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- Examining the Association between Optimal Hedging Strategy and Cost of Capital: Evidence from Egypt**
Menna Gamal, Magdy Abdel-Kader, and Kholoud Abdelkarim 1-12
- Educating the Next Generation of Accountants: Linking Learning Objectives and Cognitive Ability**
Matthew J. Sargent and Bradley G. Winton 13-30
- Perceived Talent Management and Turnover Intention: Mediating Role of Career Adaptability**
Abdullah Khalfan Alrushadi, Kamisah Supian, and Nor Azah Jahari 31-41
- The Impact of Electric Vehicles on Automotive Aftermarket in 4-Wheeler Car Segment**
Saurav Nandi, A. Seetharaman, K. Maddulety, and Nada Sayarh Lebbar 42-56
- Green Footprint Through the Development of a Sustainability Reporting Concept for Karangpring Village**
Siska Aprilia Oktaviani, Fitriya Andriyani, Oryza Ardhiarisca, Prillinaya Yudhistira, Berlina Yudha Pratiwi, and Dessy Putri Andini 57-73
- Costing Techniques in Supply Chain Cost Management: A Systematic Literature Review**
Bilkis Akhter and Md. Maksudur Rahman Sarker 74-97
- Exploring ESG Corporate Tax Honesty Behind Ownership Structure and Financial Constraints**
Agustina R. Pangaribuan and Dielanova Wynni Yuanita 98-114
- Is Covid-19 the Ideal Period for Boosting the Use of Impression Management in Annual Reports?**
Ruksana Parvin 115-140
- Unveiling the Nexus of Digital Transformation and Change Management: A Pioneering Bibliometric Analysis**
Pallavi Singh, Rinki Joshi, Prachi Pathak, and Vaishali Aswal 141-161
- The Role of Government Internal Supervisory Apparatus and Corruption Control on Regional Independence**
Deswita Martinez, Rudy Usman, and Latifah Sukmawati Yuniar 162-175

Educating the Next Generation of Accountants: Linking Learning Objectives and Cognitive Ability

Matthew J. Sargent*
Bradley G. Winton†

Abstract

Accounting students have historically had their cognitive ability examined through the lens of Bloom's taxonomy. However, does a relationship exist between Bloom's continuum of categories of cognitive processes and a student's cognitive ability? This study aims to answer this question by investigating whether Bloom's taxonomy aligns with an accounting student's measured level of cognitive ability. The analytical focus of this study is to extract qualitative information from accounting students' critical thinking exercises. This information provides the basis for analyzing whether textual evidence from accounting students based on Bloom's taxonomy significantly relates to an assessment of cognitive ability. The implications of this research are both theoretical and practical in nature. From a theoretical perspective, this study provides evidence of the overlap between Bloom's taxonomy and measurements of critical thinking and reflective judgment. In this understanding, accounting educators can refine their use of Bloom's taxonomy when educating the next generation of accounting students. By analyzing each category and its relationship to cognitive ability, accounting educators can more effectively apply each level of Bloom's framework to enhance critical thinking while also focusing on areas where there appears to be minimal overlap to maximize the development of cognitive abilities in students.

Keywords: cognitive ability, critical thinking, reflective judgment, Bloom's taxonomy, accounting education, business education.

I. INTRODUCTION

Strong cognitive abilities are crucial to the success of business graduates, including accounting students, and are highly valued by accounting firms (Bui & Porter, 2010; Butler et al., 2019; and Rossouw & Steenkamp, 2025). Strengthening the cognitive abilities of students should be a primary goal of higher education, as it enhances students' problem-solving abilities and is a crucial component of the learning process (Hart et al., 2021; Soldevilla et al., 2025; Soufi & See, 2019; and Stupple et al., 2017). From an educational perspective, instructors must continually strengthen students' cognitive abilities as they prepare them for the demands of the job market (Ayçiçek, 2021). We can no longer define job readiness solely by allowing students to recite technical accounting knowledge (Sinnewe et al., 2023). Terblanche and De Clercq (2021) noted that cognitive ability is a critical skill in the modern workforce and an important commodity in the accounting profession. If accounting educators strongly emphasize building cognitive

* School of accountancy, College of Business and Economic Development, The University of Southern Mississippi, 118 College Drive #5178, Hattiesburg, Mississippi 39406, USA. E-mail: matthew.sargent@usm.edu.

† School of leadership, College of Business and Economic Development, The University of Southern Mississippi, 730 E. Beach Blvd., Long Beach, MS 39560, USA, E-mail: bradley.winton@usm.edu.

abilities, accounting students can successfully enter the workforce and perform their jobs at higher levels (Sackett et al., 2024).

