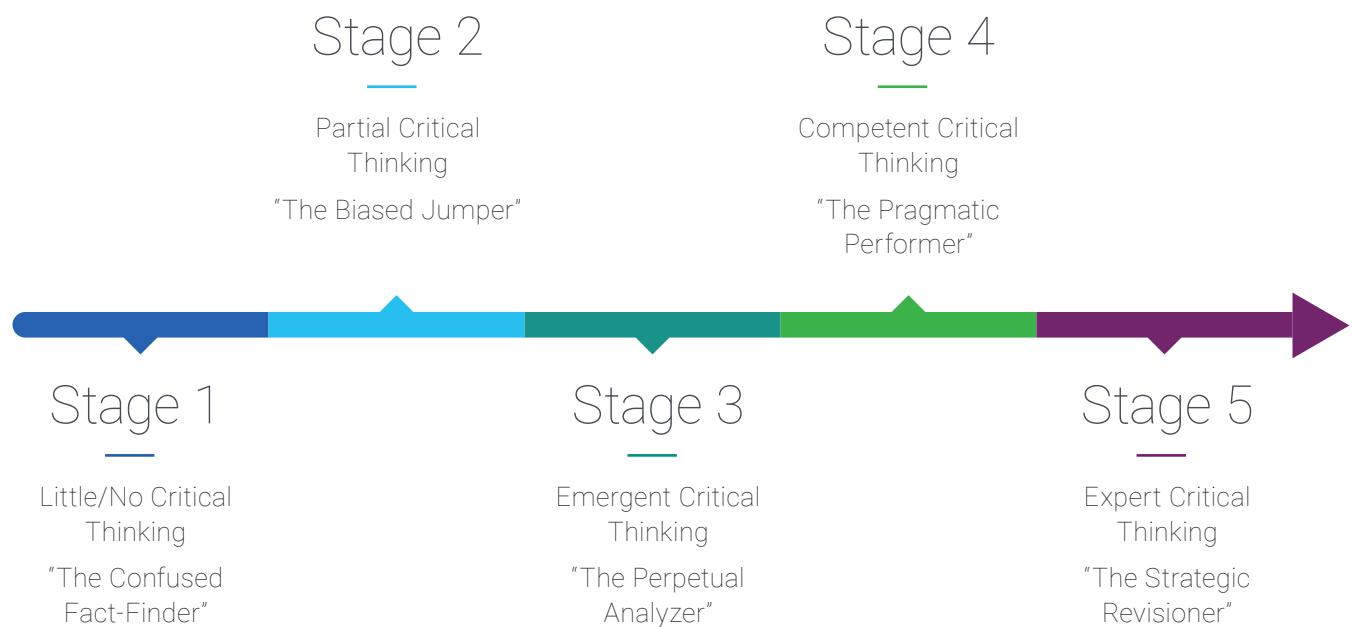
This chapter introduces concepts from developmental psychology based on King & Kitchener's reflective judgment model. The reflective judgment model has been researched extensively in higher education.³

Figure 3: Five stages of adult cognitive development

Stages of cognitive development are introduced in this Guide because they have significant effects on student performance and also help to explain why and how students respond to different types of learning activities. The sections below explain how you can use concepts from developmental psychology to help your students develop stronger critical thinking skills.

2.1 Stages of adulthood cognitive development

According to King and Kitchener, five adulthood stages of cognitive development exist, as summarized in Figure 3:⁴



³ See, for example, pages 106-108 in Mayhew et al., 2016, *How College Affects Students Volume 3: 21st Century Evidence That Higher Education Works*, San Francisco: Jossey-Bass.

⁴ Different models of cognitive development include different numbers of stages. The five stages shown in Figure 3 correspond to reflective judgment stages 3, 4, 5, 6, and 7 and omit pre-adult performance (i.e., stages 1 and 2). The nicknames shown for each stage (e.g., "The Confused Fact-Finder") and more details about the theoretical underpinnings for this guide can be found in Wolcott, 2016, *Faculty Handbook: Steps for Better Thinking* (2e). For a freely available copy, send an email to swolcott@WolcottLynch.com.

Unfortunately, research indicates that most undergraduate students achieve only Stage 1, 2 or 3.

A 1994 meta-analysis of data across many institutions and degree programs found the following average stages of cognitive development for undergraduate and graduate students:⁵

	Average stage	Standard deviation
Undergraduate first year	1.63	0.53
Undergraduate fourth year	1.99	0.67
Master's/early doctoral	2.62	0.81

In general, the above data suggest that many students in introductory accounting courses are likely to operate at Stage 1 (nicknamed "Confused Fact-Finder"), while the average for fourth-year undergraduate students is Stage 2 (nicknamed "Biased Jumper").⁶

Because most accounting students are likely to operate at Stage 1, 2 or 3, the rest of this guide will focus on teaching and learning ideas for those three stages.

2.2 Stages of critical thinking and student beliefs that hinder progress

According to King & Kitchener's reflective judgment model, stages of critical thinking are defined by a person's underlying beliefs about knowledge (i.e., epistemological beliefs). These beliefs determine the mindset with which a person approaches a critical thinking task and often hinder the development of stronger critical thinking skills. Peoples' beliefs can also reduce motivation to exert effort when confronted with a critical thinking task (discussed in Chapter 6).

By directly addressing students' underlying beliefs about knowledge, accounting educators can enhance students' motivation to learn critical thinking skills and the effectiveness of learning activities.

Figure 4 briefly summarizes what we observe in student work, students' critical thinking skills, and the most important beliefs that hinder development at Stages 1, 2, 3 and 4.⁷ A major recommendation in this guide is for faculty to explicitly help students shift their underlying beliefs to facilitate stronger critical thinking.

⁵ The data in this table are reported on page 161 by P.M. King and K.S. Kitchener, 1994. *Developing reflective judgment: Understanding and promoting intellectual growth and critical thinking in adolescents and adults*, San Francisco: Jossey-Bass. Reflective judgment stages 3, 4, 5 and 6 have been converted in this guide to Stages 1, 2, 3 and 4.

⁶ Susan Wolcott, the author of this guide, has found similar results among various populations of accounting students from different educational institutions, including a 2010 study of 199 post-undergraduate precertification accounting students in Canada. However, she has also found that accounting students in some courses/programs operate at higher stages.

⁷ Stage 4 is presented because it corresponds with the definitions of critical thinking introduced in Chapter 1. In other words, Stage 4 is an appropriate educational target for entry-level accountants. Stage 5 is an appropriate target for Ph.D. or more advanced (e.g., executive) accountants and is beyond the scope of this guide.

Figure 4: What we observe in student work

	Stage 1 Little/no critical thinking (The Confused Fact-Finder)	Stage 2 Partial critical thinking (The Biased Jumper)	Stage 3 Emergent critical thinking (The Perpetual Analyzer)	Stage 4 Competent critical thinking (The Pragmatic Performer)
What is most noticeable in the student's work?	Seems confused about requirement(s); may provide highly irrelevant response (e.g., definition instead of analysis); may appear to have done little work (e.g., short response)	Focuses on arguments that support one point of view; may discount or ignore other viewpoint(s); strong writing may give mistaken impression of strong critical thinking	Provides overly-long response with thorough analyses from multiple viewpoints; fails to reach and/or adequately support a conclusion	Provides thorough analyses from multiple viewpoints, prioritized for the situation and assignment; reaches valid, well-supported conclusion
What are the student's critical thinking skills?	<ul style="list-style-type: none"> Recites problem as given or identifies an inappropriate problem 	<ul style="list-style-type: none"> Identifies the clearly-evident problem; recognizes that the problem is open-ended/ambiguous 	<ul style="list-style-type: none"> Identifies the main problem and its complexities 	<ul style="list-style-type: none"> States the main problem plus the most important embedded, subsidiary problem(s)
	<ul style="list-style-type: none"> Applies calculations, definitions, or other "textbook" concepts that might or might not be relevant 	<ul style="list-style-type: none"> Partially analyzes relevant information; focuses on supporting own viewpoint; may discount other viewpoint(s) 	<ul style="list-style-type: none"> Thoroughly and objectively explores information, assumptions, stakeholders, consequences, and alternatives 	<ul style="list-style-type: none"> Objectively analyzes the most important information, assumptions, stakeholders, consequences, and alternatives; summarizes key pros and cons
	<ul style="list-style-type: none"> Instead of a conclusion, provides facts, definitions, or other "authoritative" statements 	<ul style="list-style-type: none"> Reaches a biased conclusion that is consistent with analyses 	<ul style="list-style-type: none"> Reaches no conclusion, or provides a conclusion with little or no explanation 	<ul style="list-style-type: none"> Identifies/develops valid decision criteria and reaches a convincing conclusion; provides additional value-added advice
What beliefs hinder progress to the next stage?	All problems are "black and white"; the student's job is to find the correct answer according to experts	Open-ended problems cannot be solved by anyone, including "experts"; it is sufficient to generate arguments to support one's own position	Supporting one conclusion denies the legitimacy of other viewpoints (except within a specific context)	Development after stage 4 is beyond the scope of this guide.

It is highly unusual for a person to “skip” a stage (e.g., to shift directly from Stage 1 to Stage 3).⁸ In addition, students are not likely to understand or to perform well on tasks that are too far beyond their current abilities. Thus, a possible explanation for the poor development of critical thinking in higher education is that many professors either avoid teaching critical thinking or focus on skills that are too far beyond their students’ abilities.

In general, education is more likely to be effective if the faculty helps students shift their thinking one stage at a time by working simultaneously on their beliefs and on appropriate types of new critical thinking skills. Chapters 3, 4 and 5 in this guide provide teaching and learning suggestions for students who are currently operating at Stages 1, 2 and 3.

2.3 Students might not be “at” a stage

Developmental psychology research suggests that:

- People do not necessarily operate at only one cognitive stage.
- Development is likely to be slow.
- People often revert to earlier patterns of thinking, especially when learning new skills.

Below are three major implications for accounting educators.

First, students often exhibit inconsistent patterns of thinking while they are learning new skills. For example, a student at Stage 2 may begin to more thoroughly and objectively analyze information. The student’s critical thinking might seem to improve but later revert to Stage 2. Student performance often drops during times of stress (such as a final exam) and when an assignment raises emotions (such as an ethics case). It is normal to observe student progress followed by regression.⁹ Accordingly, faculty should not be surprised if it takes accounting students two academic years of concerted effort to develop stable Stage 3 skills.

