

SOBIE 2024 Proceedings



**Society of
Business, Industry, and Economics**

24th Annual Academic Conference

**Sandestin Golf and Beach Resort
April 10-12, 2024
Destin, Florida**

SOBIE 2024



Registration – Bayview Foyer

April 10	April 11	April 12
7:00 – 11:00 AM	7:00 – 11:00 AM	7:00 – 11:00 AM

Wednesday, April 10

	Terrace 1	Terrace 2	Terrace 3
7:30 – 8:45	1- Round Table	2- General Business	3-Open
9:00 – 10:15	4- Economics	5-Pedagogy	6-Student Research
10:30 – 11:45	7- Leadership	8- Finance	9- Pedagogy
12:00 -1:15	10- Economics	11- Open	12- Student Research

Thursday, April 11

	Terrace 1	Terrace 2	Terrace 3
7:30 – 8:45	Breakfast (Bayview Room and Terrace)		
9:00 – 10:15	13- Round Table	14- Student Research	15- Pedagogy
10:30 – 11:45	16- Pedagogy	17- Student Research	18- Economics
12:00 – 1:15	19- Marketing	20-Student Research	21- Healthcare
1:30 – 2:45	22- General Business	23- Student Research	24- Open
3:00 – 4:15	25- General Business	26- Student Research	27- General Business
4:30 – 5:45	28- General Business	29- Real Estate	30- Student Research

Friday, April 12

	Terrace 1	Terrace 2	Terrace 3
7:30 – 8:45	31-Pedagogy	32- Student Research	33- Accounting
9:00 – 10:15	34- Economics	35- Student Research	36- Accounting
10:30 – 11:45	37- Management	38- Accounting	39- Student Research
12:00 – 1:15	40- Open	41- Data Analytics	42- Student Research

SOBIE 2024 Proceedings

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Using Simulation to Solve the Strong Birthday Problem

Ed Pappanastos
Troy University

Jeffrey Bohler
Auburn University at Montgomery

Benjamin Larson
Troy University

Charles Coco
Troy University

Abstract

The classical birthday problem is often used in introductory statistics and probability courses as an entertaining way to teach introductory probability concepts. When birthdays are assumed to be independent and uniformly distributed throughout the year, this probability is easy to calculate by hand. When the strong birthday problem is considered, the mathematics involved with hand calculations becomes extremely difficult, if not impossible. This article examines how simulation can be used to solve the strong birthday problem using Excel, R, and Python, addressing difficulty of creating the simulation and speed of performing probability calculations.

An Insurance Case that Develops Problem-Solving, Statistical Analysis, and Excel Skills

Ed Pappanastos
Troy University

Jeffrey Bohler
Auburn University at Montgomery

Benjamin Larson
Troy University

Charles Coco
Troy University

ABSTRACT

Good Faith Insurance is a successful insurance company that has found its niche as the hometown insurer that builds strong relationships with the community it serves. After almost ten years of profitable business, the company made three strategic decisions designed to grow the company and develop its brand into that of a quality regional insurer. This case requires students to examine the financial impact of these decisions. It allows students to develop better decision-making and problem-solving skills and is well-suited for an undergraduate statistics or insurance course.

Supported Learning: Improving Outcomes in Introductory Financial Accounting and Student Retention by Combining a Flipped Classroom with Structured Support

Jeffrey Byrne, Dwayne Powell, Lisa Russell, and Dakota Russell

ABSTRACT

In prior research, the flipped classroom has led to modest learning improvements in introductory financial accounting courses over traditional lectures. This paper analyzes how combining the flipped classroom with established pedagogical principles of curricular support can lead to stronger outcomes. In a study of 500 students at a mid-western university with a low 6-year graduation rate, the approach known as Supported Learning led to an average letter grade increase in course exams and a higher pass rate over the traditional lecture format, all while exam content and percentage of exams comprising overall student grades remained closely matched. Further, the improved performance led to a significant increase in the number of students who matriculated and passed their next required accounting class and first required finance class (a three-course completion rate). The results may benefit business programs and other disciplines with gateway courses and/or declining enrollment, particularly for nonselective universities.

Exploring the Relationship Between Flexible Course Design, Course Delivery, and Student Success

Jamye Long and Cooper Johnson

The University of Tennessee at Martin

Abstract: Understanding the relationship between flexible course design, student output, quality of student learning experiences, and student satisfaction is critical in providing a successful transfer of knowledge from faculty to student that is understood and retained. This exploratory study examines convenience samples of data to better understand student needs, expectations, and experiences, as they relate to success and satisfaction. The research purpose aims to help faculty understand the teacher-learner relationship with the current generation of students and assist faculty in knowing what factors in flexible course design and delivery are appreciated, helpful, and wanted by students and how they impact student success in their classes.

Time Is On Story's Side: Story Development Impacts Daily Shares of Viral Advertising Videos

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Abstract

Research on viral advertising videos has studied what factors contribute to total shares and views, but little has focused on how videos are shared over time. A previous content analysis of 105 YouTube viral advertising videos found more fully developed stories on a 0 to 5 act drama scale increased total shares and views. From that previous study's data, a growth curve model regressed daily video shares and views over a 23-day period. Results found a significantly sharper linear decline (dropout rate) for videos that tell a less developed story (lower number of acts) compared to videos that tell a more developed story (higher number of acts). Videos are shared for a longer time, or stay viral longer, with a story. The same growth curve model was performed for video views, but no significant growth curve effect was found. Theoretical and managerial implications of these results are discussed.

Embracing Artificial Intelligence in the Classroom
David Scott Kiker, PhD, Auburn University Montgomery
Mary Brtek Kiker, PhD, Auburn University Montgomery

Abstract

Since ChatGPT was launched in November 2022, there has been much discussion about potential nefarious usage of the new technology. In education, the primary concerns revolve around the technology being used by students to engage in plagiarism and cheating on assignments. The concerns are great enough that many educational institutions have banned the use of ChatGPT on their campuses. While these concerns are real, ChatGPT and similar artificial intelligence (AI) technologies also offer the promise of improving student outcomes if used judiciously by instructors. In this paper, we describe an effort to embrace AI technology and incorporate its use into the lesson plan of a graduate-level business communication course at a mid-sized regional college campus. While students were initially unfamiliar with the ChatGPT tool, they largely reported that they were excited to be introduced to the technology. They also found it to be very helpful in improving their educational outcomes.

Career Decision Self-Efficacy: Getting Embedded with Microsoft Certifications

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Abstract

This study aims to provide information about business school students who complete the Career Decision Self-Efficacy – Short Form (CDSE-SF) embedded in online and face-to-face classes. I plan to use the Career Decision Self-Efficacy-Short Form (CDSE-SF) to examine student career decision-making. Betz and Taylor's CDSE-SF contains 25 questions spread across five sub-scales (self-appraisal, occupational information, goal selection, planning, and problem-solving). The sub-scales are scored by a 5-point Likert like scale (No Confidence at All, Very Little Confidence, Moderate Confidence, Much Confidence, Complete Confidence).

In this study, we plan to collaborate with course instructors who provide teaching in technological knowledge for Microsoft (MS) or QuickBooks (QB) certifications. Along with teaching, we expect that professors will ensure that students have time to practice in MS Word, MS PowerPoint, MS Excel, and Intuit's QuickBooks. Once students complete the MS or QB certifications, we plan to deploy the CDSE-SF as a post-test in Phase 1. The reason for no pre-test is that our online classes are seven weeks long and students may be disenchanted to see the same questions twice in a short course. Additionally, pre- and post-test per student is \$5.00 each and funds are limited to the submitter/primary investigator's (PI) research funds, which covers research supplies and travel related to research. Pending the outcome of Phase 1, we can make a better decision about the sample size for Phase 2.

Beyond the Pandemic: Prospects and Challenges for Panama City's Real Estate Market Post-COVID-19

Eren Ozgen
Florida State University
Zachary Murzyn
Florida State University

Abstract

This research delves into the prospects and challenges facing Panama City's real estate market in the aftermath of the COVID-19 pandemic, based on the Opportunity Recognition theory. The study explores how the pandemic has reshaped housing preferences, presenting new opportunities and obstacles for real estate professionals. The emergence of remote work, catalyzed by the pandemic, has profoundly reshaped the real estate landscape. A discerning analysis of market dynamics reveals a notable surge in interest towards suburban and rural properties. This surge is propelled by several factors, foremost among them being affordability and the allure of expansive living spaces. Nevertheless, urban centers continue to retain their allure, fortified by their unmatched proximity to workplaces and an array of amenities. The paper outlines hypotheses and rationale behind factors influencing opportunity recognition within Panama City's real estate market, including housing demand, real estate dynamics, interest rates, and government policies. It also addresses the opportunities and challenges presented by these factors, along with suggestions for future research directions.

Inclusive Insights for Strategic Planning: Harnessing SWOT and Stakeholder Input in Higher Education

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Robin L. Snipes, Ph.D.
Columbus State University

Fonda Carter, Ph.D.
Columbus State University

Abstract

In an era of rapid technological advancements, demographic shifts, and evolving societal needs, universities face unprecedented challenges that necessitate agile and forward-thinking strategic planning. This paper examines the strategic planning process within a public university setting, emphasizing a holistic and participatory approach to ensure the institution's resilience and relevance in the 21st century.

The paper emphasizes the importance of environmental scanning and robust stakeholder engagement as a first step in the planning process. A significant component of the case study involved a comprehensive stakeholder survey, which was instrumental in developing an in-depth SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis. These foundational steps ensured that the strategic plan was responsive to external environmental factors and reflected the aspirations and concerns of the university's diverse internal and external community.

The analysis also proved crucial in identifying and informing the strategic priorities guiding the university's future direction and aligning the institution's vision and mission with modern-day goals and strategic initiatives. The manuscript contributes to the body of knowledge on strategic planning in public universities by providing a detailed account of an empirically based, participatory process that leverages stakeholder input and analytical tools to inform decision-making and priority setting. The paper concludes by asserting that university strategic planning is not a one-time event but a continuous process of adaptation and growth, offering a pathway to achieving sustained excellence and impact in higher education.

Promoting Faculty Diversity in Colleges of Business

Cassie Ward

Abstract

While university student bodies are becoming more diverse, faculty demographics remain stagnant. This is impacted by many factors, including the faculty employment pipeline, ineffective diversity hiring programs, and resistant institutional cultures. Preconceived biases and stereotypes hinder the recruitment and retention of a diverse faculty, despite research that supports the benefits of a multicultural institution. Diversity and inclusion are guiding principles and expectations for AACSB accreditation. These themes are referenced in 6 of the 9 AACSB standards, emphasizing the need for an institutional culture that welcomes and accepts faculty and students of all backgrounds. This paper discusses the implications and historical perspectives of faculty diversity, challenges and cultural biases, and recommendations for recruiting and retaining diverse business faculty.

The Relationship Between Brand Strategy and Marketing Performance: Focusing on Logo Design Changes

Sungwoo Jung

Columbus State University

Abstract

As the trend of simplifying logo designs becomes increasingly popular amongst restaurant brands, a rebranding logo can result in various outcomes in terms of financial status. Previous research has explored the importance of logo design and rebranding can significantly alter a company; however, none have analyzed empirical data on actual companies that can be utilized to further interpret the real-world implications of existing restaurant brands. A quantitative, statistical analysis that employs an ANOVA test, Mann-Kendall test, and a correlational test was conducted in order to determine whether a logo change had a particularly significant change, trend, and pattern on a restaurant brand's stock price and revenue sales. Furthermore, company logos were categorized between logotypes (text) and combination marks (symbolism and text) in order to determine whether different types of logos have alternative effects. Ultimately, a logo redesign didn't have a significant effect on the stock price. However, there was a significant change in revenue sales after a logo change for certain companies after ~1-2 years with logotypes typically having more success. Furthermore, a redesign of a logotype should only have slight changes in order to have the most impact.