University students are more likely to build stronger cognitive abilities than those without higher education experience (Mayhew et al., 2016). Thus, educators must be responsible for designing exercises that build and strengthen cognitive abilities such as critical thinking and reflective judgment (Meyer et al., 2024; Sargent & Winton, 2023; and Wolcott & Sargent, 2021). When accountants possess stronger cognitive abilities, they can more effectively evaluate the complexity of a situation, apply their professional judgment, and combine their technical accounting knowledge with problem-solving skills to solve business problems (Bucaro, 2019; Wolcott & Sargent, 2021). When educators understand the areas where students require extra support and the most effective ways to foster the continued development of those skills, they can help their students achieve higher levels of reflective judgment (Sargent & Winton, 2023).

Higher education should actively support the development of critical thinking skills, and that development should be included within an educator's learning objectives (Pascarella & Terenzini, 1991; 2005). Cognitive abilities development within higher education can be categorized into two outcome areas: a) knowledge application and b) reflective judgment (Carini et al., 2006; Kuh et al., 2006). Within knowledge application, accounting educators focus on helping students learn the core technical knowledge of accounting subjects. Prior research suggests that students can develop their critical thinking skills more effectively as they become immersed in the course's technical knowledge (Abrami et al., 2015; Rebele & Pierre, 2019). When students learn to apply this technical knowledge, they become better critical thinkers, which enables them to transition into reflective thinking and judgment. Research has shown that critical thinking is significantly correlated with reflective judgment, and students who score high on dispositions to critical thinking can significantly increase their reflective judgment abilities over time (Dwyer et al., 2015). One of the tasks of educators is to implement support structures, or frameworks, to help support the development of their students. One of the most used frameworks for developing a student's cognitive abilities is Bloom's taxonomy.

Bloom's taxonomy of Educational Objectives focuses on developing thinking abilities that encompass simple information acquisition to complex processes (Adams, 2015; Bloom et al., 1956). Benjamin Bloom and others finalized the work in 1956, proposing a classification system for knowledge mastery that students could achieve. The taxonomy serves as a framework to facilitate communication between college educators and align design objectives with the continued intellectual development of students (Bloom et al., 1956). Bloom's observation was motivated by the notion that many exam questions require only memorization. Because this only requires students to regurgitate what they have memorized, those questions do not accurately assess whether they have mastered a concept (Starr et al., 2008). Bloom's original taxonomy was reassessed and updated by some of Benjamin Bloom's former students and colleagues and released in 2001 (Anderson et al., 2001).

Both the original and revised versions of Bloom's taxonomy have their criticisms. A research study examining the validity of the Taxonomy revealed only two categories, not six, and suggested that no relationship existed between the original six categories (Miller et al., 1979). Others argue that the Taxonomy is too neutral to be effective, and it is used without its value being questioned by educators (Paul, 1993). Additionally, it may not be an appropriate tool for observing changes in knowledge and skills (Stringer et al., 2021). It may also be challenging to apply Bloom's taxonomy in a manner that stimulates critical thinking skills (Zaidi et al., 2018). Case (2013) cited perceived flaws with the

Taxonomy, including its potential to lower expectations about a student's critical thinking ability. Despite its critics, Bloom's taxonomy is widely regarded as a fundamental means of engaging students in cognitive development, enabling more effective assessment of what students have learned (Alshurafat et al., 2024; Chandio et al., 2021; Hawk, 2024; Karanja & Malone, 2021; Starr et al., 2008; and Sudirtha et al., 2022).

However, the viability of Bloom's taxonomy is not debated in this research. The research question centers on whether a relationship exists between Bloom's continuum of categories of cognitive processes and a student's measured cognitive ability. The study attempts to answer this question by comparing Bloom's taxonomy at different cognitive levels that are aligned with an accounting student's cognitive ability. The evidence from this research provides a basis for whether a student's use of textual Bloom's indicators significantly relates to an assessment of cognitive ability. The implications of this research are both theoretical and practical. Theoretically, this investigation of the relationship provides evidence of the overlap between Bloom's taxonomy and measurements of critical thinking/reflective judgment. Translating this theoretical extension into practical application, this understanding enables accounting educators to refine their approaches to utilizing Bloom's taxonomy in the classroom. By analyzing each category and its relationship to cognitive ability, accounting educators can more effectively apply the various levels of Bloom's framework to develop critical thinking.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Blooms Taxonomy

The common framework for developing critical thinking skills and the most referenced model within accounting education is Bloom's taxonomy (Sinnewe et al., 2023; Wolcott & Sargent, 2021). Bloom's taxonomy helps outline learning levels and can be used to develop course learning objectives while being flexible enough to accommodate students' different stages of learning (Juve & Zisblatt, 2024). Business schools have utilized Bloom's taxonomy to help accounting students develop stronger critical thinking skills through exercises that align with the taxonomy (Debreceeny & Farewell, 2010; Dickins & Reid, 2022).