Second, students’ levels of cognitive development might vary across subject matters based on preconceived ideas. For example, students might enter an introductory accounting classroom expecting to learn only well-defined material with single correct answers. Thus, students who operate at Stage 2 in another course might revert to Stage 1 in introductory accounting. More importantly, **students who prefer single correct answers might choose accounting as a major if their introductory course is taught as a well-defined subject.**

Third, students might not apply critical thinking skills learned in other business or non-business courses to accounting. Every domain has unique types of complexities and might require different approaches. The Pathways Vision Model introduced in Chapter 1 illustrates some of the key aspects of critical thinking for accounting. Overall, **it is unrealistic to expect students to develop critical thinking skills elsewhere and to automatically apply those skills in accounting.**

⁸ Susan Wolcott, the author of this guide, has observed a small number of students who demonstrate critical thinking skills below their actual ability on a first assignment, presumably because the students believe that Stage 1 performance is expected (i.e., that the focus should be on recitation of well-defined knowledge). But when course expectations are clarified and higher stages of thinking are explicitly encouraged, some students immediately demonstrate Stage 3 or 4 skills. Such students obviously had stronger critical thinking skills at the beginning of the course, but demonstrated their true skills only when explicitly called on to do so.

⁹ For more details about this phenomenon, see K. W. Fischer and E. Pruyne, 2002, Reflective thinking in adulthood: Development, variation, and consolidation, pp. 169-197 in J. Demick & C. Andreoletti (Eds.), *Handbook of Adult Development*, New York: Plenum.

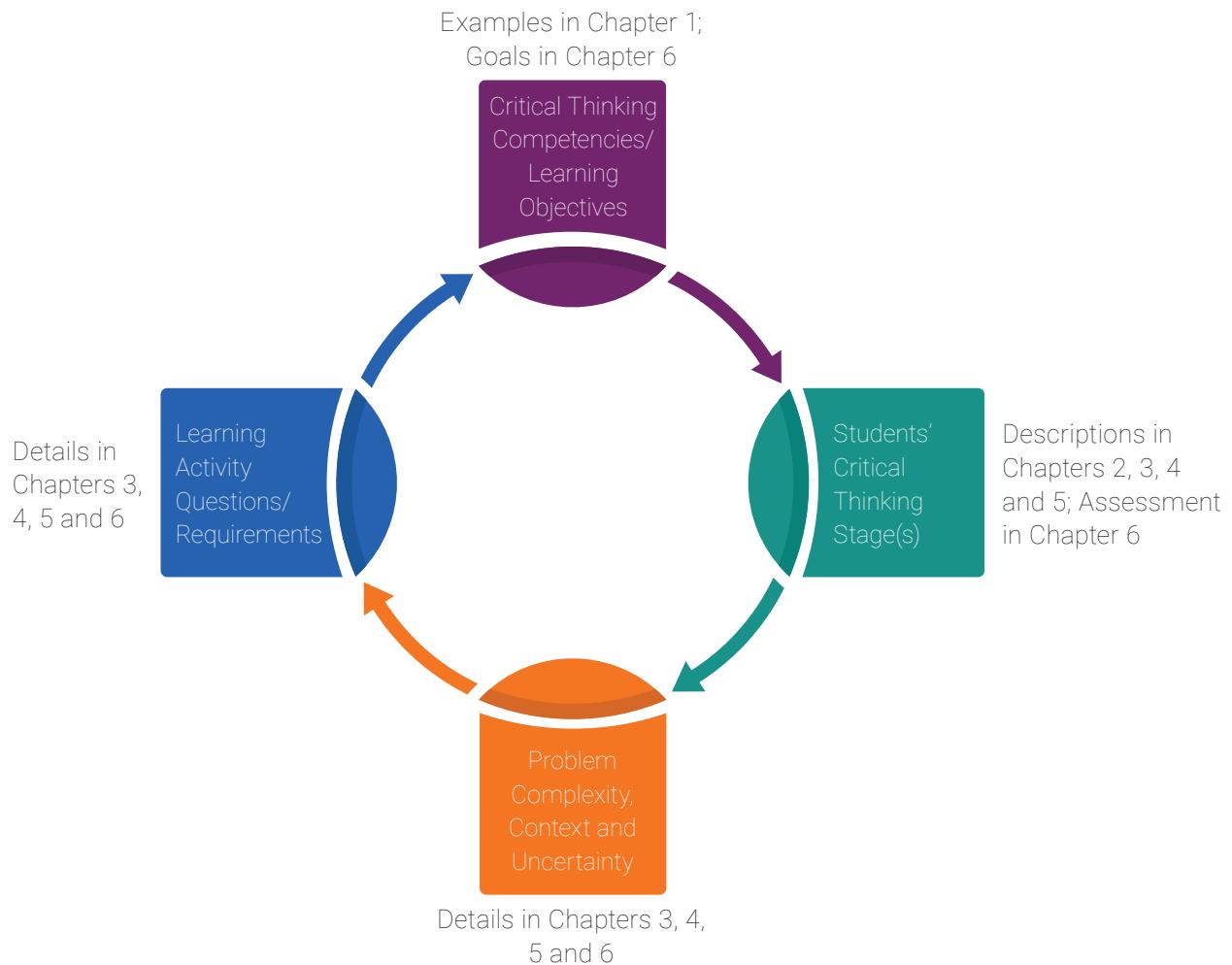
Because development can take a long time and because perceptions of accounting as a well-defined subject hinder development – and can attract the wrong students to accounting – it is essential that critical thinking development begin in introductory accounting courses.

In addition, faculty members need to remain patient as they help students develop new critical thinking skills. Try not to become frustrated when students fail to quickly demonstrate and maintain new skills!

2.4 Critical thinking and course design

Figure 5 illustrates how accounting faculty can organize their approach to critical thinking. Chapters 3, 4 and 5 in this guide provide detailed teaching and learning suggestions for helping students at Stages 1 (Confused Fact-Finders), 2 (Biased Jumpers), and 3 (Perpetual Analyzers). Chapter 6 will provide additional suggestions.

Figure 5: Course design considerations



Chapter 3: Students at Stage 1 (“Confused Fact-Finders”)

This chapter addresses students at Stage 1, who exhibit little or no critical thinking ability. Research in higher education indicates that approximately one-half of first-year undergraduate students operate at this stage. Many advanced undergraduates and master-level students may also operate at this stage, especially in an accounting course.

Figure 6 (adapted from Figure 4 in Chapter 2) summarizes the characteristics of Stages 1 and 2. The goal for students who are currently operating at Stage 1 is to help them transition to Stage 2, especially in an accounting course.

Figure 6: Transition from Stage 1 to Stage 2

	Stage 1 Little/no critical thinking (The Confused Fact-Finder)	Stage 2 Partial critical thinking (The Biased Jumper)
What is most noticeable in the student’s work?	Seems confused about requirement(s); may provide highly irrelevant response (e.g., definition instead of analysis); may appear to have done little work	→ Focuses on arguments that support one point of view; may discount or ignore other viewpoint(s); strong writing may give mistaken impression of strong critical thinking
What are the student’s critical thinking skills?	<ul style="list-style-type: none">• Recites problem as given or identifies an inappropriate problem• Applies calculations, definitions, or other “textbook” concepts that might or might not be relevant• Instead of a conclusion, provides facts, definitions, or other “authoritative” statements	<ul style="list-style-type: none">→ • Identifies the clearly-evident problem; recognizes that the problem is open-ended/ ambiguous→ • Partially analyzes relevant information; focuses on supporting own viewpoint; may discount other viewpoint(s)→ • Reaches a biased conclusion that is consistent with analyses
What beliefs hinder progress to the next stage?	All problems are “black and white”; the student’s job is to find the correct answer according to experts	→ Open-ended problems cannot be solved by anyone, including “experts”; it is sufficient to generate arguments to support one’s own position

Confused Fact-Finders address critical thinking problems incorrectly and have little to say when writing a paper. Consequently, faculty might mistakenly believe that this type of student spent insufficient effort on a critical thinking assignment. Unfortunately, the opposite might be true! Confused Fact-Finders often spend considerable amounts of time trying to locate correct answers in their textbooks, class notes, and other resources. Not surprisingly, they often become very frustrated.

Because Confused Fact-Finders believe that all problems can be solved correctly, they are highly resistant to the idea that they must reach their own conclusions. **Why, after all, would mere students' conclusions make any sense if experts know – and can tell them – the answers?** These students might mistakenly believe that you are trying to trick them when you ask for their opinion. Their responses to open-ended learning tasks often seem illogical. However, these students' responses are completely logical when viewed from their perspective. Remember: they believe that all problems have only one right answer.

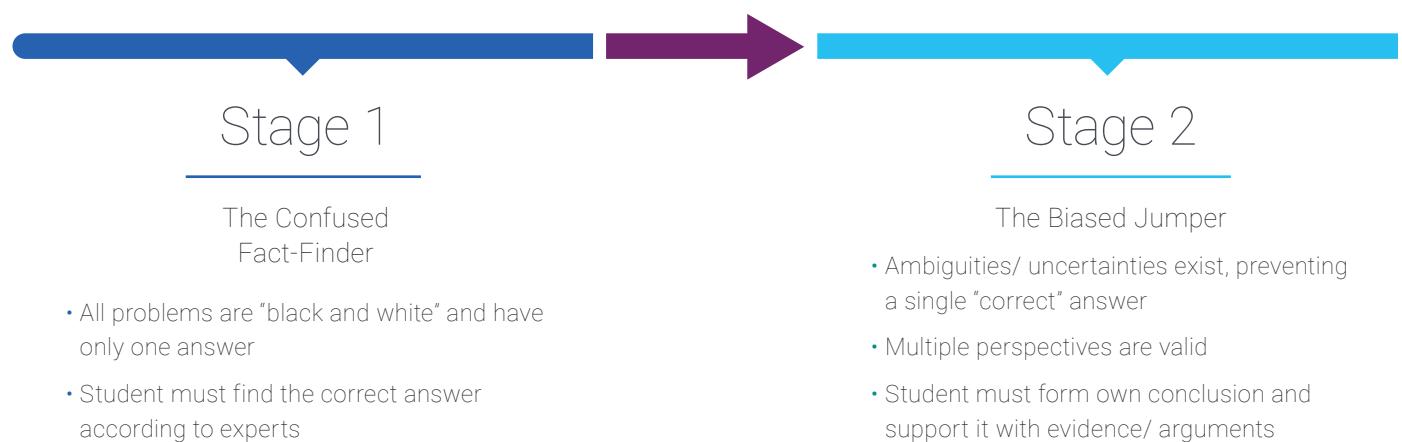
Students' beliefs about knowledge drive their critical thinking approaches. Hence, our challenge as faculty members is to encourage students to alter their underlying beliefs about how the world – and accounting – works. Here are some suggestions for how to do this.