The Imposter Phenomenon and Its Cross-Cultural Implications

Achira Sedari Mudiyansele, *Austin Peay State University*

Vikkie McCarthy, *Austin Peay State University*

Elaina McCaskill, *Austin Peay State University*

Abstract

The imposter phenomenon, or the likelihood of an individual feeling like a fraud despite external evidence to the contrary, was initially identified in clinical studies. It has been the subject of considerable recent popular interest due to its prevalence in a variety of contexts. Research shows that stable antecedents such as locus of control and neuroticism, as well as dynamic antecedents such as tenure and sense of belonging, affect the individual experience of imposter feelings. In this paper, we examine these antecedents as they relate to students in higher education. We do so via a cultural lens and argue that cultural attitudes can affect the potency of imposter feelings. Using achievement goal theory, we also explain how a growth mindset, where individuals can see opportunities in failures, has a mitigating effect on such feelings. Our study contributes to a deeper understanding of the imposter phenomenon as a culturally driven experience. On a practical note, we expect this study to provide organizations with a way to counter imposter feelings through a change of mindset.

IMPACTS OF THE 2023 NCAA FOOTBALL RULES CHANGES ON SCORING AND THE TOTALS MARKET

Evan Moore, Auburn University at Montgomery

James Francisco, Auburn University at Montgomery

Abstract

The National Collegiate Athletics Association (NCAA) introduced rule changes prior to the 2023-24 season. According to the Football Foundation Rules Committee, "...*the most significant 2023 football rule changes involve adjustments to the timing and clock rules,*" with the purpose to shorten the length of the game and to "...moderately reduce the number of plays per game." We examine the impact of these changes on actual and expected scoring during the season. The rule changes led to lower average scoring, which was not fully encompassed at the start of the season in the financial (betting) market. The early season volatility in the market subsided as the season progressed resulting in a generally efficient market.

Introduction

Starting with the 2023-24 season, the NCAA enacted changes in the clock rules of college football games, intended to shorten the overall game times. The clock rule change was as follows:

Stopping and Starting the Clock – First Downs (Rule 3-3-2-e-1)

When Team A (the offense) gains a first down, the clock will no longer be stopped to award a first down except with less than two minutes remaining in the 2nd and 4th quarters. This change is effective immediately for DI and DII and will be implemented in 2024 for DIII. (www.footballfoundation.org, 2023).

The rule had its intended effects of shortening the game, especially early in the season. As noted after 3 weeks of the season:

In short, this means that the new rules have cut about six plays and six minutes from games. (There have also been 0.5 fewer flags per game). Teams are combining to score about two fewer points per game. According to TruMedia, FBS teams are averaging 12.0 possessions per game, down slightly from an average of 12.3 possessions through Week 3 in 2022. (Auerbach and Vannini, 2021).

In previous seasons in both college football and other sports, clock rule changes have been found to be associated with inefficiencies in wagering in totals markets (also known as "over/under markets.") The most recent major clock rule change in college football, in 2006, was found to cause lower scoring that was not immediately encompassed in totals betting markets, leading to an inefficiency (Linna et al, 2014). Similar impacts have been found in other sports, including the National Basketball Association (NBA). In the 2018-19 season, the NBA enacted rules shortening the shot clock from 24 seconds to 14 in various situations, in an effort to generate more possessions and hasten play. The rule changes led to an increase in scoring, not encompassed in the betting markets, which led to significant returns to betting the over. (Moore 2022).

In this study, we investigate whether the clock rules changes introduced in 2023-24 generated sufficient scoring declines to generate inefficiencies in the totals market, and whether they generate a profitable strategy of betting the under over any period of time.

Data

The data used for this study are publicly available from www.collegefootballdata.com, a popular website for data and analytics related to college football. The data set constructed by the authors contains all games involving an FBS team from the 2022-23 and 2023-24 college football seasons. We examine all such games that have both a closing line for the game total (over/under), and also are not “pushes” (bets that end in a tie). This sample yields 1,778 games that fit those criteria.

Literature and Methodology

We examine the efficiency of the totals market, and the profitability of betting the under, using well established tests. The first test of efficiency we use employs the methodology of Gandar (1988).

$$(1) A_i = \beta_0 + \beta_1 T_i + u_i$$

where A is the actual score and T is the closing total. A “fair bet” in the context of football wagering is one in which generates a .5 probability of covering for both over and the under. We test the joint hypothesis of “fairness” that $\beta_0 = 0$, and $\beta_1 = 1$, which would mean no-profit.

In addition to applying the methodology of Gandar et al (1988), shown in Equation (1), we also utilize the log likelihood efficiency test employed by Even and Noble (1992), as shown below:

$$(2) L^u = n[\ln(\hat{q})] + (N - n)\ln(1 - \hat{q}), \text{ where } n \text{ is number of covers, } N \text{ is number of matchups, and } \hat{q} \text{ is ratio of covers to matchups.}$$

Because this method assumes that an efficient market means that $q=.5$, we substitute .5 for \hat{q} , which yields the following likelihood ratio for the null hypothesis:

$$(3) 2(L^u - L^r) = 2\{n[\ln(\hat{q}) - \ln(0.5)] + (N - n)[\ln(1 - \hat{q}) - \ln(0.5)]\}$$

We also tested for profitability, using a modification of the efficiency test above, by substituting 0.524 for \hat{q} using the method of Paul and Weinbach (2005):

$$(4) 2(L^u - L^r) = 2\{n[\ln(\hat{q}) - \ln(0.524)] + (N - n)[\ln(1 - \hat{q}) - \ln(0.476)]\}$$

where n is number of covers, N is number of matchups, and \hat{q} is ratio of covers to matchups.

Summary Statistics

In Table 1, we report the summary statistics of the actual scores and lines for the totals (over/under) from games in the 2022-23 and 2023-24 seasons.

Table 1 – Summary Statistics

	Both		2022-23		2023-24	
	Actual	Total	Actual	Total	Actual	Total
Mean	54.252	53.997	54.787	54.978	53.73	53.039
Std. Dev.	17.369	8.091	17.65	8.259	17.084	7.81
N	1778		878		900	

Results

In Table 2, we report the results of the “weak” efficiency testing for both seasons. Note that the only source of statistical significance is the efficiency test for 2023-24, indicating an inefficient market.

Table 2 – Efficiency Results of Both Seasons

	Both		2022-23		2023-24	
	Coeff.	St. Dev	Coeff.	St. Dev	Coeff.	St. Dev

Constant	4.661	2.513	-0.228	3.547	9.175	3.613
Total	0.918	0.046	1.001	0.064	0.84	0.674
N	1,778		878		900	
F test	397.9		246.01		155.35	

Joint test of null hypothesis that the coefficients of **Constant = 0** and **Over/under = 1**

F test	1.81	0.07	3.68**
p-value	0.165	0.936	0.026

Table 3 provides the likelihood ratio test results for efficiency for the combined seasons and for each season separately. There are no results listed for the profitability tests as the under win percentage did not exceed 52.38% in any of the scenarios.

Table 3 –Results of Likelihood Ratio Testing of Both Seasons

Season	Under covers	Games	Under Win %	Likelihood ratio tests	
				Fair bet	No profits
Both	895	1778	50.34	0.0810	-
2022-23	444	878	50.57	0.1139	-
2023-24	451	900	50.11	0.0044	-

In Table 4, we report the likelihood ratio results for 2023-24 for the first 4 weeks of the season and the season as a whole. We find that betting the under is not a profitable strategy over the season. We find that the under covers enough games to be profitable in the first 2 weeks of the season, but is not statistically significant. We also find that that the market becomes more efficient over the course of the season.

Table 4 – Weekly Results for the 2023-24 Season

Week	Under covers	Games	Under Win %	Likelihood ratio tests	
				Fair bet	No profits
1	50	93	53.763	0.52738034	0.071431113
2	44	84	52.381	0.19054824	3.05E-08
3	39	75	52	0.12003202	-
4	33	65	50.769	0.01538522	-
Season	451	900	50.11	0.004444	-

Conclusion

As hypothesized, the clock rule changes led to lower average scoring during the 2023-24 season. The average total score of a game fell from 54.787 points per game in 2022-23 to 53.73 in 2023-24. This decline was not fully accounted for in the early weeks of the season. As Table 3 shows, the first two weeks of the season were profitable for under bettors, meaning that automatically betting the under in all games would have yielded a profit. By week 3, such a strategy had slipped just below profitable levels. The early season volatility in the market subsided as the season progressed, resulting in a generally efficient market in totals for the remainder of the season.

References

Auerbach, N., and C. Vannini, “Do college football’s new clock rules work? Complaints abound, but the data shows progress,” <https://theathletic.com/4884655/2023/09/21/college-football-clock-rules-game-time-data/>, retrieved May 1, 2024.

Even, W. E. and N.R. Noble. (1992). “Testing Efficiency in Gambling Markets.” *Applied Economics*, 24. 85-88.

<https://footballfoundation.org/news/2023/7/19/important-rule-changes-for-the-2023-college-football-season.aspx#:~:text=The%20most%20significant%202023%20football%20rules%20changes%20involve,consistency%20in%20officiating%20mechanics%20managing%20the%20game%20clock>, retrieved May 1, 2024.

Gandar, J., Zuber, R., O'Brien, T., and Russo, B. (1988). "Testing Rationality in the Point Spread Betting Market." *Journal of Finance*, (43). 995-1007.

Moore, E. (2022). "Impacts of the 2018-19 NBA Rule Changes on Scoring and the Totals Market," *The Journal of Prediction Markets*. v16, n2.

Linna, Kenneth; **Moore, Evan**; Paul, Rodney; Weinbach, Andrew; (2014). "The Effects of the Clock and Kickoff Rule Changes on Actual and Market-Based Expected Scoring in NCAA Football". *International Journal of Financial Studies*, v. 2, iss. 1-4, pp. 179-92.

Paul, R. J., and A. P. Weinbach. (2005). "Bettor Preferences and Market Efficiency in Football Totals Markets." *Journal of Economics and Finance*, 29(3). 409-415.

An Evaluation of Higher Education Student-Focused Business Processes using Supply Chain Management Concepts

Cynthia R. Lovelace *Global Logistics and Supply Chain Management faculty, College of Business, Athens State University*

Abstract

Much has been written about how supply chain management has impacted manufacturing organizations in terms of its enhanced ability to expand market reach, compete internationally, and respond quickly to changes in customer demands. By involving all the key participants in the key business processes used to meet these expectations, the transformation of materials into products is accomplished more quickly, efficiently, and effectively. Academic institutions could also increase student success and satisfaction by applying the managerial strategies embodied within SCM, and do so with business processes that are efficient, effective, and focused on student success - in the classroom, in the university community, and in the greater collective society. This paper will explore how the key business processes of the Global Supply Chain Forum (GSCF) model for manufacturing-oriented supply chains can be redefined for application within institutions of higher learning. Specifically, those business processes that directly impact student success and satisfaction will be considered.