The original Bloom's taxonomy has six cognitive learning objective levels (Bloom et al., 1956). The first objective is knowledge, a foundational skill that enables the retention and recall of specific facts by recognizing ideas (Bloom et al., 1956). Next is comprehension, where students demonstrate their understanding by explaining information in their own words, either verbally or in writing (Bloom et al., 1956). The third is application, where students demonstrate their ability to apply the knowledge, skills, or techniques learned in new situations (Bloom et al., 1956). Fourth is analysis; students can distinguish the elements within generalizations or principles, the relationships between these elements, and how those principles are organized (Bloom et al., 1956). The fifth level is synthesis, which involves new knowledge structures where students can recombine parts of previous experiences into a new construct, such as an operational plan for use by management. The final level of Bloom's taxonomy, evaluation, allows students to assess the value of knowledge which involves conscious and thoughtful decision-making (Bloom et al., 1956).

In the late 1990s, a group of researchers led by Lorin Anderson, a former student of Bloom, set out to update Bloom's taxonomy, now known as the Taxonomy for Learning, Teaching, and Assessing (Anderson et al., 2001). The group had two main goals: focusing educators on the value of the original framework while integrating updated knowledge and findings into a revised framework (Anderson et al., 2010). Their

revision resulted in structural changes to the framework, and the dimension names were revised from a noun-based approach to a verb-based one. The updated taxonomy is two-dimensional, with a knowledge dimension that contains a) factual knowledge, b) conceptual knowledge, c) procedural knowledge, and d) meta-cognitive knowledge. The other dimension is the cognitive process dimension (Krathwohl, 2002). The cognitive process dimension categories are as follows (old term in parentheses): a) remember (knowledge), b) understand (comprehension), c) apply (application), d) analyze (analysis), e) evaluate (evaluation), and f) create (synthesis) (Anderson et al., 2001; Bloom et al., 1956). The cognitive skill associated with the dimension categories is thought to increase in complexity as cognitive development progresses to higher stages, as illustrated in Figure 2.1.

The descriptions of critical thinking for each verb become increasingly complex as cognitive development progresses to higher stages. Faculty can provide their students with more appropriate critical thinking assignments if they pay less attention to individual verbs and more attention to the student's current stage and the next higher stage. For example, Anderson et al. (2001, p. 68) provide an example of analyze: "distinguishing relevant from irrelevant parts or important from unimportant parts of the presented material." With this in mind, we ask, how would students at different cognitive stages respond to an assignment with this requirement? Moreover, what would that response show about a student's reflective judgment?

Figure 2.1

Cognitive Skills within the Revised Bloom's Taxonomy

Lower Level Cognitive Skills			Higher Level Cognitive Skills		
Remember	Understand	Apply	Analyze	Evaluate	Create
Recall specific facts	Grasp meaning of materials	Use information in a new situation	Identify schemas or relationships	Use information to make judgment	Create or develop something new

2.2. Reflective Judgment

Reflective judgment is grounded in cognitive development and builds upon Kurt Fischer's skill theory (1980), which charts the development of a person's reflective thinking as it progresses toward attaining reflective judgment (Kitchener et al., 2006). Reflective Judgment focuses on the use of epistemic cognition, which involves underlying assumptions about knowledge, and a person assigns a truth value to various solutions based on whether they believe a solution is true or false (King & Kitchener, 1994; Kitchener et al., 2006). This occurs when individuals use their knowledge and previous experiences to review and explore situations, thereby clarifying potential outcomes more effectively (King & Kitchener, 2012; Kitchener et al., 2006). Reflective judgment is a higher-order reasoning process that occurs when an individual understands that a problem has multiple possible solutions. To understand a problem, an individual must gather sufficient evidence and work through possible solutions (Bourner, 2003; Milner & Wolfer, 2021; and Pascarella, 1999).

The reflective judgment model outlines how individuals develop their reasoning ability, beginning in their youth and continuing to mature as they become adults (Kitchener et al., 2006). The early stages of epistemological development are earlier in life. It is not until adulthood that we begin to understand the epistemic nature of problems and how to use reflective judgment to help solve various dilemmas (Kitchener et al., 2006). There are several stages within the reflective judgment model, and within

each stage of development are related sets of epistemological assumptions. Those stages are broken down into three distinct areas of development, referred to as pre-reflective (stages 1-3), quasi-reflective (stages 4 and 5), and reflective thinking (stages 6 and 7) (King & Kitchener, 1994).

Multiple research studies have assessed the reflective judgment model, which has been utilized by various individuals concerned with college outcome assessments (Fischer & Pruyne, 2003). Multiple studies support the validity of the reflective judgment model, which has been applied within the cognitive development process across various settings, including higher education (Sargent & Borthick, 2013; Wlodarsky & Walters, 2010; Wolcott, 2000; Wolcott, 2005; and Zhou & Tan, 2020). Educators should help students progress through stages of reflective judgment as they work within the higher education environment, and stages 3-7 correspond to the stages of adult development (Kitchener & King, 1981; Wolcott & Sargent, 2021). Based on the use of Bloom's taxonomy as a framework for the development of cognitive abilities of students, which includes critical thinking and reflective judgment, there is a need to determine if Bloom's taxonomy of assessing learning at different cognitive levels aligns with an accounting student's measured cognitive ability through a reflective judgment assessment.