3.2 How to develop the critical thinking of Confused Fact-Finders

To help students make the transition from Stage 1 to Stage 2, you need to focus on their underlying beliefs about knowledge. In particular, students at Stage 1 need to learn about the existence of ambiguities/ uncertainties that can lead to more than one viable answer to a problem. They can then be convinced that not all problems have a single correct answer. In turn, this realization helps them recognize the need to reach their own conclusion rather than to rely completely on experts (such as the professor and the textbook).

Figure 7 illustrates the desired shift in student beliefs.

Figure 7: Change in student beliefs from Stage 1 to Stage 2



3.3 Teaching/learning recommendations for Stage 1

Here are some ways to teach students how to recognize the existence of uncertainties:

3.3.1 Discuss different reasons for uncertainty

Find opportunities to discuss uncertainties in the material you are teaching. In an introductory financial accounting course, for instance, you can readily discuss uncertainties in conjunction with topics such as bad debts, depreciation, contingent liabilities, and interpretation of ratios. In an introductory management accounting course, you could discuss uncertainties about cost behavior, relevant costs for decision-making, budgeting, and interpretation of variances. Below are examples of ways to word a learning task:

Describe uncertainties concerning _____

List and describe uncertainties about the interpretation or significance of _____

List risks associated with _____

Describe why there is no single, “correct” way to _____

List reasons why _____ might change or vary

3.3.2 Read about and discuss conflicting theories, opinions and viewpoints

Students need to learn how to distinguish between problems having a single correct answer versus those having multiple viable solutions. Reading about and discussing conflicting theories, opinions and viewpoints can help students learn to recognize each type of problem, which, in turn, will help them adopt an appropriate approach. Below are ways to word a requirement given to students:¹⁰

How is it possible that different people hold different opinions (or viewpoints) regarding _____ ?

Identify more than one theory about _____ (an accounting method or approach)

Is it possible for managers to know with certainty whether _____ (one accounting method, approach or estimate versus another method, approach or estimate) is correct? Why or why not?

Describe why there is no single, “correct” way to _____

Is one theory about _____ correct, while the other theory is wrong? Why or why not?

¹⁰ Also see Chapter 5 for a suggestion to use this type of learning activity for a quick assessment of student stages.

3.3.3 Discuss whether a problem has only one "correct" answer

Confused Fact-Finders need to learn not only that problems may be open-ended (i.e., not have a single correct answer), but they also need to learn how to recognize the type of problem they are addressing. The previous two learning recommendations can prepare students to go one step further and to classify problems as well-defined (i.e., having only one solution) versus open-ended (i.e., having more than one viable solution).

Have students classify problems as homework and then discuss their classifications in student groups during class.

Below is a table you can use to help students focus on the criteria when evaluating the type of problem.

Figure 8: Well-defined versus open-ended problems

	Well-defined problems	Open-ended problems
Definition	<ul style="list-style-type: none"> • Can be described with a high degree of completeness • Can be solved with a high degree of certainty • Experts usually agree on the correct solution 	<ul style="list-style-type: none"> • Cannot be described with a high degree of completeness • Cannot be resolved with a high degree of certainty • Experts often disagree about the best solution
Examples	<ul style="list-style-type: none"> • Perform a linear regression analysis with given data • In your own words, define accelerated versus straight-line depreciation • Describe and apply personal tax rules for cash dividend income 	<ul style="list-style-type: none"> • Qualitatively interpret linear regression results • Recommend accelerated versus straight-line depreciation for a company situation • Discuss the pros and cons of cash dividend income to the individual investor
Goals	<ul style="list-style-type: none"> • Learn to <i>reason to correct solution</i> 	<ul style="list-style-type: none"> • Learn to <i>construct and defend a reasonable solution</i>

As students develop an understanding of uncertainties and open-ended problems, they will be ready to develop simple critical thinking skills such as the following:

3.3.4 Distinguish between relevant and irrelevant information

Students often have difficulty distinguishing between information that is relevant to solving a problem and that which is not. They need to practice addressing problems that include both types of information. Developing an understanding of uncertainties will help them recognize which pieces of information matter for a given purpose or decision. Below are ways to word a requirement given to students:

- List data or types of information relevant to _____
- List relevant information in _____ (a textual passage such as a case, article or professional literature)
- Is _____ (a piece of information in a textual passage such as a case) relevant to your analysis? Why or why not?
- Describe why there is no single, “correct” way to _____
- List or access relevant theories, laws, standards or rules for _____

3.3.5 List potential solutions and arguments

Before students can perform detailed analyses and form their own opinions, they must first learn how to recognize potential solution options and arguments from the information that they are given. A useful exercise is to have students read a well-written student paper and identify the issues discussed, the supporting evidence,

and the conclusion. Although this type of assignment might seem simplistic, it can be very beneficial to students at Stage 1. Another approach is to give students a short case and ask them to identify the solution options and evidence/ arguments contained in the reading. Below are ways to word a requirement to help students more thoroughly read and organization information before they begin analysis:

- List the solution options for _____
- List factors or issues related to _____
- List evidence/arguments in favor of each solution option.
- List evidence/arguments against each solution option.

Note: The requirement to “list” information might seem too simple, but it is essential for students to be able to identify and sort information before they begin more detailed analysis. Students at Stage 1 often have difficulty with this type of activity.

As discussed in Chapter 4, students at Stage 2 focus on information supporting their preferred solution. Requiring them to list relevant information for and against more than one option can encourage more thorough analysis. Thus, this learning activity is useful for students at Stages 1 and 2.

3.3.6 Begin to use evidence to support conclusions

Once students learn that some problems have multiple viable solutions, they need to assume the responsibility for reaching conclusions. They should be encouraged to form their own opinion and to provide evidence/ arguments to support it. Most students tend to use only limited evidence to support their opinions. Once they stop relying entirely on expert opinions, they are likely to rely too much on personal opinion compared to other

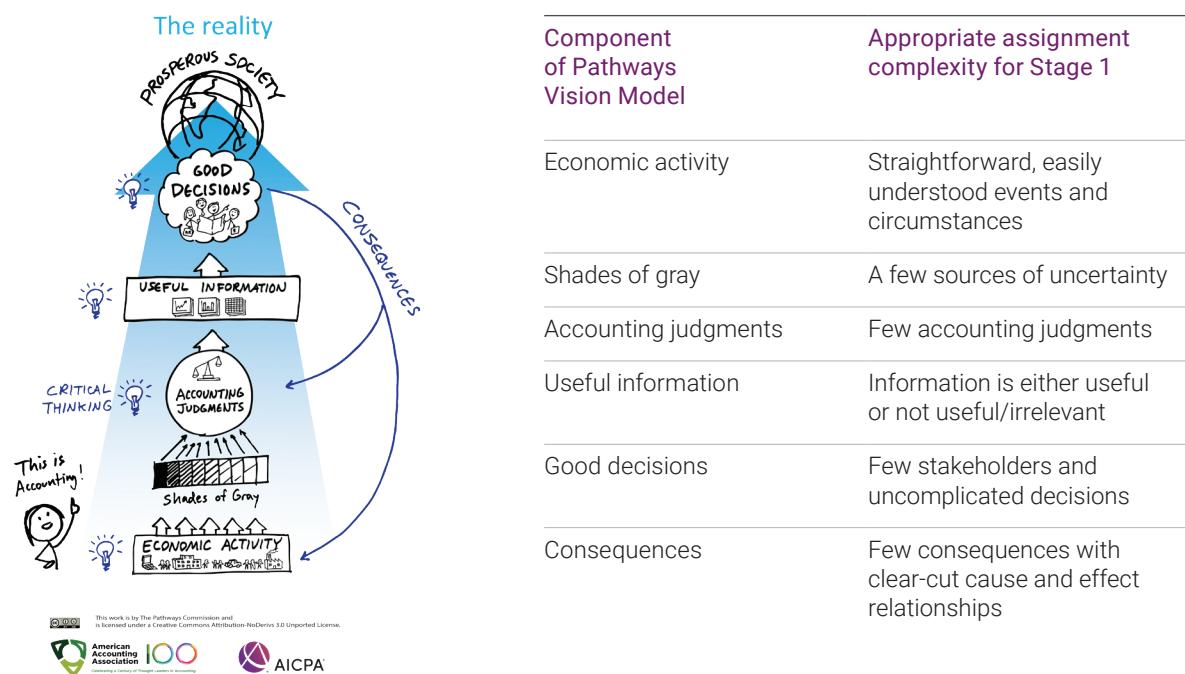
forms of evidence. Don't expect too much too soon; keep in mind that Stage 1 students are making progress when they know they need to form their own opinion. Below are ways to word a requirement to encourage students to both form their own opinion and to provide at least some arguments:

- Form your own opinion about _____
- List evidence/arguments in favor of your opinion
- List evidence/arguments against your opinion

3.4 Assignment complexity for Stage 1

When creating critical thinking assignments for Confused Fact-Finder students, be sure to include at least some complexity (including at least some uncertainty). However, you should avoid making the business setting and requirements too complex. Figure 9 illustrates appropriate ways to build complexity into assignments for Stage 1 students.

Figure 9: Pathways Vision Model and Stage 1 students



3.5 Overall comments: Stage 1

Although your classroom might include many Stage 1 students, most classrooms include students at more than one stage. You can take advantage of this variation. For example, consider asking students to address a question/task as homework, and then ask students to brainstorm during class to clarify and expand all students’ recognition of key issues. Stage 1 students can benefit from exposure to the ideas of students having stronger critical thinking skills.