Key Words: *Supply Chain Management, Business Processes, Higher Education Administration*

An Evaluation of Higher Education Student-Focused Business Processes using Supply Chain Management Concepts

1. Introduction

Much has been written about how supply chain management has impacted manufacturing organizations in terms of its enhanced ability to expand market reach, compete internationally, and respond quickly to changes in customer demands (Lambert et al., 1998; Simchi-Levi et al., 2021; Goldsby and Garcia-Dastugue, 2003; Chau et al., 2021). The multi-organizational collaborative environment created through SCM, enabled by digital communication amongst the participating organizations, allows for a cradle to grave, raw materials to finished product focus on meeting customer expectations. By involving all the key participants in the business processes used to meet these expectations, the transformation of materials into products is accomplished more quickly, more efficiently, and more effectively than is possible through internal efforts alone. In essence, the barriers to accomplishing the key tasks of product creation and delivery, with a focus on

customer satisfaction, are reduced (Colin et al., 2015).

The same barriers to customer satisfaction seen in organizations that produce goods can also be seen in academia, which “creates” educated people, who in turn provide human resources for student’s future employers (Calma and Dickson-Deane, 2020; Budd, 2017. Alexander et al., 2009; Laing and Laing, 2016; Naidoo and Jamieson, 2005; Ng and Forbes, 2009). By applying the managerial strategies embodied within SCM, academic institutions could also increase student success and satisfaction, and do so with business processes that are efficient, effective, and focused on student success - in the classroom, in the university community, and in the greater collective society (Bayrak, 2020).

The issue under consideration is a complicated one, since students serve in many roles during their higher education experience, such as “customer, client, evaluator, partner, and/or co-creator of their own knowledge” (Calma and Dickson-Deane, 2020). However, higher education administrators, as the business leaders of their institution, create value through multiple avenues, such as student learning, scholarly teaching, research, and service - to the university, community, alumni, and others (Bayrak, 2020).

The purpose of this research is to apply supply chain management strategies to higher education and define academic business processes directly impacting student satisfaction and success. Although universities serve the greater community in many ways, as mentioned earlier, the focus of this work will be on those business processes that directly impact the student experience.

2. Supply Chain Management Defined and Explained

Langley et al. (2025) define Supply Chain Management as “the art and science of integrating the flows of product, information, and financials through the entire supply pipeline from the vendor’s vendor to the customer’s customers and consumers”. This approach to managing the production of goods and/or services in response to customer demand acknowledges the reality that the producer must collaborate with external providers of raw materials and services so that the materials of production are available when needed. In addition, the producer must also collaborate with external distributors for final product distribution, as well as with the final customer, who dictates what the producer should produce and when. By breaking down barriers between the individual members of the chain and implementing a collaborative approach to customer satisfaction, customers stand the best chance of receiving what they demanded, when and where they demanded it, in the right quantity, and in the right condition. Supply chain management can significantly increase a producer’s ability to efficiently, and effectively, meet customer expectations. Figure 1, below, illustrates this concept.

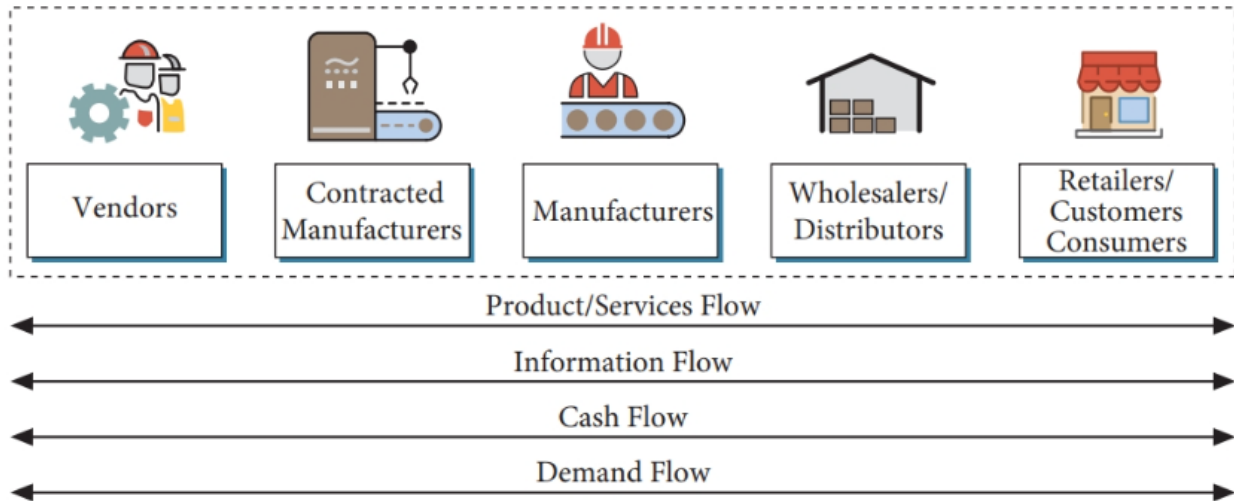


Figure 1: Illustration of an Integrated Supply Chain (from Langley et al., 2025)

Figure 1 illustrates that while supply chains consist of multiple independent organizations, they are connected through the flow of product/services (enabled by transportation and storage entities), the flow of cash/financials, and the flow of information and demand between the supply chain partners.

The same benefits of supply chain management may also be realized internally, within individual organizations. Traditionally, individual functions within a manufacturing organization - finance, sales, production, accounting, IT, etc. – operate independently, each with its own goals and performance metrics. Often the performance goals of these functions are at odds with each other, preventing an optimal approach to overall customer satisfaction. By taking the supply chain management approach and focusing on overall customer satisfaction rather than functional goals, an organization can optimize its ability to meet customer needs. This can be accomplished by focusing on the key business *processes* used to fulfill customer expectations, processes that span all the individual business functions.

3. The GSCF Supply Chain Model

The Global Supply Chain Forum model of supply chain management, as illustrated in Figure 2, embodies the approach outlined above.

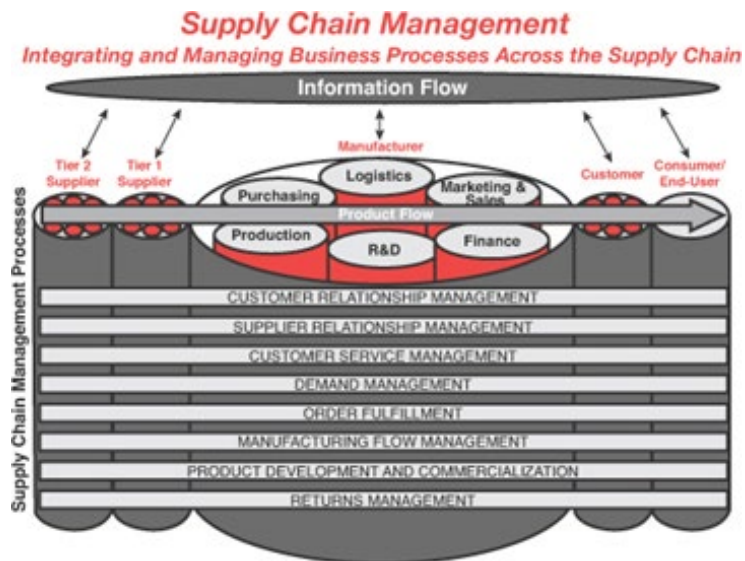


Figure 2: Global Supply Chain forum framework (Lambert et al., 1998)

The GSCF framework is a significant paradigm shift from previous organizational management approaches, where each function worked in relative isolation within its own functional silo. Now, the focus is on the integration and management of business *processes*, as opposed to functions, that span the entire supply chain. The eight business processes encompassed within the GSCF model, and as defined by Lambert (2014), include:

1. Customer Relationship Management – “provides the structure for how the relationships with customers will be developed and maintained”
 2. Supplier Relationship Management – “provides the structure for how relationships with suppliers will be developed and maintained”
 3. Customer Service Management – “deals with the administration of the PSAs [product and service agreements] developed by customer teams as part of the customer relationship management process”
 4. Demand Management – “balances the customers’ demand with the capabilities of the supply chain”
 5. Order Fulfillment – “more than filling orders”, it “includes all activities necessary to design a network and enable a firm to meet customer requests while maximizing its profitability”
 6. Manufacturing Flow Management – “includes all activities necessary to obtain, implement, and manage manufacturing flexibility in the supply chain and to move products into, through, and out of the plants”
 7. Product Development and Commercialization – “provides the structure for developing and bringing to market products jointly with customers and suppliers
 8. Returns Management – process by which “activities associated with returns, reverse logistics, gatekeeping, and avoidance are managed within the firm and across key members of the supply chain”.
- (Lambert, 2014, pp. 10 – 12)

Higher education management could also benefit from the supply chain management approach to doing business, and in turn educating its students. By modifying the GSCF framework for academia, institutions of higher learning could also see the increases in efficiency and effectiveness

experienced in the private commercial sector. This modification involves re-defining the functional areas to align with the university or college organizational structure, determining the supply chain-wide business processes used to educate students, and identifying the performance metrics used to benchmark success. Most importantly, the product(s) or service(s) produced within the supply chain and the end customer(s) must be clearly defined. This last important task requires careful consideration of the role of the student, and the student’s future employer, within the framework.

4. Higher Education Business Functions

Organizational structure may serve as a defining feature for best-in-class universities in terms of overall student satisfaction, graduation rates, and earnings increase potential after graduation. Moreover, effective organizational structures define the essential higher education business functions that foster student success. For this research, data on higher education organizational structure was collected from the WSJ/College Pulse 2024 Best Colleges in the U.S. rankings (WSJ/College Pulse Rankings, 2024). For the WSJ ranking, three factors were considered: (1) Student outcomes (as defined by graduation rate and graduate salaries) accounted for 70%; (2) Learning environment scores accounted for 20%, and (3) Diversity accounted for the remaining 10%. The importance of the student outcomes measures is understandably important to potential students, as is seen with #1-ranked Princeton, where the median salary of its graduates is high enough to pay off the full cost of attendance in less than a year. (McAllister and Corrigan, 2024). An examination of the organizational structures of the top schools provides important clues as to the drivers behind their success, including areas of organizational focus that are directly tied to student success.

For this research, the top 50 schools in the WSJ Best Colleges ranking for 2024 were evaluated for total undergraduate enrollment (as of Fall 2022, via U.S. News and World Report (US News and World Report, 2024), key words in each institution’s mission statement, major functional areas reporting to the school’s president, and subordinate functional areas reporting to the school’s Provost or equivalent. Figure 3 shows the distribution by undergraduate enrollment of the top 50 schools in the survey.

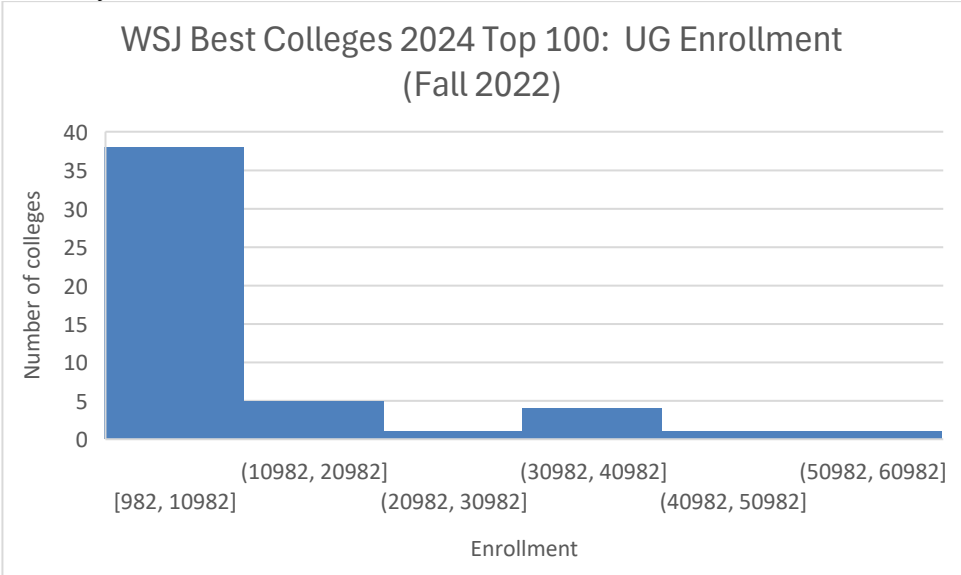


Figure 3: Fall 2022 Undergraduate Enrollment

The WSJ college ranking data was also stratified by public vs. private institution. Analysis of this

stratification revealed that 80% of the schools were private institutions, with the remaining 20% classified as publicly-funded entities. A hypothesis of unequal mean enrollment between the public and private institutions within the sample was confirmed via F- and t-tests for variance and mean comparison, respectively. These tests, as shown in Figures 4 and 5, found that mean undergraduate enrollment in the private institutions was significantly lower than those of their public institution counterparts, as was expected given the differences in mission and scope between these two approaches to higher education.