2.3. Hypotheses Development

To effectively help students develop their cognitive abilities, Bloom's taxonomy should be paired with cognitive development models, such as reflective judgment (Wolcott & Sargent, 2021). As individuals strengthen their cognitive abilities, they can better assess complex situations, a requirement for accountants (Sargent & Winton, 2023). There have been numerous studies that have assessed the relationship between verbs attributed to each category of Bloom's taxonomy and assignment grades or the relationship between Bloom's and courses within a program (Agarwal, 2019; Aspy & Roebuck, 1972; Bhargav et al., 2016; Bolin et al., 2005; Crowe et al., 2008; Frank & Walsh, 2023; Oliver & Dobebe, 2007; and Stanny, 2016). However, despite the widespread usage of Bloom's taxonomy and the recognition of the reflective judgment model, little to no research has gathered empirical data on the alignment between the categories within the cognitive process dimension of Bloom's taxonomy and cognitive ability.

In the revised taxonomy of educational objectives, the six categories are thought to differ in complexity. If the space between the dimensions of apply and analyze is set as a center point, the cognitive process dimension could be seen as a hierarchy, forming a scale that ranges from simple to complex (Krathwohl, 2002). Since all six categories are within the cognitive process dimension, it is reasonable to believe the six categories, especially the more complex categories of analyze, evaluate, and create, would align with a measurable cognitive ability assessment.

The first category, "remember," involves retrieving relevant knowledge from long-term memory, including our ability to recognize facts or recall information (Krathwohl, 2002). This aligns with stage 1 of prereflective thinking, where knowledge is obtained by direct observation, and no justification of an answer is necessary (King & Kitchener, 2002).

H₁: there is a significant correlation between a student's use of verbs identified for Bloom's category of "remember" within critical thinking assignments and their lectical reflective judgement assessment (LRJA) score.

The second category, "understand," helps us to determine the meaning of messages given during instruction, which includes our ability to interpret, classify, summarize, infer, or explain information (Krathworl, 2002). This aligns with stage 2 of

prereflective thinking, where knowledge is not immediately available, and beliefs can be justified by correspondence with a teacher (King & Kitchener, 2002).

H₂: there is a significant correlation between a student's use of verbs identified for Bloom's category of "understand" within critical thinking assignments and their lectical reflective judgement assessment (LRJA) score.

The third category, "apply," enables us to carry out or perform tasks within an applicable situation, allowing us to execute a familiar exercise or implement a solution when the task involves an unfamiliar problem. When a task is unfamiliar, students need to determine which knowledge to apply, which may require acquiring conceptual knowledge from a teacher (Anderson et al., 2001; Krathwohl, 2002). This aligns with stage 3 of prereflective thinking, where knowledge can be certain (familiar) or uncertain (unfamiliar); when uncertain, knowledge is not certain until it is obtained from authorities (King & Kitchener, 2002).

H₃: there is a significant correlation between a student's use of verbs identified for Bloom's category of "apply" within critical thinking assignments and their lectical reflective judgement assessment (LRJA) score.

The fourth category, "analyze," is used to break down information into parts, allowing us to detect how those parts relate to each other and align with an overall structure, which includes our ability to differentiate, organize, and attribute pieces of information (Krathwohl, 2002). This aligns with stage 4 of quasi-reflective thinking, where situational variables can influence knowledge, and beliefs must be justified by providing reasons (King & Kitchener, 2002).

H₄: there is a significant correlation between a student's use of verbs identified for Bloom's category of "analyze" within critical thinking assignments and their lectical reflective judgement assessment (LRJA) score.

The fifth category, "evaluate," helps us to make judgments on situations or dilemmas based on certain criteria or standards, which includes our ability to check and critique information (Krathwohl, 2002). This aligns with stage 5 of quasireflective thinking, where knowledge is filtered through criteria for judgment, and beliefs can be balanced against other interpretations of evidence (King & Kitchener, 2002).

H₅: there is a significant correlation between a student's use of verbs identified for Bloom's category of "evaluate" within critical thinking assignments and their lectical reflective judgement assessment (LRJA) score.

The final category, "create," enables us to put elements together and form an original product, which includes our ability to generate, plan, or produce information (Krathwohl, 2002). This aligns with stage 6 of reflective thinking, where knowledge is based on evaluations across contexts, and solutions are constructed based on evidence and the need for action (King & Kitchener, 2002).

H₆: there is a significant correlation between a student's use of verbs identified for Bloom's category of "create" within critical thinking assignments and their lectical reflective judgement assessment (LRJA) score.

III. RESEARCH METHODOLOGY

3.1. Sample

The population consisted of students enrolled in accounting classes at a major university. Accounting students may be enrolled in various accounting courses that cover different subjects within accounting and general business topics. For this study, the sample consisted of 53 part-time students enrolled in two undergraduate accounting courses at a large university in the southwestern United States, who were 18 years of age

or older. While differences exist between the subject matter taught in these two courses, they share a common focus on increasing the student's use of critical thinking. This instruction occurs within a series of data analytics assignments and explores critical thinking conceptions in class material.