You might be uncomfortable asking your students to address the rather simple questions about uncertainties and relevant information described in this chapter. These learning tasks might seem too low-level for college students. If you have this concern, try the **quick one-paragraph assessment** described in Chapter 6. If many of your students are unable to adequately identify and explain uncertainties without resorting to memorization, then this is an essential learning activity. In introductory accounting courses, consider devoting at least a few classroom minutes to uncertainties during each major accounting topic.

If you teach an intermediate-level course, consider conducting the same type of assessment described above. If students failed to learn about uncertainties during their introductory courses, then it will be necessary to introduce uncertainties later in the accounting program. And until students accept the existence of uncertainty, they will make virtually no progress on critical thinking skills.

Chapter 4: Students at Stage 2 (“Biased Jumpers”)

This chapter addresses students at Stage 2, who exhibit only some critical thinking ability. Research in higher education indicates that senior-level undergraduate students on average operate at this stage. It is also very common among master-level students.

Figure 10: Transition from Stage 2 to Stage 3

	Stage 2 Partial critical thinking (The Biased Jumper)	Stage 3 Emergent critical thinking (The Perpetual Analyzer)
What is most noticeable in the student’s work?	Focuses on arguments that support one point of view; may discount or ignore other viewpoint(s); strong writing may give mistaken impression of strong critical thinking	→ Provides overly long response with thorough analyses from multiple viewpoints; fails to reach and/or adequately support a conclusion
What are the student’s critical thinking skills?	<ul style="list-style-type: none">• Identifies the clearly-evident problem; recognizes that the problem is open-ended/ ambiguous• Partially analyzes relevant information; focuses on supporting own viewpoint; may discount other viewpoint(s)• Reaches a biased conclusion that is consistent with analyses	→ <ul style="list-style-type: none">• States the main problem and its complexities• Thoroughly and objectively explores information, assumptions, stakeholders, consequences, and alternatives• Reaches no conclusion, or provides a conclusion with little or no explanation
What beliefs hinder progress to the next stage?	Open-ended problems cannot be solved by anyone, including “experts”; it is sufficient to generate arguments to support one’s own position	→ Supporting one conclusion denies the legitimacy of other viewpoints (except within a specific context)

Figure 10 (adapted from Figure 4 in Chapter 2) summarizes the characteristics of Stages 2 and 3. The goal for students who are currently operating at Stage 2 is to help them transition to Stage 3.

4.1 "Biased Jumper" thinking and how to recognize it

The nickname for Stage 2 (Biased Jumper) describes the general approach this type of student uses when asked to think critically. They jump to a conclusion and then defend their position with personal biases and logic.

Because Biased Jumpers believe it is sufficient to simply stack up arguments to support their opinion – and because they believe that everyone acts the same way – they are highly resistant to more fully or objectively analyzing other viewpoints. These students exhibit overconfidence. They believe it would be a waste of time to explore other viewpoints and may become defensive if challenged or confronted with conflicting evidence.

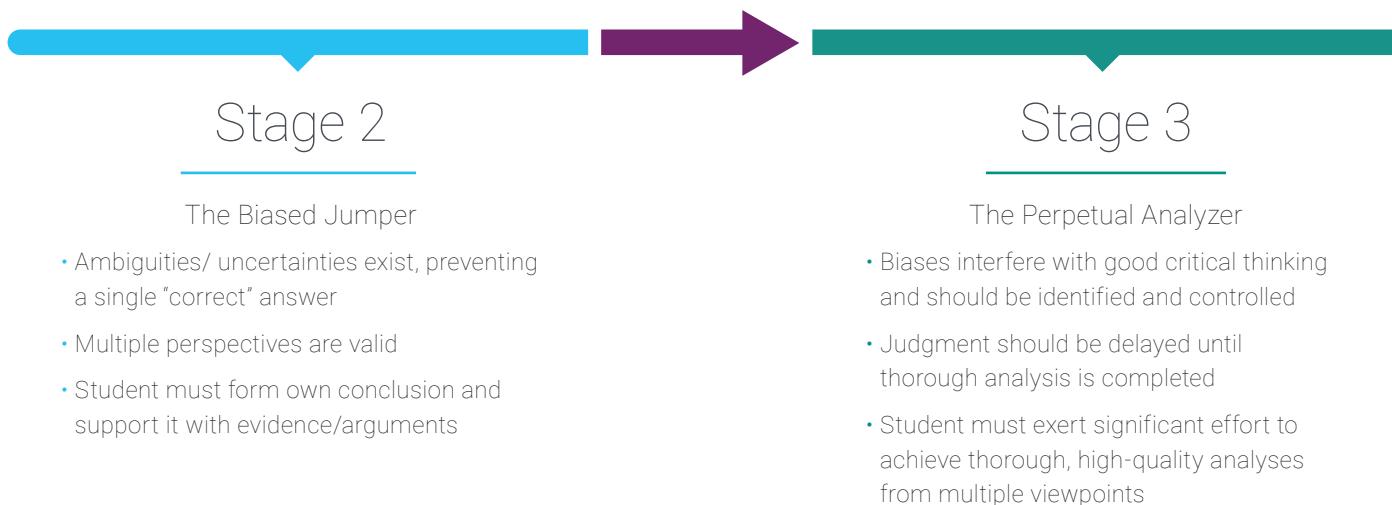
4.2 How to develop the critical thinking of Biased Jumpers

To help students make the transition from Stage 2 to Stage 3, you need to focus on the thoroughness and objectivity of student analyses while addressing their mistaken belief that they already think critically.

Biased Jumpers need to learn that good critical thinking means delaying conclusions until after relevant information, including other viewpoints, has been objectively and thoroughly explored. They must learn to do the hard work of breaking problems down, exploring multiple perspectives, controlling their own biases, and qualitatively evaluating evidence and arguments. Students will make these changes more readily if they also adopt a mindset that is consistent with the accounting profession as shown earlier in Figure 2 (e.g., continuous improvement, due care, objectivity and skepticism).

Figure 11 illustrates the desired shift in student beliefs.

Figure 11: Change in student beliefs from Stage 2 to Stage 3



4.3 Teaching/Learning recommendations for Stage 2

Here are some ways to teach students how to develop more thorough and objective analyses:

4.3.1 Identify and control biases

Classroom discussions can help students recognize and learn to control their biases. Although undergraduate Biased Jumpers acknowledge the existence of other viewpoints, they are often surprised during class discussions to learn that multiple viewpoints exist within the classroom. You can take advantage of student differences by conducting classroom discussions about the effects of preferences and preconceptions when interpreting and using information. (Note: Students might be more willing to acknowledge and discuss their "preferences" than their "biases.") You can also give students readings to help them learn about common biases and their negative impact on decision making.¹¹ Additionally, have students brainstorm ideas for identifying and controlling bias.

4.3.2 Provide arguments for and against alternatives

Students are usually taught to begin an essay with an introduction and thesis statement. Similarly, they are taught to begin a business memo with a statement of the problem and their conclusion. While this is a good way to communicate the results of critical thinking, this formatting encourages students to mistakenly believe that they must first choose their conclusion before analyzing information. They will probably also resist what they see as "wasting" their time exploring information that disagrees with their opinion. Thus, it is essential to require students to demonstrate more thorough analysis.

Below are examples of questions to help students identify and explore arguments and viewpoints.

- Analyze the costs and benefits of _____
- Explain how ambiguities affect your analysis of _____
- Interpret _____ from the viewpoint of _____
- Appropriately use _____ (a technique) to analyze _____
- Objectively evaluate _____ information
- Explain how alternative solutions might positively and negatively affect _____ (one or more individuals, organizations, groups or other stakeholders)
- Identify the positive and negative effects of _____ on _____

¹¹ For classroom ideas, see Fay and Montague, 2015, Witnessing Your Own Cognitive Bias: A Compendium of Classroom Exercises, *Issues in Accounting Education* 30(1). In addition, [Wikipedia.org](https://en.wikipedia.org/wiki/Cognitive_bias) has a major page about cognitive biases.

Consider asking students to complete a table describing the pros and cons (or strengths and weaknesses, or costs and benefits) for each potentially viable alternative as shown in Figure 12. (Note: As discussed in Chapter 2, Confused Fact-Finders should focus on identifying and listing arguments from readings/sources, whereas Biased Jumpers should go beyond identification to describing and/or explaining arguments.)

Figure 12: Pros and cons table

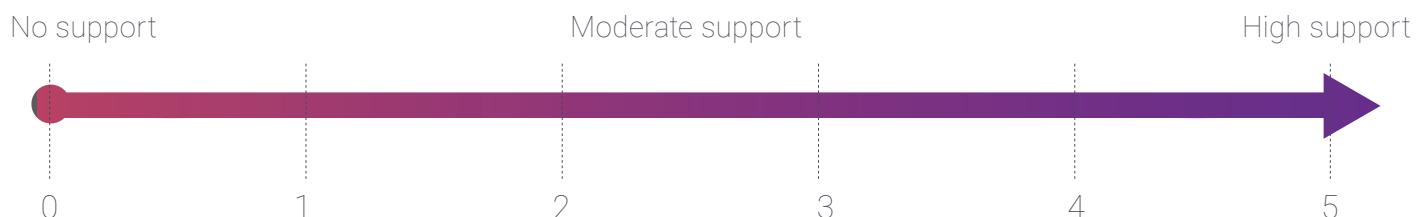
	List and describe/explain	
	Pros/advantages/strengths	Cons/disadvantages/weaknesses
Alternative/option/ viewpoint no. 1		
Alternative/option/ viewpoint no. 2		
Etc.		

4.3.3 Qualitatively evaluate information/evidence

Although Biased Jumpers recognize the existence of uncertainties, they tend to ignore those uncertainties when evaluating information. They focus on whether individual pieces of evidence support or do not support their argument ("all-or-nothing" thinking), and they ignore the quality of information. To help students learn how to qualitatively evaluate information, you can ask them

Students might complete the table as homework, and then expand their tables during small group and/or whole class discussions. To increase student motivation to address both pros and cons, ensure that grading criteria require a balanced set of arguments.

Figure 13: Degree of support



Also consider varying the types of information/evidence that students address. Examples include facts, descriptions, definitions, opinions, ideas, claims, theories, concepts, observations, statistics, values, perceptions, beliefs, influences and effects.

Below are questions you can ask students to explore the interpretation and quality of information.