F-Test Two-Sample for Variances

	<i>Public</i>	<i>Private</i>
Mean	29398.9	6163.5
Variance	217105349	33183862
Observations	10	40
df	9	39
F	6.542497876	
P(F<=f) one-tail	1.25463E-05	
F Critical one-tail	2.130597059	

Figure 4: F-test for difference in variances. Significant difference in variance was confirmed.

t-Test: Two-Sample Assuming Unequal Variances

	<i>Public</i>	<i>Private</i>
Mean	29398.9	6163.5
Variance	217105349	33183862.36
Observations	10	40
Hypothesized Mean Difference	0	
df	10	
t Stat	4.894089768	
P(T<=t) one-tail	0.000314311	
t Critical one-tail	1.812461123	
P(T<=t) two-tail	0.000628623	
t Critical two-tail	2.228138852	

Figure 5: t-test for comparison of means, assuming unequal variances

To define the primary business functions for academia, the presidential organizational chart was evaluated for each institution with respect to the titles of the president’s direct reports. General observations revealed that those institutions with lower undergraduate enrollment had clearer definitions of university functions within the president’s direct reports. These observations also revealed that larger institutions tended to include other direct reports to the University President that managed specialized programs not directly related to the primary university functional areas.

Table 1 lists the top functional areas reporting to the University President, in order by prevalence:

Table 1: Top Business Functional Areas Reporting to the University President

Ranking by Prevalence in President’s Organizational Chart	University Business Function
1	Provost / Academic Affairs
2	Chief Financial Officer
3	VP of Communications / Public Relations
4	VP for Advancement
5	VP for Student Affairs / Campus Life
6	VP of Human Resources
7	Director of Athletics
8	VP of Strategic Planning
9	Chief Information Officer
10	VP of External Affairs / Government Relations

Other functional areas reporting to the President for some institutions (in order of prevalence) included VP of Enrollment/Admissions, VP of Diversity, Equity, and Inclusion, VP of Operations / Administration, VP of Facilities, Chief Investment Officer, VP of Alumni Affairs, and VP of Research.

The organizational structure of the Office of the Provost / Academic Affairs is also of interest for this research since it directly relates to student academic education and support. The organizational chart of the Office of the Provost was also evaluated for each institution in the WSJ ranking with respect to the titles of the Provost’s direct reports. Table 2 lists the top functional areas reporting to the University Provost, in order by prevalence:

Table 2: Top Business Functional Areas Reporting to the University Provost

Ranking by Prevalence in Provost’s Organizational Chart	University / Academic Affairs Business Function
1	Academic Affairs
2	Academic Deans
3	Institutional Research
4	University Librarian
5	Learning Support and Innovation / IT Services
6	Faculty Development
7	Budget / Finance
8	Diversity, Equity, and Inclusion
9	Student Support Services
10	Enrollment

Other functional areas reporting to the Provost for some institutions (in order of prevalence) included Financial Aid, Admissions, and Academic Strategic Initiatives, among others.

The purpose of the organizational chart evaluations for President and Provost was to identify the primary business functions of higher education institutions. Upon general observation of the data, it was seen that variances exist between institutions in terms of job descriptions of direct reports. Furthermore, it was observed that many primary university functions are often nested within the responsibility of the University Provost. The location/reporting structure for these functions also

varied with the size of the institution under consideration.

Based on the analysis and general observations of the organizational structure of the top colleges in the U.S., as defined by the top 50 institutions listed in the 2024 WSJ Best Colleges in the U.S. ranking, the primary business functions directly related to student success may be defined as Academic Affairs, Finance, Communications/Marketing, Student Affairs (including Enrollment, Admissions, Student Support Services, and DEI), Research, Strategic Planning, Operations/Facilities, Information Technology, Human Resources (including Faculty and Staff development), and External Relations/ Governmental Affairs.

5. Student-Focused Business Processes for Higher Education

Embracing the supply chain paradigm within higher education begins with a change of mindset, or a change of perspective if you will. A higher educational institution's mission regarding students is accomplished, not through the individual efforts of faculty, staff, administration, and resources, but through focused *processes* that involve most, if not all, of these players. Each process is tailored to accomplish a specific category of tasks, tasks tightly linked to accomplishing the overall mission of the school. Utilizing the Ishikawa Diagram concept for process definition, each process can be defined by its components: Man (faculty, staff, administration, support personnel, and external vendors), Machine (physical resources, information technology resources, facilities, labs, etc.), Method (a defined sequence of events to accomplish the task), and Money (financial resources). Other categories of Measurement (performance metrics for the tasks performed), and Environment (environmental factors that impact process performance) can be outlined for each process for improvement purposes (ASQ, 2023).

Successful, cross-functional processes have several key factors in common. First, they involve collaboration of key personnel across all major functions within the university along with external vendors and business partners. Information visibility, availability, and accuracy are key enablers of the process. A well-structured, well-defined process not only supports optimal performance as the current process is structured, but also reveals opportunities for improvement. This might be manifested as the revelation of unused/unneeded resources that could be utilized elsewhere in the institution, bottlenecks (and their causes) which slow down task fulfillment time, duplicity of effort which can be eliminated, reducing cost and time, and process inefficiencies which provide opportunities for improvement. Finally, successful processes are aligned with the university's mission, vision, and overall business strategy.

While a base list of businesses processes can be defined for higher education, variances will exist due to differences in the mission statements and specialties of each individual institution. Also, because of the wide range of stakeholders within academia (to include current students, alumni, research partners, and many others, even to include athletic event attendees), only a subset of the total number of business processes would be directly applicable to current students. As was shown earlier, not all business functions within a higher education institution directly impact student success.

The following section presents proposed redefinitions of the GSCF Business Processes framework as applicable to current students within institutions of higher learning. They would serve as a base definition, from which individual schools could adjust based on their unique mission, vision, and student base.

The redefinition of the GSCF supply chain model for higher education, including internal business functions and extended enterprise business processes, are illustrated in Figure 6.

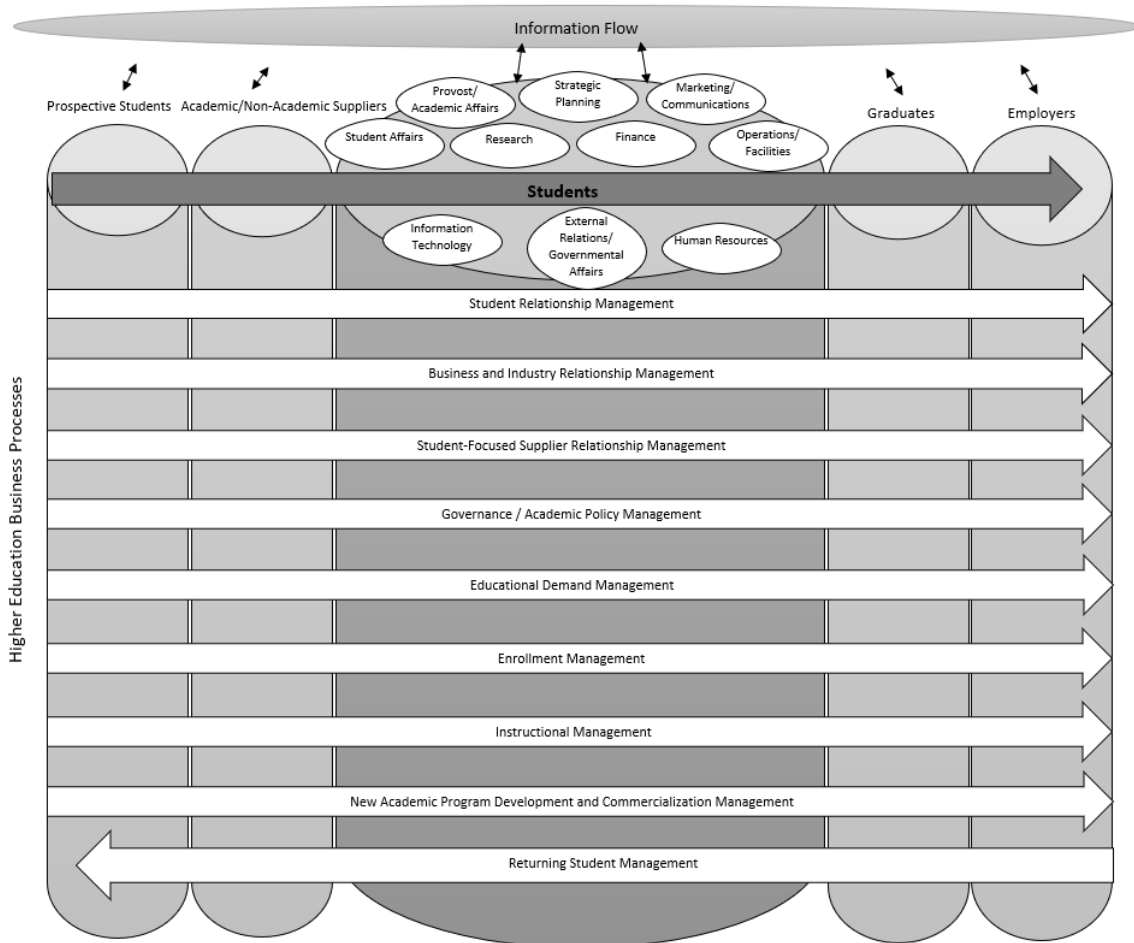


Figure 6: Proposed Student-Focused Higher Education Business Processes

Process 1: Student Relationship Management

Standard customer relationship management processes focus on building and maintaining relationships with customers. Customers benefit from these relationships by being better able to provide feedback on their needs and wants, and the supply chain serving them benefits by being able to gather accurate demand information from the customer. For universities, using the CRM approach to manage relationships with students (the customer in this case) provides the same types of benefits seen in industry. The student relationship management process provides the structure for how relationships with students are developed and maintained. Student relationships can be fostered through an engaging campus environment, proactive communication channels, the creation and support of student learning communities, opportunities for additional academic engagement and research, the provision of essential student support services, and other avenues that support students in their educational journey. The development of student relationships begins before their enrollment, through effective marketing strategies and efficient enrollment, admissions, and financial aid processes, then continues until post-graduation through alumni engagement efforts. In turn, universities can reap the benefits of strong student relationships well past graduation through alumni engagement and financial support.