Of particular importance for this study is the shared use of data analytics assignments that require students to understand both the content and the structural form. These assignments allowed for the simultaneous assessment of these two interdependent subsets of critical thinking skills. Students engaged in critical thinking by investigating, linking, and integrating unrelated facts and employing tools to extract actionable insights from the data. These assignments form one arm of the data collection methodology outlined below.

The characteristics of the study sample included an almost even gender percentage (50.9% female) and students aged predominantly within a typical college-age distribution (73.6% under 25 years old). The majority of the remaining students were only slightly older (20.8% 25-34 years old). This sample of students can also be identified by distinct qualities such as its higher percentage of transfer students (64.2%), higher percentage of full or part-time working students (67.9%), and a significant amount of junior/senior level students (96.2%). Most students were accounting majors (86.8%), with the remaining students representing other business majors. A large proportion of these students held GPAs greater than 3.0 (77.3%). Commentary on the generalizability of this sample's demographic profile are presented below.

3.2. Data Collection and Measures

This study uses data gathered in two specific modalities. First, a collection of data for cognitive ability was performed by students completing the lectical reflective judgement assessment (LRJA). The LRJA measures cognitive and metacognitive skills through an online writing assessment. Those skills are recommended by researchers contributing to the Delphi report—a consensus report on critical thinking for educational assessment and instruction purposes (Facione, 1990). Furthermore, the assessment measures the student's level of hierarchical cognitive complexity relative to cognitive development and ability (Fischer, 1980). Measurements are scored and then aligned with calibrated rubrics on the Lectical Scale, which has 14 levels ranging from 0 (equivalent to that of a newborn) to 13 (equivalent to that of Einstein). Researchers argue that this system of critical thinking measurement has advantages over other measures of cognitive ability in its ability to separate the structure from the base content of performance while also evaluating the performance on the assessment (Dawson-Tunik, 2004; Sargent & Winton, 2023). The concepts of cognitive development measured in the LRJA are related to other traditional frameworks for critical thinking. Specifically, the association of the LRJA with Bloom's taxonomy leads to the second modality of data collection.

The revised Taxonomy encompasses concepts such as analyze, evaluate, and create, which potentially overlap with higher-order critical thinking and reflective judgment abilities assessed by the LRJA. Accounting studies look for evidence of these concepts and the remaining levels of thinking by examining verbs (Wolcott & Sargent, 2021). This study employs a similar methodology by gathering data through the examination of content from critical thinking assignments. Content analysis of student assignments has been widely used in non-accounting disciplines for over eighty years (Krippendorff, 2019) and also within the accounting realm for a substantial period of time (Orme, 2008). Previous research has set a precedent for using content analysis in

assessing critical thinking (Hart et al., 2021), with particular attention paid to accounting for content analysis of critical thinking based on Bloom's taxonomy (Irafahmi et al., 2018).

3.3. Content and Hypotheses Analysis

Using a dictionary of verbs identified for the levels of Bloom's taxonomy (Stanny, 2016; see Appendix A), content analysis began by unitizing. A systematic method of examining student critical thinking assignments was employed to distinguish the segments of the text of interest for analysis (Krippendorff, 2019). Working with a syntactic unit of a word (Murphy et al., 2006), a coding process began by performing a word-by-word analysis of the student assignments using a pre-defined methodology of verb identification based on the dictionary. This pre-defined decision scheme focused on the recognition of specific verbs and any variation of these verbs (i.e., tenses) (Krippendorff, 2019). A mixed-method coding practice was utilized to allow for resource allocation (e.g., split coding) and reliability (e.g., consensus coding). Frequency counts were performed for both total words and verbs for each Bloom's taxonomy category via a computer-assisted hand-coding procedure. As a final step to allow for equivalent comparison, these counts were transformed into relative frequency by dividing the frequency by the total number of words in the analysis.

Hypotheses were tested through linear regression techniques in SPSS statistical software. This straightforward analysis focused on the model's limited complexity and sample size considerations. To the end of the sample size, a priori analysis using the G*Power software program (Faul et al., 2007) determined a valid minimum sample size of 26 participants. The sample size calculation is based on an estimated minimum effect size of 0.33, as determined by previous meta-analyses examining learner and teaching factors related to critical thinking abilities (Mahapoonyanont, 2010).

As a special note on analysis before reporting results, the theoretical underpinnings of Bloom's taxonomy do not envision each cognitive level as fully distinct and distinguishable constructs (Anderson et al., 2001; Bloom et al., 1956). Instead, Bloom's taxonomy provides a framework that builds upon itself, with overlapping cognitive functions. To provide clear evidence supporting the use of the simple linear regression methodology employed herein, a multiple regression analysis was first conducted. This multiple regression analysis, in concert with and in comparison to linear regression analysis, highlighted the overlapping nature of the cognitive levels, exhibiting differences in significance of the relationships between reflective judgment and Bloom's taxonomy levels (i.e., p-value variation). The result of this initial investigation was a confirmation of the theoretical and, therefore, methodological nuance necessary to analyze the relationships hypothesized.