- Is this evidence absolutely true/certain? Why or why not?
- Would everyone agree with the interpretation of this evidence? Why or why not?
- If this evidence or interpretation is true, then what else must also be true?
- How could we go about evaluating the quality/reliability of this piece of information?
- What makes some evidence stronger or weaker than other evidence?

4.3.4 Identify and analyze assumptions

Biased Jumpers often use assumptions, but they rarely identify them or evaluate their reasonableness. Ask students to define and explain the purpose of assumptions. Then help them learn to identify and apply criteria for evaluating the quality of assumptions. It is usually easier for students to identify and evaluate assumptions others use. Accordingly, you might want to begin by having students evaluate others' assumptions, and then ask them to focus on their own assumptions. Consider using questions such as the following.

- What assumption are you making?
- Are you making an assumption or an assertion? What is the difference?
- Is this assumption always true?
- If this assumption is true, then what else must also be true?
- How might you justify this assumption?
- What arguments might be made against this assumption?

4.3.5 Organize information into meaningful categories

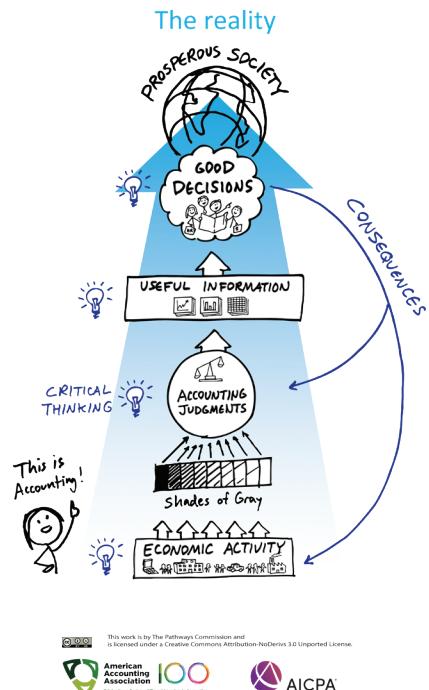
As students develop stronger analysis skills, they will begin to consider a wider and richer set of information and have greater difficulty deciding how to organize it. You can help students improve both their analysis and organization skills by having them use concept mapping. Consider having your students practice using different methods for organizing information. A critical thinking model, such as the ones illustrated in Chapter 1, can also help students organize and communicate their overall work into a statement of the problem, analyses, and conclusions.

4.4 Assignment complexity for Stage 2

When creating critical thinking assignments for Biased Jumper students, you can increase complexity of the

business setting and requirements to a moderate level. The following diagram illustrates appropriate ways to build complexity into assignments for Stage 2 students.

Figure 14: Pathways Vision Model and Stage 2 students



Component of Pathways Vision Model	Appropriate assignment complexity for Stage 2
Economic activity	Moderate scope and interaction of events and circumstances
Shades of gray	Multiple sources and degrees of uncertainty
Accounting judgments	Several accounting judgments
Useful information	Questions exist about the degree of information usefulness
Good decisions	Multiple stakeholders and decisions involving multiple factors
Consequences	Some uncertain cause and effect relationships

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4.5 Overall comments: Stage 2

Beyond the introductory accounting course, most accounting courses tend to be populated by more Stage 2 students than any other type of student. Once you are sure that most of your students can recognize uncertainties (i.e., have moved past Stage 1), then your educational focus should be on helping Stage 2 students move to Stage 3. This means placing heavy emphasis on thorough and objective analyses — and de-emphasizing conclusions.

You might be unwilling to reduce your emphasis on conclusions because this aspect of critical thinking is essential in the workplace. Keep in mind, however, that a focus on conclusions might encourage Stage 2 students to continue jumping to conclusions and prevent them from making progress.

As stated in Chapter 2, you should not be surprised if it takes students two academic years of concerted effort to develop stable Stage 3 skills. If you place heavy grading weight on a strong opinion and less grading weight on thorough analysis, then students may not progress beyond Stage 2. This might be one reason why most students fail to achieve Stage 3 (see the data in Chapter 2).

Chapter 5: Students at Stage 3 (“Perpetual Analyzers”)

This chapter addresses students at Stage 3, who exhibit many desirable critical thinking skills. Research in higher education indicates that some senior-level undergraduate and many master-level students may operate at this stage.

Figure 15: Transition from Stage 3 to Stage 4

	Stage 3 Emergent critical thinking (The Perpetual Analyzer)	Stage 4 Competent critical thinking (The Pragmatic Performer)
What is most noticeable in the student’s work?	Provides overly long response with thorough analyses from multiple viewpoints; fails to reach and/or adequately support a conclusion	→ Provides thorough analyses from multiple viewpoints, prioritized for the situation and assignment; reaches valid, well-supported conclusion
What are the student’s critical thinking skills?	<ul style="list-style-type: none">• States the main problem and its complexities• Thoroughly and objectively explores information, assumptions, stakeholders, consequences and alternatives• Reaches no conclusion, or provides a conclusion with little or no explanation	<ul style="list-style-type: none">→ • States the main problem plus the most important embedded, subsidiary problem(s)→ • Objectively analyzes the most important information, assumptions, stakeholders, consequences, and alternatives; summarizes key pros and cons→ • Identifies/develops valid decision criteria and reaches a convincing conclusion; provides additional value-added advice
What beliefs hinder progress to the next stage?	Supporting one conclusion denies the legitimacy of other viewpoints (except within a specific context)	→ Open-ended problems can be solved tentatively and pragmatically based on available information; no generalized principles or procedures exist for further investigation/improvement

Figure 15 (adapted from Figure 4 in Chapter 2) summarizes the characteristics of Stages 3 and 4. The goal for students who are currently operating at Stage 3 is to help them transition to Stage 4.

5.1 "Perpetual Analyzer" thinking and how to recognize it

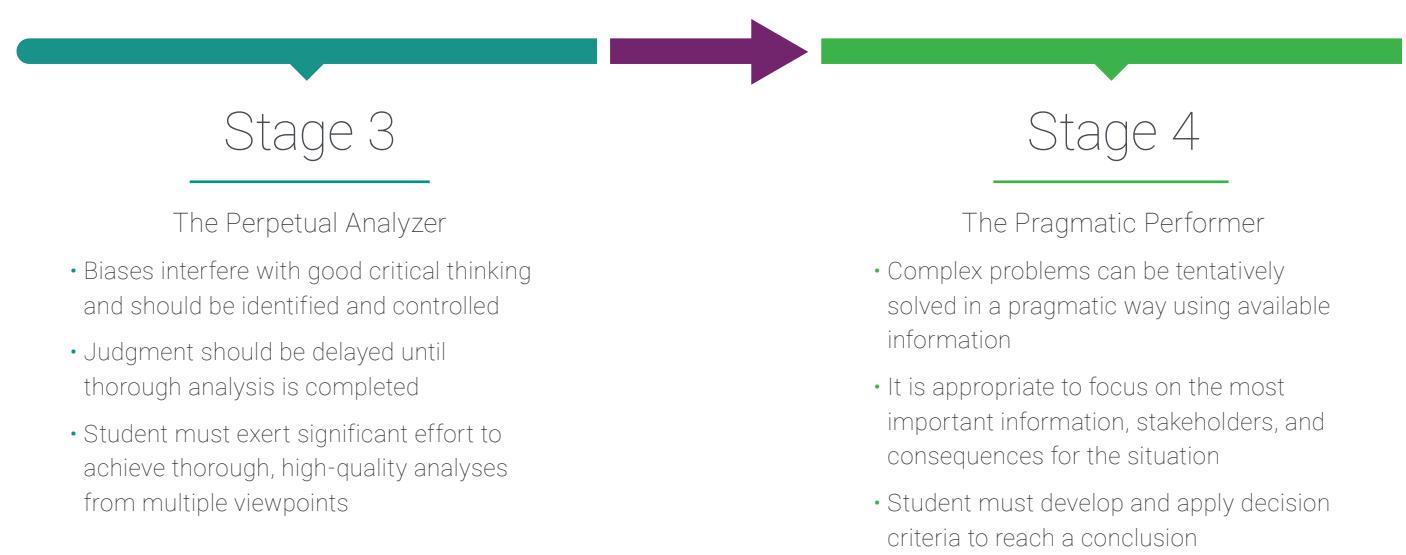
The nickname for Stage 3 (Perpetual Analyzer) describes the general approach this type of student uses when asked to think critically. They understand problems in a complex way, but are often subject to "analysis paralysis."

The strong reasoning skills of Perpetual Analyzers allow them to logically and qualitatively evaluate the evidence and assumptions from different perspectives, and they can draw logical conclusions within a given perspective. However, they have considerable difficulty reaching and defending a single "best" solution when more than one viable option exists. Their difficulty arises in part because they have given up their previous "Biased Jumper" ways of thinking and have not yet developed a way to make decisions that controls for personal bias.

5.2 How to develop the critical thinking of Perpetual Analyzer

To help students make the transition from Stage 3 to Stage 4, you need to focus on their underlying beliefs about knowledge.

Figure 16: Change in student beliefs from Stage 3 to Stage 4



5.3 Teaching/learning recommendations for Stage 3

Here are some ways to teach students how to prioritize information when addressing an open-ended problem.

5.3.1 Clarify the most important issues and factors

You might assume that students who can thoroughly and objectively analyze information can readily identify the most important issues, risks, evidence and stakeholders in a situation. However, the ability to remain objective while also establishing priorities requires students to move back and forth between the details of a problem and the overall situation. It is often helpful to encourage students to first identify information about values/priorities that are included in the description of a problem or case. Ask students to consider questions such as the ones below.

- Who are the most important stakeholders and which issues are most important to those stakeholders?
Why?
- For this problem, which details and evidence need to be addressed, and which are less important – and, therefore, could be set aside?
- Is additional evidence necessary (as opposed to desirable)?
- Why are the priorities for this situation different than for another similar situation?

5.3.2 Choose and explain assumptions and decision criteria

Because Perpetual Analyzers are trying to maintain objectivity and avoid bias, they often have difficulty establishing priorities that lead to appropriate assumptions and decision criteria. You can help these students by having them compare and contrast the terms bias and priority and by identifying each characteristic in sample responses to an accounting problem.