Process 2: Business and Industry Relationship Management

Another category of “customer” for higher education includes the organizations that benefit from both the research conducted at the institutions and the educated students whom they may hire. In fact, another purpose of higher education is to prepare students for lives of service to their profession and to their community. Therefore, a process is needed to establish and maintain

relationships with the business community. Through these relationships, needed workforce knowledge, skills, and abilities can be identified and tracked over time. This information can then be used to develop or augment academic programs to meet the needs of students and their potential employers, as well as provide experiential learning opportunities for students within partner organizations. If the relationships are well established and mechanisms are in place to gather accurate information about business and workforce requirements on an ongoing basis, universities can respond more quickly to changes in market demand. Students will also benefit from academic programs that are updated and in demand. They also provide valuable input regarding curricular improvements and new academic programs.

Process 3: Student-Focused Supplier Relationship Management

Supplier Relationship Management within supply chains involves the development of collaborative relationships with those partners who supply raw materials, finished component parts, logistics and transportation services, and other associated materials and services to a given entity within the supply chain. In academia, the student-focused supplier relationship management process provides the resources that students need to be successful. These resources fall within two tracks: academic and non-academic. For academic purposes, SRM may be used for relationship development with providers of academic curricula and software tools. Non-academic relationship management would be used to develop relationships with vendors that supply everything from campus dining services. There are many benefits associated with long-term supplier relationships, opportunities for quantity discounts, increased bargaining power, priority supply replenishment, and input on the design of new products and services. The best benefits, however, come from strategic improvement initiatives that include the suppliers. They may have insights into efficiency and effectiveness improvements for the institution, based on their industry expertise and exposure to other clients, that would otherwise not be identified by internal efforts alone.

Process 4: Governance / Academic Policy Management

Lambert (2014) defines the customer service management process as “the administration of the PSAs [product and service agreements] developed by customer teams as part of the customer relationship management process”. A customer service agreement is defined as “a contract between two parties where one party agrees to provide services in exchange for the other’s promise to pay” (“What is a Product Agreement?”, 2024). It is beneficial to both parties, in that the provider of the product or service has some assurance that it will get paid, whereas the customer has some assurance that the product or service provided will fulfill expectations. The academic counterpart to customer service management is academic policy management, by which academic policies are developed, vetted, updated, and maintained. Moreover, it is within governance policies that students’ rights are codified. Students’ rights include “rights such as civil, constitutional, contractual and consumer rights which regulate student rights and freedoms and allow students to make use of their educational investment. These include such things as the right to free speech and association, to due process, equality, autonomy, safety and privacy, and accountability in contracts and advertising, which regulate the treatment of students by teachers and administrators” (*Student Rights in Higher Education*, 2024; AAUP, 2024). Likewise, the institution has a vested interest in protecting itself (including faculty, staff, and physical resources) from undue harm because of the products and services it provides. These rights and responsibilities are typically encoded within university policy and re-stated within the institution’s academic catalogs.

While many of the higher education processes require involvement from a variety of personnel across the institution, those pertaining to students’ rights would require additional participation by the institution’s legal counsel.

Process 5: Educational Demand Management

The demand for educational instruction and student services by current and potential students

drives all of the university services dedicated to student education. For example, the level of instructional demand dictates the types of programs offered, the qualifications and number of faculty, the amount of classroom space provided, the types and volume of educational technology needed, and the type and quantity of student support resources (including everything from advising support to dormitory capacity). The key task within this process is *demand management* – at the university, college, department, and individual program level. The accuracy and communication of demand forecasts is crucial to successful planning (Langley et al., 2025). Institutions should consider utilizing a central repository for demand forecast information, containing real-time course and program demand forecasts and enrollment data, that is available to all impacted by this demand, from university president to individual instructors, as well as those involved in providing instructional space and technology.

Influencing demand is also an important task within educational demand management. Demand for educational services is influenced by many factors, such as university reputation, academic specialties, campus culture, the modality of course offerings, and even athletic event attendance opportunities, along with the practical considerations of admissions requirements (including testing requirements), tuition and fee rates, and the availability of scholarships and financial aid.

A university's marketing and communication function is commonly considered to be responsible for influencing educational demand, but in the business process approach, entities throughout the institution have a role in building relationships with students (current and potential) and influencing demand. For example, professors serve an important function in building relationships among class members, getting to know each individual student, and gauging his/her students' short-term plans for enrollment. Departmental staff, familiar with enrollment trends year over year within their area, would be better prepared to build course schedules if they have access to short-term enrollment data gathered from both professors and the marketing function. Student advisement services are better able to assist students in building course schedule plans with access to demand data as well. If information visibility was extended to feeder high schools and transfer institutions, data gathered from academic counselors would further improve demand forecasting.

Process 6: Enrollment Management

In the GSCF model, order fulfillment management “includes all activities necessary to design a network and enable a firm to meet customer requests while maximizing its profitability” (Lambert, 2014). Its counterpart within higher education would therefore include all the activities necessary to admit, enroll, and initially support students as they begin their course of study. While this business process could be viewed from many perspectives, it can be assumed at this point to refer to sub-processes utilized for student admittance and enrollment, as well as processes for executing course waivers and substitutions as needed. The IT/ERP systems utilized to execute these tasks are also critical for this process, since they serve to enable the equivalent of order entry, order fill, order documentation, order delivery, and post-delivery performance measurement seen in manufacturing supply chains (Lambert, 2014).

Supply chain optimization techniques would prove valuable when applied to the student registration process. While educational demand data, gathered through the demand management process, can be used for mid- and long-range classroom capacity planning, real-time registration data can also be harnessed to add course sections and associated classroom and/or lab space while balancing instructor teaching loads. The use of leading-edge digital prediction tools would result in optimal allocation of resources and minimize waste in the form of unneeded educational space.

Process 7: Instructional Management

The 7th business process within the GSCF model is manufacturing flow management, which “includes all activities necessary to obtain, implement, and manage manufacturing **flexibility** in the supply chain and to move products into, through, and out of the plants” (Lambert, 2014). In the

academic context, this is akin to all activities fostering and influencing classroom instruction. The heart of this process lies in classroom or online instruction, provided by instructors and their assistants. However, support for this process comes from many places across campus – materials support from the university library, curricular materials support from textbook vendors, IT support in the form of learning management systems, academic support from campus tutoring services, general student support from “student services”, and available learning space provided by facilities management. Of primary importance is the utilization of student course demand and educational resource capacity information to assign resources to courses and manage those resources in such a way that flexibility in resource assignment is gained, making it easier to add or drop sections, secure educational space, or perform major reallocation of resources as new academic programs are introduced or legacy programs are retired. Real-time visibility of information regarding demand and supply will enable optimal faculty scheduling as well the allocation of resources. Capacity planning would also be related to this process, as it plays a critical function in allocating instructor and facility resources for the purposes of instruction.

Process 8: New Academic Program Development and Commercialization Management

Product development and commercialization “provides the structure for developing and bringing to market products jointly with customers and suppliers” (Lambert, 2014). For higher education institutions, the counterpart is the management of new academic program development and commercialization. The process of developing and launching new academic programs begins with the identification of need, the development of the initial proposal, the evaluation of the program first at the institution level, then by state-level higher education regulatory bodies and the appropriate academic or professional accrediting bodies. A needs assessment may involve many parties, including faculty knowledgeable on the subject, educational survey data, and the input of outside entities, including those outside the institution with a vested interest in the program. Considering that the future students in a new program would be both the customer AND the product produced, their input is valuable as well (Calma and Dickson-Deane, 2020). A well-documented process, detailing each step, that is easily accessible by faculty and staff, is valuable for fostering and encouraging innovation in academic programs. It would also serve to speed up the new program approval process, since meeting deadlines of approval bodies is central to the timely implementation of new programs.

Process 9: Returning Student Management

The final GSCF process is Returns Management, which includes “activities associated with returns, reverse logistics, gatekeeping, and avoidance are managed within the firm and across key members of the supply chain”. The counterpart within academia would be the administration of academic programs geared towards working adults returning to retool their skills or obtain additional degrees. Just as in a product-oriented supply chain, where product returns are handled, stored, and returned to the supply chain through channels different from forward-flowing products, returning students fit a different demographic profile and have different academic needs than their younger counterparts. For example, returning students may be interested in shorter certificate programs, tailored just to the specific skillset they desire to obtain. Or, they may desire digital badging for very targeted skills that might be offered within graduate courses as part of a graduate degree. Therefore, the academic products and services offered to them must meet their expectations. They may desire a different modality, or even different academic scheduling, such as night or weekend-only courses. The management of returning students would involve many aspects of the previous processes, but these processes would be adjusted to accommodate the needs of the returning adult learner. The key point to note is that these students are different, with different needs.

6. Conclusion

The fundamental tasks associated with the student-focused business processes are not new, as they are core activities necessary for the administration of any higher education program. However, the supply chain management focus introduces a new strategy for completing these tasks. The supply chain management approach adds the involvement of all business functions within each process, the inclusion of parties outside the institution as supply chain partners, and the strategic use of information sharing to enable process function.

Through the supply chain management approach to higher education administration, extended enterprise business processes have the potential to improve the efficiency and effectiveness of service to students, which in turn may increase education quality, student retention and graduation rates, and overall student satisfaction.

References

- Alexander, P., Schallert, D. & Reynolds, R. (2009). What is learning anyway? A topographical perspective considered. *Educational Psychologist*, 44(3), 176 – 192.
- American Association of University Professors (AAUP) (2024). Joint Statement on Rights and Freedoms of Students. *AAUP Reports and Publications*. <https://www.aaup.org/report/joint-statement-rights-and-freedoms-students>
- American Society for Quality (2023). Fishbone Diagram. <https://asq.org/quality-resources/fishbone>
- Bayrak, T. (2020). A content analysis of top-ranked universities' mission statements from five global regions. *International Journal of Educational Development*, 72, 102130.
- Budd, R. (2017). Undergraduate orientations towards higher education in Germany and England: problematizing the notion of 'student as customer'. *Higher Education*, 73, 23 – 27.
- Calma, A. and Dickson-Deane, C. (2020). The student as customer and quality in higher education. *International Journal of Educational Management*, 34(8), 1221 – 1235.
- Chau, K-Y, Tang, Y.M., Liu, X., Ip, Y-K, & Tau, Y. (2021). Investigation of Critical Success Factors for Improving Supply Chain Quality Management in Manufacturing., *Enterprise Information Systems*, 15(10), 1418 – 1437.
- Colin, M., Galinda, R. and Hernandez, O. (2015). Information and Communication Technology as a Key Strategy for Efficient Supply Chain Management in Manufacturing SMEs. *Procedia Computer Science*, 55, 883 – 842.
- Goldsby, T.J. & Garcia-Dastugue, S.J. (2003). The manufacturing flow management process. *The International Journal of Logistics Management*, 14(2), 33 – 52.
- Laing, C.L. & Laing, G.K. (2016). The student-as-customer metaphor: A deconstruction using Foucauldian constructs. *Australian Accounting, Business, and Finance Journal*, 10(1), 40 – 54.
- Lambert, D.M. (2014). *Supply Chain Management: Processes, partnerships, performance, 4th edition*. SCM Institute.
- Lambert, D.M., Cooper, M.C., & Pagh, J.D. (1998). Supply Chain Management: Implementation issues and research opportunities. *The International Journal of Logistics Management*, 9(2), 1 – 19.
- Langley, Jr., C.J., Novack, R.A., Gibson, B.J., & Coyle, J.J. (2025). *Supply Chain Management: A logistics perspective, 12th edition*. (Cengage Learning).
- McAllister, K. & Corrigan, T. (2023, Sept 6). The 2024 best colleges in America: Princeton, MIT