IV. RESULTS AND DISCUSSION

4.1. Results

Summarizing the linear regression analysis, the results show limited support for the hypotheses posited here-in. The direct effect model coefficients (Table 4.2) for the antecedent Bloom taxonomy levels show non-significant correlations with reflective judgment scores for remember ($F(1,52) = 288.1, p = .496$), apply ($F(1,52) = 1020.1, p = .694$), analyze ($F(1,52) = 482.7, p = .084$), evaluate ($F(1,52) = 181.0, p = .677$), and create ($F(1,52) = -347.3, p = .150$) levels. Therefore, these results do not support Hypotheses 1, 3, 4, 5, and 6. The analysis did support hypothesis 2, finding that the "understand" level

of Bloom's taxonomy level significantly correlated with reflective judgment scores, $F(1,52) = 1020.1$, $p < .05$.

Table 4.1**Descriptive Statistics of All Variables**

	1	2	3	4	5	6	7	M	SD
1. REFJUD	1.000							1076.038	21.418
2. KN	.096	1.000						.01017	.00711
3. UN	.347*	.316*	1.000					.00983	.00729
4. AP	-.055	.044	-.065	1.000				.01367	.01056
5. AN	.0240	.406**	.432**	.132	1.000			.01482	.01064
6. EV	.058	.178	.410**	.300*	.291*	1.000		.00843	.00692
7. CR	-.200	-.021	-.055	.397**	.135	.496**	1.000	.01492	.01235

Notes: N= 53. ** correlation is significant at $p < .01$, * correlation is significant at $p < .05$, REFJUD= reflective judgement, KN= knowledge, UN= understand, AP= apply, AN= analyze, EV= evaluate, CR= create, M= mean, and SD= standard deviation.

Table 4.2**Direct Effect Model Coefficients**

Antecedent	Lectical Score				
	Coeff.	SE	p	LLCI	ULCI
Knowledge	288.1	420.0	.496	-555.1	1131.4
	$R^2 = .009$, $F(1,52) = .471$				
Understanding	1020.1	385.7	.011	245.6	1794.5
	$R^2 = .121$, $F(1,52) = 6.993$				
Apply	-112.2	283.5	.694	-681.3	457.0
	$R^2 = .003$, $F(1,52) = 1.57$				
Analyze	482.7	273.7	.084	-66.7	1032.1
	$R^2 = .057$, $F(1,52) = 3.111$				
Evaluate	181.0	432.5	.677	-687.3	1049.2
	$R^2 = .003$, $F(1,52) = .175$				
Create	-347.3	237.9	.150	-825.0	130.3
	$R^2 = .040$, $F(1,52) = 2.131$				

Notes: SE= standard error, LLCI= lower level of confidence interval, and ULCI= upper level of confidence interval.

4.2. Discussion

The results of this study help provide a better understanding of whether textual evidence from accounting students based on Bloom's taxonomy significantly relates to an assessment of cognitive ability. This study contributes to addressing the call for more research on these relationships within the field of accounting (Wolcott & Sargent, 2021). There is a need for a deeper understanding of the relationship between classroom efforts, including the application of Bloom's taxonomy, and the development of cognitive abilities such as critical thinking and reflective judgment. This work is crucial to the fields of accounting and higher education, as leading bodies in industry, academia, and accreditation demand the evolution of efforts to enhance the cognitive abilities of accounting students.

This study provides evidence of limited overlap between categories within the cognitive process dimension of Bloom's taxonomy and measurements of critical thinking and reflective judgment. With this understanding, accounting educators should refine their use of Bloom's taxonomy when educating accounting students. As educators create course learning objectives and assignment outcomes by analyzing each category and its relationship to cognitive ability, they can more effectively apply each level of Bloom's

framework to maximize the development of cognitive abilities in students. Accounting educators should focus on providing a relevant learning environment for their students, teaching them technical content while also developing higher-order cognitive skills (Hawk, 2024).

Accounting education regulators concur and underscore the seriousness of the apparent disconnection between Bloom's taxonomy and the cognitive abilities of accounting students. The American institute of certified public accountants (AICPA) and the American accounting association (AAA) established the pathways commission on accounting higher education to explore improved pathways for higher education, intending to increase the number of students entering the accounting profession. In 2012, the pathways commission released a strategy for educating the next generation of accountants (Pathways Commission, 2012). The commission stated that academic accounting programs must quickly develop incentives and partnerships as part of their strategy. Those programs must also develop processes identifying current accounting and business information technologies (IT) and integrating emerging technology components throughout their curricula (Pathways Commission, 2012).