It is also helpful for these students to gain greater comfort through practice. For example, you can ask students to identify reasonable assumptions or decision criteria as a homework problem, and then have students compare and discuss the reasons for their choices in small group and/or whole class discussions. As Perpetual Analyzers gain greater experience considering assumptions and decision criteria, they will become more comfortable making their own choices.

Another approach is to ask students to identify and apply more than one realistic set of assumptions and decision criteria. By identifying more than one set, Perpetual Analyzers will become less concerned about perfection.

Consider asking your students to address questions such as the following.

- Which assumptions have the biggest influence on conclusions in this problem?
- How important is the solution to this problem, and what does that importance imply about the importance of assumptions or decision criteria?
- What does it mean for an assumption to be reasonable versus unreasonable?
- What is the worst that can happen if it turns out that this assumption is incorrect or the decision criteria are flawed?
- What might be the priorities for different groups of stakeholders in this problem? Whose priorities are most important? Why?

5.3.3 Adapt communications for different audiences

Perpetual Analyzers not only have difficulty prioritizing details when analyzing a problem, they also have difficulty prioritizing information when communicating to an audience. Ask students to practice modifying communications for different audiences when writing about open-ended problems. Also ask students to compare how and why they modified the content, language, and/or tone of their communications for a given audience during small group and/or whole class discussions.

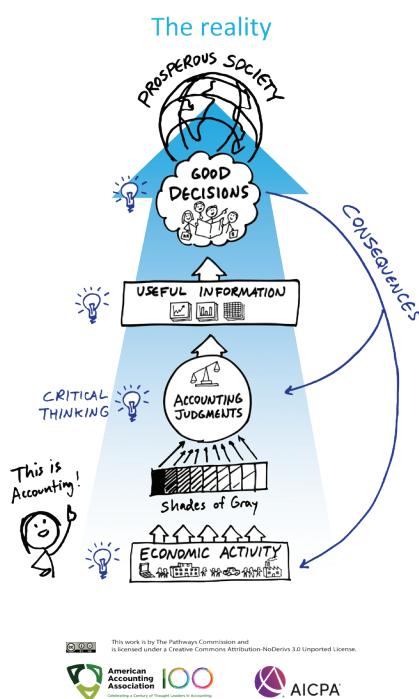
5.3.4 Ask students to explain their thinking

When students respond to an assignment, we usually see only their final effort. You can gain considerable insights into student thinking by asking them to respond to an open-ended assignment in two parts. In the first part, ask students to address the needs of an audience within a (relatively short) paper length limit. In the second part, ask students to explain to you how they decided which information to include/exclude in the first part. This assignment design reduces Perpetual Analyzer stress about prioritizing details in the first part of the assignment. The second part of the assignment provides you with information for giving students useful feedback. As discussed in Chapter 6, student responses to the second part can also provide useful assessment information.

5.4 Assignment complexity for Stage 3

When creating critical thinking assignments for Perpetual Analyzer students, you can increase the complexity of the business setting and requirements to a realistic level. Figure 17 illustrates appropriate ways to build complexity into assignments for Stage 3 students.

Figure 17: Pathways Vision Model and Stage 3 students



Component of Pathways Vision Model	Appropriate assignment complexity for Stage 3
Economic activity	Realistic scope of activities that may be highly complex
Shades of gray	Many sources and degrees of uncertainty
Accounting judgments	Many accounting judgments
Useful information	Many questions exist about information usefulness
Good decisions	Many stakeholders with divergent interests and complex decisions
Consequences	Many complex and uncertain cause and effect relationships

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5.5 Overall comments: Stage 3

You might misunderstand the critical thinking abilities of Perpetual Analyzers because you are looking for a well-founded conclusion that the Perpetual Analyzer does not provide. You might also be frustrated by the long papers written by these students. Students need to learn how to write concisely for the business world. Yet, Stage 3 students need the freedom to learn how to prioritize information and reach well-founded conclusions – without being overly penalized for their current stage of development.

Fortunately, these students' already-strong analysis critical thinking skills make it easier for them to develop the additional skills needed to move to Stage 4. Given guidance about how to prioritize and several opportunities to practice, Perpetual Analyzers may move quickly to the next stage – perhaps in the span of a single course.

Chapter 6: Additional ideas for better critical thinking

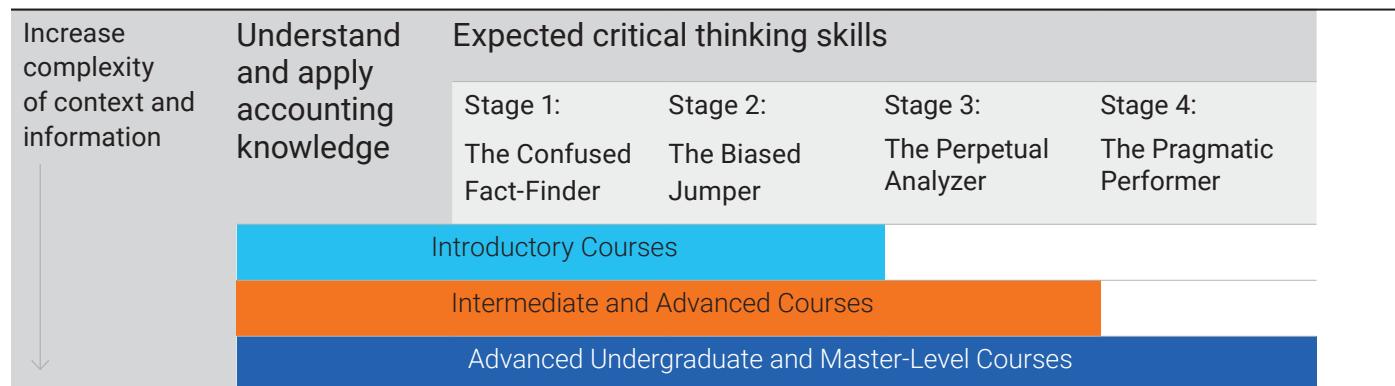
This chapter provides overall recommendations for courses and accounting programs and also provides suggestions for assessment.

6.1 “Ideal” goals within in an accounting program

Figure 18 illustrates an “ideal” progression of critical thinking stages for an accounting program. Employers and

workplace demands call for Stage 4 critical thinking skills. If we would like students to achieve this goal for entry to the accounting profession, then introductory accounting courses need to help students achieve Stage 2, and intermediate to advanced courses need to help students achieve Stage 3. Then, capstone and/or master-level courses could help students achieve Stage 4.

Figure 18: “Ideal” critical thinking goals



Unfortunately, the goals shown above are most likely NOT achieved by most accounting programs today. Instead, most students at the end of a bachelor or master program are probably demonstrating only Stage 2, with some students demonstrating Stage 3 skills. Few students achieve Stage 4.

Successful achievement of the above critical thinking goals probably requires (1) at least some focus on critical thinking in all or most accounting courses, (2) planned, systematic development of critical thinking skills across the accounting program, and (3) assessments to measure progress and to help design appropriate learning activities.

6.2 Problem complexity, context and uncertainty

The left side of the preceding diagram illustrates the idea that the complexity of business context and information should generally increase over the span of an accounting program. In Chapters 2, 3, and 4, complexity recommendations using the Pathways Vision Model were provided for each stage of critical thinking development. Figure 19 summarizes the recommendations from those chapters. This table can be used by an accounting program to consider progressive learning design.

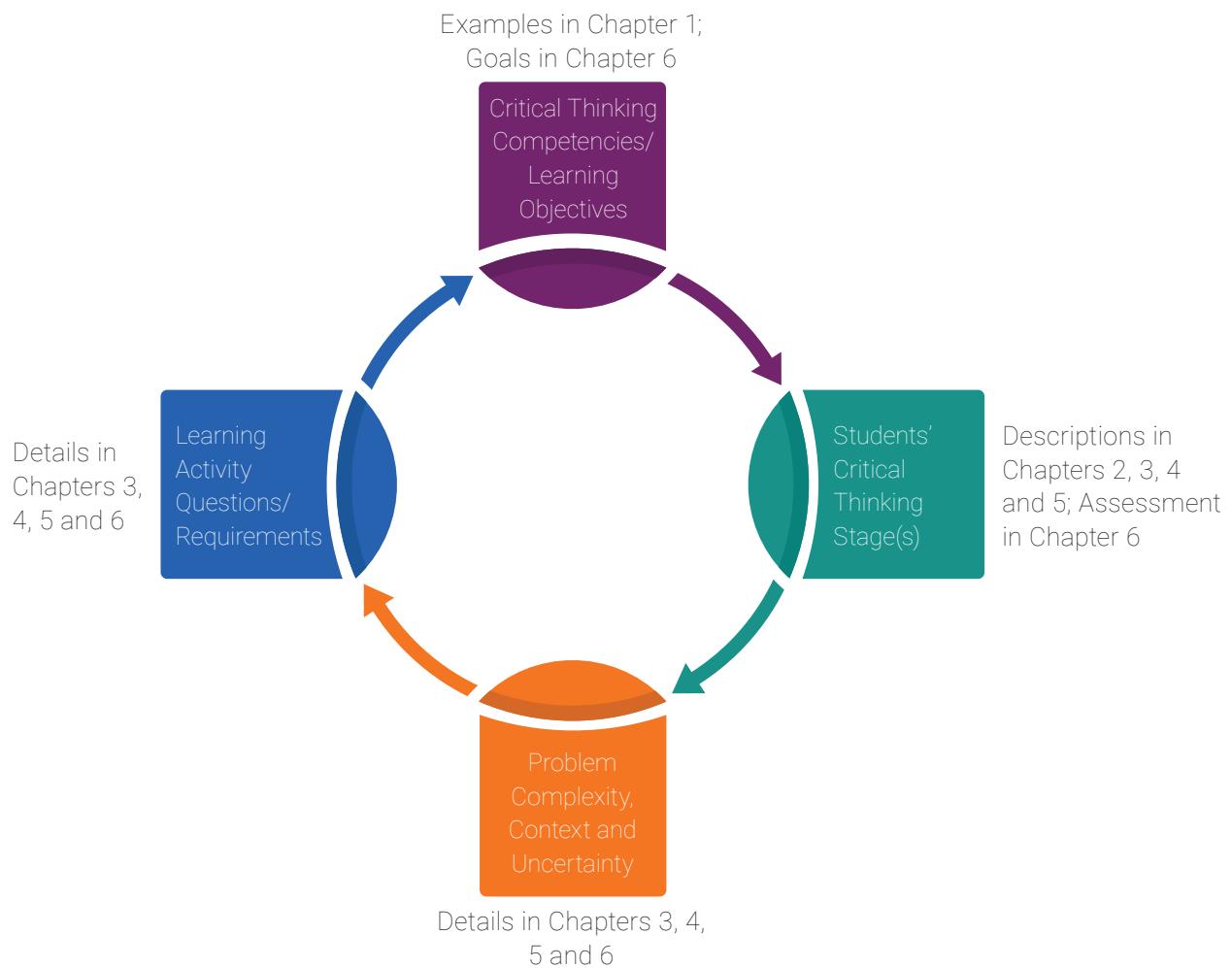
Figure 19: Assignment complexity for stages 1, 2 and 3