- and Yale take top spots. *The Wall Street Journal*.: <https://www.wsj.com/us-news/education/wsj-best-college-rankings-princeton-12c44c47>
- Naidoo, R. & Jamieson, I. (2005). Knowledge in the marketplace: The global commodification of teaching and learning in higher education. In *Internationalizing Higher Education: Critical Explorations of Pedagogy and Policy* (Eds: P. Ninnes and M. Hellsten), pgs. 37 - 52. Hong King University Press.
- Ng, I.C. & Forbes, J. (2009). Education as service: The understanding of university experience through the service logic. *Journal of Marketing for Higher Education*, 19(1), 38 – 64.
- Simchi-Levi, D., Kaminsky, P, & Simchi-Levi, E. (2021). *Designing and managing the supply chain: Concepts, strategies, and case studies, 4th edition*. McGraw-Hill Higher Education.
- U.S. News and World Report Best Colleges Rankings*. USNews.com. Retrieved Mar 27 from <https://www.usnews.com/best-colleges>
- What is a product agreement?* Contractscounsel.com. Retrieved Mar 5, 2024 from <https://www.contractscounsel.com/t/us/product-agreement#:~:text=A%20product%20agreement%20is%20a,the%20licensing%20of%20intellectual%20property>.
- WSJ/College Pulse Rankings. 2024 Best Colleges in the U.S. Retrieved April 10, 2024 from https://www.wsj.com/rankings/college-rankings/best-colleges-2024?mod=article_inline
- Student rights in higher education*. Wikipedia.org. Retrieved Mar 27, 2024 from https://en.wikipedia.org/wiki/Student_rights_in_higher_education

A Review of Internships in Tennessee Accounting Firms

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A Review of Internships in Tennessee Accounting Firms

Abstract

The accounting profession is facing a growing crisis as it seeks to attract entry-level accounting staff. In Tennessee – like many states – accounting graduates, the primary talent pool for entry-level staff, are in decline. In a recent two-article series, the *Tennessee CPA Journal* reviewed the staffing crisis and the declining trend in accounting enrollment at Tennessee universities. To address the staffing shortage, the accounting profession must quickly analyze the causes and adapt to meet the demands of today’s workforce. Proposed solutions include improving salaries, revising CPA exam requirements, and improving internships. This article reports on one potential area of interest — accounting internships — and provides specific internship-related guidance for accounting firms and other employers who offer accounting internships. Accounting students were surveyed on key factors related to their accounting internship experience, including the number of internships completed, semester taken, employer type, internship pay rates, first-year salary expectation, and professional commitment. This information may be useful for employers who see internships as a primary means of recruiting the best and brightest accounting majors to their firms.

Keywords: accounting internship; pay rates; accounting salary; professional commitment

Introduction

The accounting profession is facing a growing crisis as it seeks to attract entry-level accounting staff (Rooney 2024; Rooney 2023). To address the staffing shortage, the accounting profession must quickly analyze the causes and adapt to meet the demands of today’s workforce. Proposed solutions include improving salaries, revising CPA exam requirements, and improving internships (Burke and Polimeni, 2023; Galbreath, Jobe, and Chen, 2023; Galbreath, Chen, and Jobe, 2023; Cohen, 2023; Kenney, 2024).

This article provides an in-depth investigation of one potential area of interest — accounting internships — and provides specific internship-related guidance for employers who offer accounting internships. Accounting students were surveyed on key factors related to their accounting internship experience, including the number of internships completed, semester taken, employer type, internship pay rates, first-year salary expectation, and professional commitment. The information gleaned from the survey may be useful for employers who see internships as a primary means of recruiting the best and brightest accounting majors.

Internship Survey

Results reported are from a survey conducted from September 6 to October 15, 2023, of accounting majors from five middle Tennessee universities.¹ One hundred and seven current accounting students returned completed surveys for a 16.6% response rate. Of the students returning completed surveys, 60 (56%) reported completing at least one internship. Students were surveyed on key questions related to their accounting internship experience, including:

¹ The universities participating in the survey are Freed-Hardeman University, Lipscomb University, Middle Tennessee State University, Trevecca Nazarene University, and Union University.

1. **Internships Completed:** How many internships did you complete while in college?
2. **Internship Semester:** In what semester(s) did you complete an internship?
3. **Internship Employer Type:** Which of the following best describes the organization(s) where you completed an internship? (A list of various employer types was provided.)
4. **Internship Pay Rate:** What was the average per hour pay rate for each internship completed? (A list of salary ranges was provided.)
5. **First-Year Salary Expectation:** What starting salary do you expect for a full-time, entry-level position at your anticipated employer?
6. **Professional Commitment:** Consider the accounting profession and rate 11 statements using the 5-point scale provided. The following statements were adapted from the Allen and Meyer (1990) Organizational Commitment scale:
 1. I would be very happy to spend the rest of my career in the accounting profession.
 2. I really feel as if the accounting profession's problems are my own.
 3. I think that I could easily become as attached to another profession as I am to the accounting profession.
 4. I am not afraid of what might happen if I quit an accounting job without having another one lined up.
 5. It would be very hard for me to change my major right now even if I wanted to.
 6. One of the major reasons I would continue to work in the accounting profession is that leaving would require considerable personal sacrifice as another profession may not match the overall benefits the accounting profession offers.
 7. I do not believe that a student must always be loyal to his or her original major choice.
 8. If I got another offer for a better job outside the accounting profession, I would not feel it was right to leave the accounting profession.
 9. I was taught to believe in the value of remaining loyal to one organization.
 10. Things were better in the days when people stayed with one organization for most of their careers.
 11. Knowing what I know about the accounting profession today, I would recommend an accounting major to college students.

The survey results for each question are reported below.

Internships Completed

The first survey question asked the accounting students how many internships they completed. Of the five universities in this study, two accounting programs require internships as a graduation requirement, and three programs do not require internships but will allow students to count internship hours for elective credit. As reported in Table 1, almost 50% of the students who completed an internship reported completing only one internship. Another 45% reported completing two to three internships. Very few students reported completing more than three internships. In recent years, internships have become a preferred hiring model in the accounting profession. This has resulted in a steady increase in demand for accounting interns. One expected

result of this increase in demand is the number of students who complete multiple internships.

One limitation of the data is that the student's class rank was not collected. Obviously, seniors will have more opportunities to pursue internships than either sophomores or juniors due to the longer-duration of their academic career. This data limitation does not allow segmenting the data to investigate completing internships and different class rank levels. Despite limitations, the data still presents a trend of just under 25% of students in the survey seeking multiple internship experiences. This is likely driven by three factors namely, increasing internship opportunities, increasing internship compensation, and increasing educational costs. Due to the staff shortage, firms are aware of the increasing importance of internships in attracting new, qualified employees and are offering more internships with higher salaries. Students often have a desire to complete multiple internships to not only earn funds to pay for college but also to "test drive" the job with multiple employers before signing on the dotted line for a full-time position. The companies and firms that best respond to these desires will likely have fewer staffing issues and recruit more new staff.

Internship Semester

The second survey question asked accounting students when they completed an internship. As reported in Table 2, students completed most internships during the summer semester with the spring semester following a close second. Completing internships in the fall semester was the least commonly reported semester. Traditionally, accounting firms experience their greatest staffing demands during the first quarter of the year; thus, spring internships have typically been the preferred and most common internship semester. An interesting observation in this data is that summer replaced the spring semester as the period with the most internships. One potential explanation for this finding is due to the lack of availability in the spring for certain segments of the student population. Student athletes, for example, often find that the summer semester is the only available window to complete internships due to the time demands of their sport during the fall and/or spring. Other accounting students located in more rural settings may lack local accounting opportunities needed to simultaneously pursue an internship and complete coursework. Another likely explanation is the aforementioned overall growth in demand for multiple accounting internships. The general lack of required coursework during summer months may lead many students to explore internship opportunities during this traditional break from coursework. At the same time, summer internship opportunities have also increased on the employer side. Based on these results, firms need to look beyond the needs of their traditional busy season internships to reach more students during semesters when they have more availability.

Internship Employer Type and Pay Rates

The third and fourth survey questions asked the accounting students to identify the type of employer where they interned and the pay range of their internship. Table 3 summarizes the results for these two questions. Students reported the most internships with local public accounting firms (22). Regional and national/international, non-Big 4 public accounting firms tied for second and third place with each reporting 14 internships. Big 4 public accounting firms were close behind in fourth place with 12 internships. Students also reported completing internships with employers in the following areas: financial services (9), governmental agencies (8), healthcare (8), and manufacturing (4). All combined, internships from public accounting firms comprised over two-thirds of the reported total – 62 out of 93. As expected, the major driver for internships is from public accounting. Given that the majority of competition for accounting interns is still arising from

with-in the public accounting field, it is imperative that firms have a strong grasp on the compensation packages required to successfully attract and retain accounting interns. In addition, another key observation is that nearly one-third of accounting interns accepted opportunities outside public accounting. Since these non-public accounting firms tend to offer lower wages, salary alone does not appear to be driving the internship decision. Firms must identify what additional factors are attracting potential staff accountants. Some of these factors may result from generational differences and require structural changes in how firms operate if they want to continue to attract staff from this emerging talent pool.

Regarding accounting internship hourly pay rates, as expected the Big 4 firms lead the way with the overall highest rates with about 92% offering \$24-\$31 or higher pay rates. National/international, non-Big 4 firms offer the second highest pay rates with about 93% of their offers between \$20-\$31 or higher. Regional public accounting firms offer the third highest pay rates with about 79% of their offers between \$20-\$30. Local public accounting firms have a much wider range of offers with 59% of their offers between \$20-\$30 and about 41% at \$19 or less per hour. Most of the non-public accounting firms offer internships at pay rates of \$23 or less per hour. In this survey, while the Big 4 firms offered compensation rates that were the highest reported rates, their pay rates were closely followed by the next highest tier of public firms. Before using this data for establishing wage levels, a cautionary note or two is perhaps in order. First, this data was collected during the fall of 2023 so pay rates may have changed. Second, accounting students provided their historical recollections. And third, many businesses are currently reviewing salary points in response to recent months of higher than normal inflation rates. Given these variables, the wage data reported here may already be dated and, likely, understates the current market rates of pay.

First-Year Salary Expectations

The fifth question examines whether accounting students who complete internships have higher first-year salary expectations. As shown in Table 4, the answer is yes, but the picture is not as straightforward as expected. Accounting students who complete two or more internships have a higher first-year salary expectation of \$64,167 when compared to students who completed no internships (\$61,563) and students who completed one internship (\$56,500). However, an interesting finding is that in this survey students who completed only one internship actually have the lowest first-year salary expectation (\$56,500), even lower than students who completed no internships. While these findings are somewhat confusing, perhaps one explanation is that there is some correlation between the number of internships a student completes and the overall quality of the student that results in higher first-year salary expectations. Simply put, better students typically have more opportunities to pursue internships. Anecdotally, one co-author who oversees accounting internships, reports that typically only the best one or two students in an introductory accounting course receive an internship offer immediately following this course. These students will also likely receive additional internship opportunities during their sophomore, junior and senior years. This creates a situation where better students get more internship opportunities and gain more experience in the accounting profession in the process. One obvious takeaway is that students, like most other workers, expect to be compensated for the experience they bring to the job. Thus, students who complete multiple internships are more likely to expect higher starting salaries than students with zero or only one internship experience. Firms should consider both the salary expectations and potential benefits when marketing to this group of more experienced accounting students.