One action item in the commission report outlined the connection between accounting curriculum models and Bloom's taxonomy (Pathways Commission, 2013). The ongoing impact of the pathways commission's work is evident in numerous guidelines issued by the AICPA, including its foundational competencies framework for aspiring CPAs and CPA evolution: new CPA licensure model (AICPA, 2021; 2022). In addition, the Association to Advance Collegiate Schools of Business (AACSB), the largest global standard-setting organization for business schools and accounting programs, requires that as part of its accreditation for accounting programs, programs address classroom content related to critical thinking skills (AACSB, 2025).

V. CONCLUSION

5.1. Implications

When combining the pathway commission report with the requirements from accrediting agencies, the results of this research highlight the potential complications of applying a hierarchical approach to Bloom's taxonomy solely to enhance critical thinking objectives in the accounting curriculum. Only one of Bloom's categories, "understand," significantly correlated to measured cognitive ability. The findings validate some of the criticisms of Bloom's taxonomy, and, unfortunately, a dialogue about these criticisms is rarely had among educators (Wilson, 2016). The lack of connection between the six taxonomy categories has been noted since the late 1970s (Miller et al., 1979). The accounting students in this study highlight this idea, with those students with the highest reflective judgment scores not using a large volume of verbs within the "higher order" categories of Bloom's taxonomy. As Stringer et al. (2021) note, Bloom's taxonomy may not be an appropriate tool for observing changes in knowledge and skills.

There are real implications with this line of thought for the future of accounting education while meeting the expectations of accounting education regulators. The researchers who contributed to the original and updated versions of Bloom's taxonomy did not believe that the categories created a hierarchy (Anderson et al., 2001; Krathwohl, 2002). For example, the authors of the original handbook wrote that evaluation is:

"Not necessarily the last step in thinking or problem-solving. It is quite possible that the evaluative process will in some cases be the prelude to the acquisition of new knowledge, a new attempt at comprehension or application, or a new analysis and synthesis" (Blooms et al., 1956, p.185).

Within the revised taxonomy, a description of the analyze category notes that “Although learning to Analyze may be viewed as an end in itself, it is probably more defensible educationally to consider analysis as an extension of understanding or as a prelude to evaluating or creating” (Anderson et al., 2001, p. 79).

This author’s commentary has an important connection to this study’s findings. The findings reveal a significant correlation between a student’s reflective judgment assessment score and Bloom’s taxonomy category of “understanding.” It could be hypothesized that students’ apparent strength in interpreting information (i.e., “understanding”) allowed them to adequately distinguish relevant and important parts of the assignment (i.e., “analyze”). However, the written output manifested itself more heavily in verbs aligned with understanding, which also refers to our ability to summarize or explain information (Krathwohl, 2002).

5.2. Application of Implications

Educators should focus on utilizing Bloom’s taxonomy categories to examine curriculum alignment and improve the delivery of instruction to students (Krathwohl, 2002). For example, an accounting educator could create an assignment that asks students to recall a key concept they learned in the principles of accounting course. That objective aligns with Bloom’s category of “remember”. The student could then be asked to explain it in greater detail, with that objective aligned with Bloom’s category of “understand.” Finally, the students could be asked to write about it and then form groups to critique the writing (i.e., “evaluate”). While this may appear out of order from a hierarchical perspective, the alignment of objectives to categories within the cognitive process dimension aligns more closely with the original intent of the researchers who outlined the taxonomy. Additionally, educators must be cautious, as students may be confused by differences in expectations from professors across various disciplines. To address this, educators should utilize resources such as the AICPA competency frameworks to provide students with specific verb descriptions related to accounting.

One of the primary objectives for educators is to help students progress through cognitive development stages, and Bloom’s taxonomy can be leveraged to design activities that foster these skills. For example, in Bloom’s category of “apply,” within one stage of development, students need to carry out well-defined procedures using relevant information in a familiar setting. To move to the next stage, we need students to consistently recognize and distinguish between relevant and irrelevant information in uncertain settings. Accounting educators can help this progress by having students practice working on accounting judgments with several options or assessing situations with multiple stakeholders, and any decisions have multiple factors (Wolcott, 2020). Ultimately, accounting educators should utilize Bloom’s taxonomy to ensure curriculum alignment while employing a targeted cognitive development model, such as reflective judgment, to design and implement more effective student learning activities (Wolcott & Sargent, 2021).

5.3. Limitations and Future Research

The primary limitation of this research is related to the complex nature of higher education. Numerous variables within the educational context influence how students develop their cognitive abilities. This research aims to examine a subset of these variables and clarify their impact, but does not attempt to extend its analysis beyond certain demographic and educational background variables. Future research would benefit from the continued exploration of the complex subject of cognitive development by examining

the effects and interactions among variables related to students' experiences, learning modality, financial circumstances, cultural affiliation, and other factors.