Component of Pathways Vision Model	Stage 1 The Confused Fact-Finder Chapter 3	Stage 2 The Biased Jumper Chapter 4	Stage 3 The Perpetual Analyzer Chapter 5
Economic activity	<ul style="list-style-type: none"> • Straightforward, easily understood events and circumstances 	<ul style="list-style-type: none"> • Moderate scope and interaction of events and circumstances 	<ul style="list-style-type: none"> • Realistic scope of activities that may be highly complex
Shades of gray	<ul style="list-style-type: none"> • A few sources of uncertainty 	<ul style="list-style-type: none"> • Multiple sources and degrees of uncertainty 	<ul style="list-style-type: none"> • Many sources and degrees of uncertainty
Accounting judgments	<ul style="list-style-type: none"> • Few accounting judgments 	<ul style="list-style-type: none"> • Several accounting judgments 	<ul style="list-style-type: none"> • Many accounting judgments
Useful information	<ul style="list-style-type: none"> • Information is either useful or not useful/irrelevant 	<ul style="list-style-type: none"> • Questions exist about the degree of information usefulness 	<ul style="list-style-type: none"> • Many questions exist about information usefulness
Good decisions	<ul style="list-style-type: none"> • Few stakeholders and uncomplicated decisions 	<ul style="list-style-type: none"> • Multiple stakeholders and decisions involving multiple factors 	<ul style="list-style-type: none"> • Many stakeholders with divergent interests and complex decisions
Consequences	<ul style="list-style-type: none"> • Few consequences with clear-cut cause and effect relationships 	<ul style="list-style-type: none"> • Some uncertain cause and effect relationships 	<ul style="list-style-type: none"> • Many complex and uncertain cause and effect relationships

6.3 Critical thinking and course design

Figure 5 was previously introduced in Chapter 1. This diagram can be used by individual professors for planning their courses, and it can also be used by programs for curricular planning.

Figure 5 (from Chapter 1): Course design considerations



To take advantage of the recommendations in the preceding chapters, you might ask, "But how do I know my students' stage of cognitive development?" And,

"What if students in my course differ from the typical cognitive stages discussed in Chapter 2?" Or, "What if different students in my classroom are at different stages?" This chapter briefly addresses these questions.

6.4 Critical thinking assessments

Chapters 2 through 5, especially Figure 4, provided indicators to help you recognize students who are operating at Stages 1, 2, and 3. Those indicators can be adequate for individual course planning and design. However, critical thinking development is most likely to be effective if critical thinking is addressed throughout the accounting program. In addition, many accounting programs require a formal assessment of major learning objectives such as critical thinking. Below are several ideas for informal and formal assessment methods.

6.4.1 Quick, one-paragraph assessment

A quick way to gather information about student thinking is to give students five minutes during class to write a paragraph explaining why some aspect of the course involves uncertainty. Below are examples of possible questions:

- Introductory financial accounting: Explain why even the manager of a company cannot know the actual amount of future bad debts.
- Introductory management accounting: Explain the possible reasons why managers might be unable to accurately estimate future costs.
- Cost accounting: Identify and explain possible reasons why managers would be uncertain about the effects of a new performance measure on employee behavior.
- Auditing: Identify and explain possible reasons why auditors might not discover evidence that an important internal control for an audit client does not always operate correctly.
- Tax accounting: Identify and explain possible reasons why a tax client cannot be certain about future income tax rates.

You might also ask a question about uncertainty on exams.

How do students respond to questions about uncertainty? Stage 1 (Confused Fact-Finder) students often write answers that seem to be off-base. For example, they might state that the company needs to hire a better manager who will know the amount of bad debts. Or, they might provide definitions without addressing the question. Stage 2 (Biased Jumper) students usually identify at least one valid reason for uncertainty. Stage 3 (Perpetual Analyzer) and more advanced students often provide very thorough discussions about the types and causes of uncertainty. Using these general characteristics, you can quickly sort student papers into three “stacks” to estimate the proportion of students at Stages 1, 2 and 3+.

6.4.2 Quick explanatory assessment added to an assignment

As discussed in Chapter 5, you can gather more details about students’ underlying thinking by adding a second written requirement to an existing written assignment. First, ask students to write a relatively short (1- or 2-page) paper for a specific audience about an open-ended problem (e.g., a business memo containing a recommendation). Next, ask students to write a paper explaining to you how they decided which information to include/exclude in the first part of the assignment.

How do students respond to the second part of this assignment? Confused Fact-Finders would typically be quite puzzled by the second part. They would probably write very little and might express their confusion or provide more information about well-defined accounting knowledge. Biased Jumpers are likely to write a fairly short paper in which they repeat arguments they made in the first part of the assignment (e.g., "That is what I thought, so that is what I said"). Perpetual Analyzers are likely to provide a very thorough (and perhaps very long) explanation of the choices they made in the first part of the assignment. Stage 4 students are likely to provide a concise, well-reasoned explanation about the key choices made in their responses. Using these general characteristics, you can quickly sort student papers into four "stacks" to estimate the proportion of students at Stages 1, 2, 3 and 4.

This type of assessment will also provide you with helpful information about students' underlying beliefs and thinking. You can use this information for individual feedback and/or to engage students in classroom discussions.

6.4.3 More valid and reliable assessments

The quick assessment methods described above are adequate for general course design and planning. You can gain a surprising amount of information about your students' thinking using these methods.

For more valid and reliable information about student cognitive stages for program assessment or research, it is possible to use carefully-crafted assignments and rubrics. For example, the rubric shown in Figure 20 incorporates the critical thinking skills from the critical thinking model introduced in Chapter 1 (Figure 2), and the columns correspond to the behaviors we observe in student work for Stages 1, 2, 3 and 4 (Figure 4).

An advantage of this rubric is that it can be used on any assignment calling for critical thinking, and students can be given feedback that ties explicitly to a critical thinking model (such as Figure 2). Students who are exposed to the same model and rubric over multiple assignments are more likely to develop desired critical thinking skills.

If a critical thinking model and rubric such as the ones shown in this guide are used by multiple faculty members, then students are likely to develop critical thinking skills even more quickly. To ensure consistent use in the program, faculty may wish to hold periodic meetings in which they assess sample student papers and reach consensus on their ratings and feedback. Greater consistency across faculty members will likely lead to even greater student critical thinking development.

6.4.4 What if student performance varies?

As discussed in Chapter 2, students might not demonstrate critical thinking skills at only one stage. Sometimes performance varies based on the assignment subject matter or based on factors such as stress (e.g., exams). Accordingly, you might observe the same student performing at different stages on different assessments.

In addition, students often demonstrate the characteristics of two adjacent stages when they have partially developed new skills, leading to performance that varies across two columns in the rubric. However, students are not likely to demonstrate performance across more than two columns. If you believe that a student's performance spans more than two columns, you should carefully review the assessment. You might have under- or over-assessed one or more critical thinking elements.

Figure 20: Critical thinking skills rubric for stages 1, 2, 3 and 4

Component of Critical Thinking Model (Figure 2)	Stage 1 Little/no critical thinking (Confused Fact-Finder)	Stage 2 Partial critical thinking (Biased Jumper)	Stage 3 Emergent critical thinking (Perpetual Analyzer)	Stage 4 Competent critical thinking (Pragmatic Performer)
Identify	<ul style="list-style-type: none"> • Recites purpose as given, or • Identifies an inappropriate problem 	<ul style="list-style-type: none"> • Identifies the clearly-evident purpose • Recognizes that the problem is open-ended/ambiguous 	<ul style="list-style-type: none"> • Identifies the main purpose • Identifies relevant stakeholders and their possible goals/preferences • Identifies relevant accounting knowledge, concepts and techniques 	<p>In addition to Stage 3:</p> <ul style="list-style-type: none"> • Identifies important embedded, subsidiary problem(s)
Analyze	<ul style="list-style-type: none"> • Applies calculations, definitions, or other "textbook" concepts • Presents irrelevant information • Misinterprets calculation(s) and/or concept(s) 	<ul style="list-style-type: none"> • Applies and describes the effects of relevant calculations and/or concepts • Partially analyzes alternatives, focusing on information supporting own viewpoint • Discounts other viewpoint(s) 	<ul style="list-style-type: none"> • Thoroughly and objectively applies and interprets relevant calculation(s) and concept(s) • Explores causes, stakeholder effects and interrelationships • Questions the quality of information and assumptions • Thoroughly discusses the pros and cons of viable alternatives 	<ul style="list-style-type: none"> • Objectively analyzes the most important relevant information, implications, consequences, and viewpoints • Evaluates the quality of information and assumptions, and adapts interpretations (as needed) • Summarizes the most important pros and cons of viable alternatives
Conclude	<ul style="list-style-type: none"> • Instead of a conclusion, provides facts, definitions or other "authoritative" statements 	<ul style="list-style-type: none"> • Reaches a biased conclusion that is consistent with analyses 	<ul style="list-style-type: none"> • Reaches no conclusion, or • Provides a conclusion with little or no justification 	<ul style="list-style-type: none"> • Identifies/develops appropriate decision criteria, and uses the criteria to reach convincing conclusion(s) • If appropriate, provides value-added advice (e.g., identifies implementation issues)

6.4.5 Assignment-specific rubrics

Instead of using a generic rubric such as the one shown in Figure 20, you may prefer to use rubrics that are specifically designed for individual assignments. This approach allows the rubric to include factors other than critical thinking (such as specific aspects of technical knowledge, written communication and mindset). Examples of this type of rubric will be made in future materials on the AICPA critical thinking resource [website](#).