Professional Commitment

The final question examines the students' level of commitment to the accounting profession by comparing the professional commitment level of accounting students who have completed internships with those who have not completed an internship. To measure professional commitment, students were asked to rate 11 statements from the Allen and Meyer (1990) Organizational Commitment scale. The questions from the original scale were slightly modified to suit a student's perspective for professional commitment, and one question deemed irrelevant was removed. Students rated each of the 11 statements listed earlier in the Internship Survey section using a five-point Likert scale: 1-Strongly Agree, 2-Agree, 3-Neither Agree nor Disagree, 4-Disagree, and 5-Strongly Disagree. The professional commitment is the sum of the student's response to all 11 questions.

As shown in Table 5, accounting students who complete two or more internships have a higher level of professional commitment (36.44) when compared to students who completed no internships (35.37) and students who completed one internship (33.71). An interesting finding is that in this survey students who completed only one internship actually have the lowest professional commitment (33.71), even lower than students who completed no internships (35.37). The unusual finding for students who completed only one internship is in line with their lower starting salary expectations revealed in Table 4.

Given the present need for accounting talent, companies must strive to provide interns with a positive internship experience to keep them invested and engaged in the accounting profession. One possible explanation for the lower level of professional commitment for the "one internship group" may relate to the "one and done" scenario. There may be students who are at first interested in an accounting career but reverse course after having an initial internship experience that does not meet their expectations. The good news for firms is that when students complete multiple internships their degree of professional commitment increases. Given the trade-offs presented in Tables 4 and 5, if firms are willing to pay more in terms of starting salaries, then they may be able to attract accounting graduates who have more experience (i.e., completing multiple internships) and who exhibit greater levels of professional commitment.

Conclusion

In this survey of accounting students, more than half of the students reported completing at least one internship, and completing multiple internships was not uncommon. Students reported completing most internships in the summer semester followed closely by the "busy season" spring semester. Most internships were with public accounting firms with students reporting the most internships with local public accounting firms. Internship hourly pay for most public accounting firms was \$20 or more. Big 4 public accounting firms offered the highest overall pay rates between \$24-\$31 or higher. When considering first-year salary expectations, students who completed two or more internships had a higher first-year salary expectation than those who completed no internships or only one internship. When considering professional commitment, students who completed two or more internships reported a higher level of professional commitment than those that completed no internships or only one internship. Future research should investigate the unexpected and lower results for the "one internship" group to determine why students who complete one internship have lower first-year salary expectations and lower professional commitments than students who complete no internships.

As the accounting staffing crisis continues, employers must consider the frequency, timing, and type of internships they offer as well as the compensation they are willing to pay. Firms offering only spring semester “busy season” internships must consider how their recruitment model will identify, attract, and engage accounting interns who are limited (by athletic constraints, curriculum demands, university location, etc.) to only summer or fall internships. The needs of firms are too great and the competition for accounting students too high for firms to concede a large segment of their potential recruiting class. As for the type of internship, two-thirds of interns worked in public accounting, and the remaining one-third were interning in governmental, manufacturing, financial or healthcare. Firms and companies interested in attracting accounting interns must be vigilant in understanding that many students desire multiple internships. Traditionally, accounting recruiters have frowned upon students wanting to pursue multiple internships and have instead attempted to “lock down” promising interns with full-time offers immediately at the conclusion of their internship. This research indicates that students are frequently pursuing multiple internships throughout their academic career. Rather than attempt to discourage the trend, firms and companies should embrace it and consider how they can leverage the benefits of multiple internships in their recruitment models. Given the findings that students who complete multiple internships have higher professional commitment, this multiple-internship model could also lead to the development of accounting professionals with greater commitment. Offering students a good internship experience in all semesters is an important factor to attract students and develop them into productive long-term employees committed not only to the firm but also to the accounting profession.

References

Allen, N. J. and Meyer, J. P. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of Occupational Psychology*, 63, 1-18.

Burke, Jacqueline A. and Ralph S. Polimeni (2023). The accounting profession is in crisis: A partial solution to the shortage of accountants. *The CPA Journal*, December 2023. Retrieved on March 5, 2024, from <https://www.cpajournal.com/2023/12/01/the-accounting-profession-is-in-crisis/>.

Cohn, M. (2023). Less than 1% of firms can find enough staff. *Accounting Today*. Retrieved on February 5, 2024, from <https://www.accountingtoday.com/news/less-than-1-of-accounting-firms-can-find-enough-staff>.

Galbreath, Susan C., Han-Sheng Chen, and Mark Jobe (2023). A historical analysis of accounting salaries as a key factor in the staffing crisis *Journal of Business, Industry, and Economics*, Volume 28, Spring/Fall 2023, 53-73.

Galbreath, Susan C., Mark Jobe, and Han-Sheng Chen. (2023). Staying competitive in a tight hiring market. *Tennessee CPA Journal*, March/April 2023, 8-11.

Kenney (2024). What top accounting academics suggest to attract talent. *Journal of Accountancy*, January 25, 2024. Retrieved on February 5, 2024, from <https://www.journalofaccountancy.com/news/2024/jan/what-top-accounting-academics-suggest-to-attract-talent.html>.

Rooney, N. (2024). Tennessee CPA talent strategy series: The future of the profession. *Tennessee CPA Journal*, January/February 2024, 18-21.

Rooney, N. (2023). Tennessee CPA talent strategy series: The future of the profession. *Tennessee CPA Journal*, November/December 2023, 22-26.

Table 1 Internships Completed	
Number of Internships Completed	Number of Students*
1	28
2	15
3	10
4	0
5+	3
*Only 56 students answered the first question regarding how many internships they completed.	

Table 2 Internship Semester	
Semester	Number of Internships Completed
Fall	18
Spring	31
Summer	44

Table 3
Internship Employer Type and Hourly Pay Rates

Employer Type	N	Hourly Pay Rate						
		Unpaid	\$15 or less	\$16 to \$19	\$20 to \$23	\$24 to \$27	\$28 to \$30	\$31 or more
Public Accounting, Big 4 Firm	12		1			3	6	2
Public Accounting, National/International, non-Big 4	14		1		5	4	3	1
Public Accounting, Regional Firm	14	1	1	1	4	6	1	
Public Accounting, Local Firm	22		8	1	10	2	1	
Governmental Agencies	8		2		6			
Financial Services	9	1	4		3	1		
Manufacturing	4	1		2			1	
Healthcare	8	1	1		5	1		

Table 4 First-Year Salary Expectations		
Number of Internships Completed	N	Mean First-Year Salary Expectation
No Internship	36	\$61,563
One Internship	28	\$56,500
Two or More Internships	28	\$64,167

Table 5 Professional Commitment		
Number of Internships Completed	N	Professional Commitment
No Internship	36	35.37
One Internship	28	33.71
Two or More Internships	28	36.44

Education, Technology, and Income Inequality

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1. Introduction

How do education and technology effect income inequality?

The income inequality literature identifies education and technology among other as key factors.

In development economics and human capital, the findings from theoretical works show that the effect of education on income inequality is ambiguous (Becker [1966] and Knight and Sabot [1983]). Education can either contribute to income inequality or reduce income inequality. Therefore, this question is ultimately empirical. Most empirical findings support the hypothesis that increased investment in education reduces income inequality (Becker and Chiswick [1966]; Chiswick [1966]; De Gregorio and Lee [2002]).

There are also quite a few papers that examine the effect of technology on income inequality and results suggest that technology contributes to income inequality (Acemoglu [2002][2003], Autor and Acemoglu [2011]).

This paper presents the empirical results on how technology and education are related to income inequality in a panel data set covering six countries: Argentina, Brazil, Canada, Chile, Mexico, and the Unites States.

2. Empirical model

Our empirical specification takes the following form:

$$Gini_{it} = C + \alpha Edu_{it} + \beta Trade_{it} + \gamma Inf_{it} + \eta Growth_{it} + \theta Tech_{it} + \varepsilon_{it} \quad (1)$$

Where subscripts of i and t are country and time respectively. Gini denotes Gini coefficient, Edu denotes education, trade denotes international trade which is the sum of export plus import, inf denotes inflation rate, growth denotes GDP growth rate, and Tech denotes technology improvement/investment as measured by research and development (R&D) spending as a percentage of GDP.

The purpose of this study is to discover the sign and magnitude of the coefficient θ and α . If estimates of θ are positive, increased technological investment

is associated with higher income inequality. On the other hand, if estimates of θ are negative, then increased technology investment is associated with lower income inequality. Similarly, if estimates of α are positive, higher education spending is associated with higher income inequality. On the other hand, if estimates of α are negative, then higher education spending is associated with lower income inequality.

In order to address the potential for reverse causation from income inequality to technology in equation (1), instrumental variable (IV) estimation will also be employed. The instrumental variable we use is patent applications, because the increases and decreases in these applications do not strongly correspond to movements in income inequality.

3. Data

Annual data for each of the six countries in our sample from 2013 to 2022 for primary school enrollment ratio (This ratio is calculated by dividing the number of students enrolled in primary education regardless of age by the population of the age group which officially corresponds to primary education, and multiplying by 100), GDP growth rate, trade as percent of GDP, research and development expenditure as percent of GDP, and Patent applications are collected from World Development Indicators Database (<https://databank.worldbank.org>) and Gini coefficients for each sample country are collected from Standardized World Income Inequality Database (<https://fsolt.org/swiid/>).

4. Empirical results and main findings

Table 1 reports estimated results of gravity regressors from equation (1). The fifth row presents the OLS estimate of technology. The coefficient is negative and significantly different from zero at the one percent level, suggesting that increased technological investment is associated with lower income inequality. One percent increase (better) in technology investment is associated with 3.24 percent decrease in Gini coefficient.

The last row provides the estimate of technology from the IV model. The coefficient is again negative and statistically significant at the one percent level, suggesting that increased technological investment is associated with lower income inequality. Of note is that the absolute value of the coefficient estimate is smaller than its OLS counterpart, as is expected with the use of IV models.

Multiple mechanisms exist for explaining the impact of increased technological investment and improved technology on reducing income inequality. Technology can provide the unemployed additional opportunities to acquire new

skills and obtain a higher paying job. Technological advance can also improve productivity, efficiency, and profitability, thus increasing hiring by firms.

We also can see the impact of education on income inequality in the results. The first row of Table 1 presents the OLS estimate of education, as measured by primary school enrollment. The coefficient is positive and significantly different from zero at the one percent level, suggesting that increased education is associated with higher income inequality. One percent increase (better) in education is associated with 5.215 percent increase in income inequality. This finding is opposite to most empirical findings support that increased investment in education reduces income inequality. One possible explanation is that disparities in educational quality contribute to income inequality. Another is that the existence of a greater technological stock may itself impact the distributional effects of returns to education.

Table 1: estimates of coefficients

Variables	Coefficient
Edu	0.5215**
Growth	0.149
Inf	-0.248**
Trade	-0.132**
Tech	-3.24**
Tech-IV	-2.4**

Coefficients significantly different from zero at 0.05 (0.01) level marked with one (two) asterisk(s).

5. Conclusions

We find a statistically significant negative correlation between technology and income inequality from both OLS and IV estimations. These results suggest that increased technological investment can reduce income inequality. Our results contradict most findings in the literature with respect to the impact of technological investment on income inequality. We also find a statistically significant positive correlation between education and income inequality. This result contradicts most findings in the literature which shows that increased education reduces income inequality. Our finding provides support to the findings from theoretical works in

development economics and human capital.

References

Acemoglu, Daron, "Technical Change, Inequality, and the Labor Market." *Journal of Economic Literature*, 40 (1): 7-72, 2002

Acemoglu, Daron, and David Autor, "Skills, Tasks and Technologies: Implications for Employment and Earnings," in *Handbook of Labor Economics*, Vol. 4, 1043–1171, 2011.