Additionally, despite the positive attributes of the LRJA, confounding poses risks to internal validity. In this study, confounding factors could mask a true difference or create an apparent difference when no association exists. Additionally, numerous financial, political, and technological factors may influence how participants perceive the dilemmas presented within the LRJA and their responses to those dilemmas. The results of the LRJA, which is used to measure a respondent's cognitive ability, could be influenced by these factors, and this study will not be able to capture the impact of these factors on the environment. Researchers should focus on controlling for known confounding variables when examining cognitive ability. Future studies of this complex topic would benefit from shifting their focus to a qualitative investigation of Bloom's taxonomy and cognitive ability, aiming to better understand which confounding variables are most significant. Furthermore, this qualitative investigation could further explore the relationship between the taxonomy and critical thinking by examining verbal interactions with accounting content rather than written interactions.

Finally, the single-university nature of the dataset limits the generalizability of these findings. While the study sample's demographic information was compared with that of post-secondary students in the United States to assess the generalizability of the findings, some characteristics of the sample do not align with those of the broader population. With this in mind, caution should be taken when attempting to generalize the results of this study. Future studies could enhance the generalizability of their cognitive ability studies by employing a multi-university study that includes a varied group of institutions based on enrollment, geography, mission, and diversity.

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Appendix A
Sample of 176 Unique Words Identified for a Level of Bloom's Taxonomy by 4 or More Lists in a Sample of 30 Published Lists
(*f* = number of lists that nominate the word for a level of Bloom's taxonomy)

	<i>f</i>	Understand	<i>f</i>	Apply	<i>f</i>	Analyze	<i>f</i>	Evaluate	<i>f</i>	Create	<i>f</i>
arrange	6	articulate	4	act	19	analyze	24	appraise	22	arrange	22
choose	4	associate	4	adapt	4	analyze	11	argue	12	assemble	14
cite	17	characterize	4	apply	22	break	8	arrange	5	categorize	7
copy	4	cite	5	back/back up	5	break down	7	assess	17	choose	7
define	21	clarify	5	calculate	10	calculate	9	attach	4	collect	9
describe	14	classify	18	change	9	categorize	19	choose	10	combine	14
draw	5	compare	11	choose	11	classify	10	compare	18	compile	7
duplicate	7	contrast	7	classify	6	compare	24	conclude	13	compose	19
identify	20	convert	13	complete	5	conclude	6	contrast	8	construct	29
indicate	4	defend	12	compute	10	contrast	19	core	6	create	19
label	21	demonstrate	6	construct	13	correlate	5	counsel	4	design	24
list	27	describe	22	demonstrate	20	criticize	11	create	4	develop	18
locate	10	differentiate	8	develop	4	criticize	11	create	11	devise	13
match	14	discuss	21	discover	8	deduce	6	critique	14	estimate	5
memorize	10	distinguish	12	dramatize	16	detect	7	decide	4	evaluate	4
name	22	estimate	11	employ	16	diagnose	4	defend	15	explain	8
order	5	explain	28	experiment	6	diagram	12	describe	4	facilitate	4
outline	11	express	17	explain	5	differentiate	20	design	4	formulate	18
quote	7	extend	11	generalize	5	discover	4	determine	6	generalize	7
read	4	extrapolate	5	identify	4	discriminate	11	discriminate	9	generate	11
recall	24	generalize	11	illustrate	18	dissect	6	estimate	15	hypothesize	8
recite	12	give	4	implement	4	distinguish	21	evaluate	16	improve	5
recognize	14	give examples	8	interpret	15	divide	12	explain	9	integrate	4
record	13	identify	14	interview	6	evaluate	4	grade	4	invent	10
relate	11	illustrate	9	manipulate	10	examine	18	invent	8	make	6
repeat	20	indicate	8	modify	12	experiment	9	judge	25	manage	8
reproduce	11	infer	15	operate	17	figure	4	manage	15	modify	10
review	4	interpolate	5	organize	4	group	4	mediate	9	organize	21
select	16	interpret	17	paint	4	identify	7	prepare	12	originate	9
state	23	locate	10	practice	15	illustrate	8	probe	4	plan	21
tabulate	4	match	7	predict	9	infer	14	rate	5	predict	8
tell	4	observe	5	prepare	11	inspect	8	rearrange	19	prepare	12
underline	7	organize	5	produce	13	inventory	9	reconcile	12	produce	13
write	5	paraphrase	22	relate	12	investigate	7	release	6	propose	9
		predict	12	schedule	11	order	5	rewrite	4	rate	21
		recognize	11	select	4	organize	6	select	5	rearrange	8
		relate	7	show	13	outline	10	set up	15	reconstruct	9
		report	10	simulate	5	point out	12	supervise	9	relate	8
		represent	4	sketch	17	predict	4	synthesize	16	reorganize	9
		restate	15	solve	19	prioritize	4	test	8	revise	12
		review	15	translate	5	question	12	value	7	rewrite	7
		rewrite	12	use	25	relate	17	verify	9	role-play	4
		select	7	utilize	4	select	12	weigh	5	set up	9
		summarize	20	write	5	separate	10	weight	5	specify	9
		tell	7			solve	8			summarize	7
		translate	21			subdivide	10			synthesize	4
						survey	7			tell/tell why	5
						test	14			write	17