6.5 Communication versus critical thinking

The critical thinking model introduced in Chapter 1 (Figure 2) includes communication. Because this guide focuses on critical thinking, it does not address the development or assessment of communication skills. However, students' strong or weak communication skills can sometimes make it more difficult to assess critical thinking.

When grading and assessing student papers, some students with strong communication skills might initially seem to demonstrate strong critical thinking. Be sure to examine these papers closely. You might discover that the analyses and conclusions are biased and that the paper displays skepticism only toward other viewpoints (i.e., Biased Jumper thinking).

Other times, a student's poor communication initially gives an impression of weak critical thinking – which turns out to be incorrect upon closer inspection.

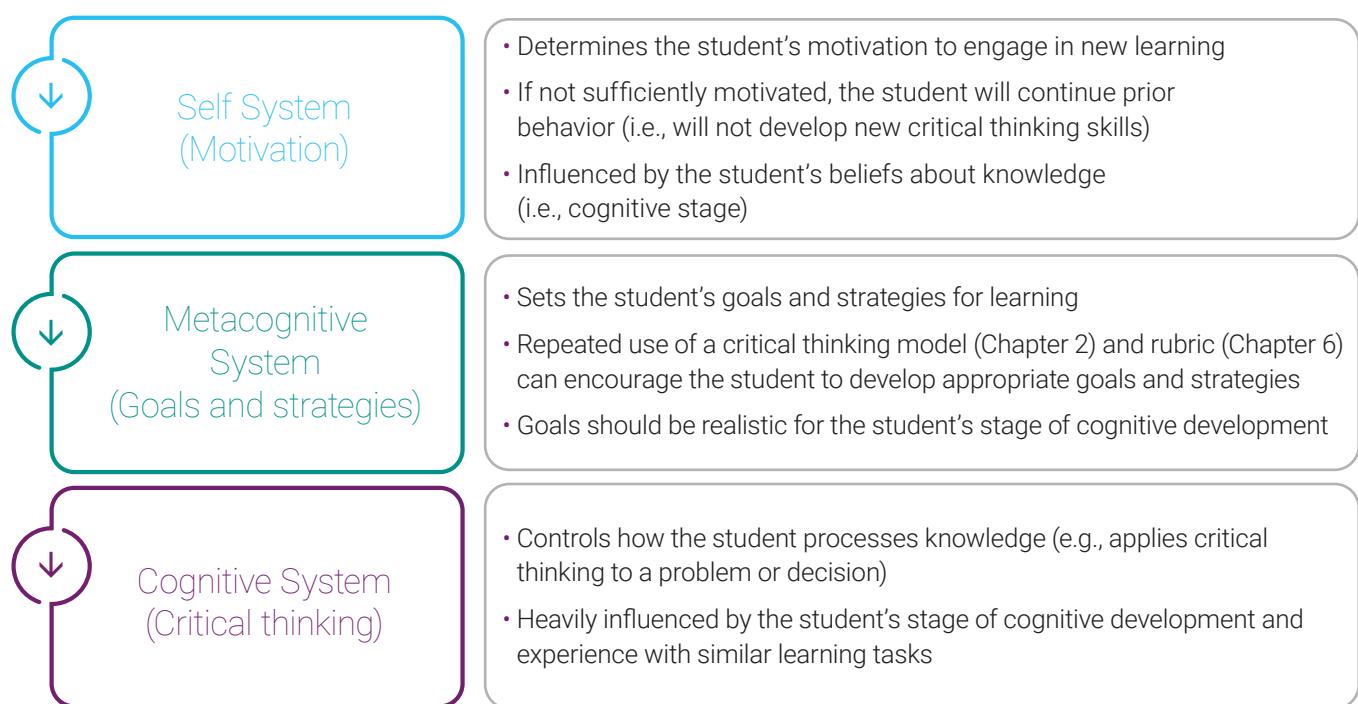
To minimize assessment/grading errors caused by variations in communication skills, consider assessing first a student's written communication skills and then re-read the paper to assess the critical thinking skills.

6.6 Student mindset: Motivation, metacognition and critical thinking

The critical thinking model introduced in Chapter 1 (Figure 2) includes mindset attributes such as continuous improvement, due care, objectivity and skepticism. Although this guide does not directly address these attributes, there is often a major overlap between mindset and student beliefs that hinder progress as discussed in Chapter 2.

The subsections below delve into several aspects of this overlap based on Figure 21, which summarizes key aspects of learning theory.

Figure 21: Self System, Metacognitive System and Cognitive System



Adapted from Figures 1.1, 1.2 and 2.7 in Marzano, R. J., and J. S. Kendall. 2007. *The New Taxonomy of Educational Objectives*. 2nd edition. Thousand Oaks, CA: Corwin Press.

6.6.1 Self system: Motivation for better critical thinking

When faced with a new learning task, students first decide how to respond based on their self-system. Not surprisingly, students must be motivated to engage in the hard work of developing critical thinking skills. However, students' stages of cognitive development can have a major impact on motivation.

Students at Stage 1 (Confused Fact-Finder) do not believe that it is their “job” to formulate their conclusion; they believe that learning involves only finding and demonstrating knowledge (e.g., from a textbook or class notes). They seek single, correct answers. These students must become motivated to form their conclusions — and they are unlikely to be motivated until they become more aware of uncertainties that prevent even experts from being absolutely certain on an accounting issue.

Students at Stage 2 (Biased Jumper) believe that it is sufficient to simply stack up evidence and arguments to support their own opinion. Because they believe this approach is used by everyone (including experts), they are not motivated to spend additional time and effort exploring other viewpoints. It may be necessary to boost their motivation through other means, such as assigning significant grade points to the thoroughness and objectivity of analyses. These students can also be motivated through discussions with other students who hold different viewpoints.

Students at Stage 3 (Perpetual Analyzer) have given up their previous biased way of thinking (Stage 2), and they are puzzled about how to reach a well-founded conclusion without doing so in a biased way. They do not lack motivation, but their motivation is to continue to explore the problem rather than to reach a conclusion. Fortunately, these students are easily motivated to learn a new critical thinking skill — prioritization — that can help them move past their “analysis paralysis.”

6.6.2 Metacognitive system: Goals and strategies for learning

If students are sufficiently motivated to engage in new learning, they establish learning goals and strategies. (Note: Students who have decided not to engage in new learning will simply continue to perform as they have in the past.) Most students have goals and strategies that they have used in the past, but those goals and strategies might or might not be appropriate for developing new critical thinking skills.

As discussed in Chapter 1, faculty can help students develop critical thinking skills by sharing a critical thinking model that they can relate directly to their assignments. A model of critical thinking, especially when used across multiple assignments and embedded in grading criteria, can be a powerful way to communicate expectations to students. This approach can also reduce the concerns of students operating at Stage 2 (Biased Jumper) that their professor grades merely according to personal bias. Greater transparency in the grading system can lead to greater student focus on and trust in the learning process.

A rubric such as the one shown in Figure 20 can also help to communicate intermediate steps of progress to students who are operating at different cognitive stages. Students should be advised to focus on moving one column to the right from their previous performance.

6.7 To-do list for getting started

You might feel overwhelmed at the many recommendations in this guide for helping students develop stronger critical thinking. To provide additional support, the AICPA plans to provide additional resources including sample assignments. Look for future announcements about resources.

If you are new to the development of critical thinking — especially if you are new to considering students’ stages of cognitive development — then you might want to start on a small scale. Pick one critical thinking aspect of your course in which students typically have difficulty, and:

- Gain useful information about students’ critical thinking skills by using the “Quick One-Paragraph Assessment” discussed earlier in this chapter.

- Focus on the “average” student in your course and consider the recommendations from Chapter 3, 4 or 5.
- Modify an existing assignment or create a new assignment that gives students a structure for better performance. (Examples to be posted on the AICPA critical thinking resource [website](#)).
- Give students feedback that focuses primarily on skills in the next-higher cognitive stage. Avoid focusing feedback on skills that are more than one stage beyond a student’s current stage.
- Avoid penalizing students for poor performance on skills above reasonable targets for the course.

6.8 Final thoughts: Can critical thinking be taught/learned? (Or, are we wasting our time?)

Many workplace professionals and faculty members believe that critical thinking skills either occur or do not occur naturally. In other words, there is a common belief that critical thinking cannot be taught.¹² A possible explanation for this common belief is that few accounting professionals or academics have been trained about cognitive development. In addition, people who have critical thinking skills generally do not remember where or how those skills were developed; the skills seem to have occurred “naturally.”

There is considerable evidence that critical thinking skills can and are developed during college. After controlling for various characteristics expected to influence cognitive development, evidence exists that college has a positive effect.¹³ However, based on the evidence reported in Chapter 2 and the call from employers for greater emphasis on critical thinking, accounting faculty and programs are expected to do more.

The recommendations in this guide are based on what we currently know about how critical thinking skills develop.

Start small; try one idea from this Guide. It can be very helpful to engage a colleague to also try the idea so that you can share and discuss your experiences. Then try another new idea.

Over time, you will learn how to help your students think more critically within the context of accounting – enabling them to become more valuable working professionals.

¹² See, for example, Rebele, J. E. and E. K. St. Pierre, 2019, A Commentary on Learning Objectives for Accounting Education Programs: The Importance of Soft Skills and Technical Knowledge, *Journal of Accounting Education* (48, 71-79). However, these ideas are not unique to accounting. See, for example, Raymond-Seniuk, C. and J. Profetto-McGrath, 2011, Can One Learn to Think Critically? – A Philosophical Exploration, *The Open Nursing Journal* (5, 45–51).

¹³ For a recent summary of research, see Chapter Three, Intellectual and Cognitive Development, in Mayhew, et al., 2016. *How College Affects Students Volume 3: 21st Century Evidence that Higher Education Works*. San Francisco: Jossey-Bass.



About the author

Susan K. Wolcott, Ph.D., CPA, CMA, adapted this guide with permission from faculty handbook materials co-developed with Cindy L. Lynch, Ph.D. For more information about their educational materials, visit WolcottLynch.com. For questions or comments about the underlying educational models used in this guide, contact Susan Wolcott at swolcott@WolcottLynch.com.

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