Acemoglu, Daron. and Pascual Restrepo, "Tasks, Automation, and the Rise in U.S. Wage Inequality," *Econometrica*, 90: 1973-2016, 2022.

Becker Gary "Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education," NBER Discussion Paper, 1964.

Becker, Gary and Barry Chiswick, "Education and the Distribution of Earnings," *American Economic Review, Papers and Proceedings*, 56, 358-69, May, 1966.

Chiswick, Barry, "Earnings Inequality and Economic Development," *Quarterly Journal of Economics*, 85, 21-39, 1971.

De Gregorio, Jose and Jong-Wha Lee, "Education and Income Distribution: New Evidence from Cross-Country Data," *Review of Income and Wealth*, Series 48, Number 3, 2002.

Knight, John and Richard Sabot, "Educational Expansion and the Kuznets Effect," *American Economic Review*, 73, 1132-6, 1983.

The Future of Accounting Education with a Technology Focus

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INTRODUCTION

“If the rate of change on the outside exceeds the rate of change on the inside, the end is near.”

–Jack Welch, former CEO, General Electric

For decades, academics and practitioners have proposed significant changes to accounting education to keep up with changes in the accounting profession. Many serious and formal efforts have been made such as Albrecht & Sack (2001) and Lawson et al. (2014) and numerous articles have been written and published. Changes have been made to the existing accounting education at the time. But in the currently rapidly changing environment awash with emerging technologies such as artificial intelligence, the questions that beg to be asked are:

Have we made the necessary changes? Are we keeping up with changes in the accounting profession with concomitant effectual changes in accounting education?

This article will attempt to answer that these questions and provide some insights to address changes in accounting education that are needed now.

MOTIVATION

Often in the past, accounting education was designed to prepare accounting majors to take and pass the CPA exam. After the advent of microcomputers and other advanced technologies, there was an obvious need to address the knowledge base needed by accountants regarding technology. The 2003 revision of the CPA exam included questions related to technology with a new Business Environment & Concepts (BEC) section (Johnson 2003). This change was related to the need for accountants, over 20 years ago, to be knowledgeable about relevant aspects of technology at that time.

Another change in that version of the CPA exam intended to address gaps between the exam and professional accounting practice was simulations (Johnson 2003). Simulations tested and assessed knowledge and skills of realistic work situations appropriate or expected of entry level CPAs. They included activities such as professional research and writing.

Another, more recent round of changes to the CPA exam was completed to bring more of the “real world” actual business and accounting environment to the exam. On January 6th, 2024, the AICPA introduced a new version of the Uniform CPA Exam. This exam removed the Business Environment and Concepts (BEC) section and replaced it with three new sections:

- Business Analysis and Reporting (BAR)
- Information Systems and Controls (ISC), and
- Tax Compliance and Planning (TCP)

Therefore, the motivation for this article is: Given the constant changes in the environment for business and accounting, and given the current content of accounting curricula, how might we conduct a gap analysis? Indeed, what is the gap between what is being taught in accounting education

and the reality of knowledge, skills and abilities needed in the profession? Is there a framework that can address whatever gap may exist?

A comprehensive study should be undertaken to assess the history of accounting education and gaps in the past including resulting changes to accounting education following Lawson et al. (2014). It seems likely that the pace of change in the environment is greater than the pace of change in academe. It also seems likely that curricula need to consider some new, innovative courses to complement traditional classes with ones that more directly address the knowledge and competencies needed in the workplace. The same could be said for accounting education addressing the most recent changes in the CPA exam (CPA Evolution, 2024). For instance, the new ISC section covers not only information systems and data management, but security, privacy, and Systems and Organization Controls (SOC) reports. This list alone suggests changes to accounting curricula to make sure those topics are covered.

Specifically, two angles need to be considered and reviewed by such a study:

- 1) Based on prior research into the future of accounting education, what changes have been made to date?
- 2) Based on the knowledge of current needs in accounting, what changes seem to both be necessary and achievable for the future of accounting education?

LITERATURE REVIEW

The first step this research took was to examine a selected sample of some previous articles that addressed the topic of the future of accounting education and analyze changes that did or did not follow. Based on the analysis from the research, a framework will be proposed for achievable changes to current accounting curricula to adapt to recent and current changes and evolving needs in business, industry, and public accounting.

The first article that was analyzed was “The Perilous Future of Accounting Education” written by Steven Albrecht and Robert Sack (Albrecht/Sack, 2001). It could be considered a landmark research study based on how it came about. Four major professional groups with a desire to improve accounting education joined together to study the current and future problems associated with accounting education (The Institute of Management Accountants (IMA), the American Accounting Association (AAA), the American Institute of Certified Public Accountants (AICPA), and the Big 5 professional services firms created a Sponsors Task Force and funded the study). The Sponsors Task Force selected Steve Albrecht and Bob Sack to complete the research and write the study’s final report. Surveys were conducted, focus groups were held, and a significant number of one-on-one interviews were held to form the basis for the Task Force’s research and the development of the final report.

The authors concluded that accounting education as currently structured at that time, was outdated, broken and in need of significant modification (Albrecht/Sack, 2001). They suggested three changes: technology, globalization, and investor power in the capital markets.

History indicates some changes were made in technology. For instance, many curricula began to adopt a class for “Accounting Information Systems” and state societies began to require that course to take the CPA exam. History also suggests that the changes in technology are probably at a faster

pace than changes in accounting education for technology. Thus, accounting education may well be further behind than it was in 2001.

It is also true that some changes were made for globalization. Audit classes and textbooks began to incorporate international auditing standards (IAS). In some cases, curricula adopted international taxes in an advanced tax course.

The investor power in capital markets was probably covered in a finance course and hopefully accountants took that class.

The next one chronologically was a study to determine not only what skills are needed in accounting education, but empirically rank and rate each skill (Burnett, 2003). The study was conducted by a regional university that used a Likert scale of satisfaction for the accounting education of its students. The survey went to employers of graduates, local CPA firms (respondent firms), and the state society of CPAs member (respondent CPAs). The scale was from 1 (very poorly) to 5 (very well), with 3 being “okay”.

- Respondent firms (local CPAs) median was 3.34
- Respondent CPAs (state wide CPAs) median was 3.23
- Only 1 respondent used a rating of 5

The authors concluded: “These results indicate that the firms and CPAs were not especially dissatisfied with accounting education today. However, we conclude that room for improvement exists because only one respondent answered very well, and over half of the respondents answered okay.”

When respondents were asked what courses should be emphasized, consolidating results of the groups leads to three topics:

- Financial Accounting
- Auditing / Assurance Services
- Information Systems

Respondents were also asked to rate professional skills (table 1), technology skills (table 2), academic/professional interaction, and outside the classroom learning activities using a Likert scale (* $p < .05$).

<p style="text-align: center;">TABLE 1: Professional Skills that Respondents Considered Important to Develop During Education</p>
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Skill	Ranking by firms (<i>M</i>)	<i>t</i> value	Ranking by CPAs (<i>M</i>)	<i>t</i> value
Analytical/critical thinking	4.34	11.64*	4.17	12.93*
Written communications	4.31	11.52*	4.50	20.34*
Oral communications	4.16	8.53*	4.20	12.78*
Teamwork	4.09	6.66*	3.92	8.34*
Decision-making	4.03	6.67*	4.01	11.95*
Computing technology	3.94	6.98*	3.72	9.21*
Professional demeanor	3.84	5.91*	3.96	10.17*
Continuous learning	3.72	4.40*	3.55	4.96*
Leadership	3.69	4.98*	3.72	6.77*
Interpersonal skills	3.65	3.71*	3.29	2.66*
Risk analysis	3.62	3.90*	3.54	5.14*
Business decision modeling	3.59	3.69*	3.72	7.95*
Project management	3.53	3.74*	3.58	5.71*
Customer orientation	3.50	2.88*	3.22	2.36*
Measurement	3.45	3.01*	3.07	.63
Research	3.41	2.63*	3.37	3.22*
Resource management	3.41	2.88*	3.16	1.61
Change management	3.16	.82	2.96	-.42
Salesmanship	3.09	.65	3.07	.58
Negotiation	3.06	.44	3.24	2.05*
Entrepreneurship	2.94	-.54	3.17	1.68
Foreign language	2.22	-6.26*	2.11	-7.90*

TABLE 2:
Technology Skills That Respondents Considered Important for New Hires to Possess

Skill	Ranking by firms (<i>M</i>)	<i>t</i> value	Ranking by CPAs (<i>M</i>)	<i>t</i> value
Spreadsheet software	4.47	14.65*	4.59	19.78*
Windows	3.91	4.47*	4.17	11.89*
Word-processing software	3.81	5.35*	4.03	9.94*
World Wide Web	3.61	4.11*	3.47	3.88*
Information systems planning and strategy	3.50	3.71*	3.20	1.85
Database software	3.41	2.52*	3.15	1.34
Communications software (e.g., Outlook)	3.31	2.06*	3.21	1.65
Project management	3.19	1.00	3.05	.41
Presentation software	3.16	.93	2.97	-.21
Technology security and controls	3.16	1.00	3.24	2.26*
Technology terminology	3.03	.16	3.40	3.88*
File and directory management	3.03	.21	3.17	1.59
Electronic commerce	3.00	0.00	2.64	-3.24*
Technology management and budgeting	2.94	-.40	2.93	-.53
Systems analysis	2.91	-.72	2.85	-1.20
Computer operations management	2.78	-1.49	2.65	-3.35*
Computer hardware	2.69	-1.71	2.47	-4.76*
Graphics software (e.g., Adobe)	2.56	-2.95*	2.36	-5.68*
Other operating systems	2.42	-3.43*	2.16	-7.68*
Intra/extranets	2.19	-4.46*	2.23	-7.15*
HTML and other Web programming	1.88	-7.31*	1.87	-10.86*
Programming languages	1.69	-9.05*	1.57	-15.72*

The professional skills could have been incorporated into multiple classes. For example, the analytical thinking, teamwork, decision making, others could be included in a project for seniors and Masters students in particular. Written skills could be included by adding a research paper or thesis type paper to seniors and Masters classes.

Some of the skills that ranked high (specifically, were significant) might be covered by a class in another discipline. For instance, most universities offer Spreadsheet, Windows, Word in the business computer systems department. The same is true for Systems Planning, Database, and WWW.

Overall, this research paper offered some good insights. In particular, the statement that stakeholders are not dissatisfied with the current curriculum but there is room for improvement.

The next research was a result of the AICPA Vision 2011 campaign that recommended soft skills should be taught in accounting education. The authors suggested that technical skills are necessary but not sufficient for a successful accounting career that includes an individual's selection, retention and advancement (Kermis/Kermis, 2011).

In order to accomplish this goal, the authors suggested a list of skills to add to the technical skills already included in accounting curricula:

- Professional Motivation
- Educational Intelligence
- Soft Skills
- Career Skills
- Time Management

The authors had instituted an incremental lab experience between sophomore and junior years that included all five topics. While these are important to accounting majors, they are not necessarily course subject matter. In fact, many of the public accounting firms offer training for those specific topics in their regularly scheduled training for incoming staff. For instance, some firms offer certain courses for first year staff that might include time management and team building. The second year might include motivation or career skills as the staff member gains experience. And in the following years the firm offers relevant training for where the person is in their career.

Most, if not all, of those topics proposed in this research present some difficulty in being melded into an accounting curriculum. However, these topics are clearly important.

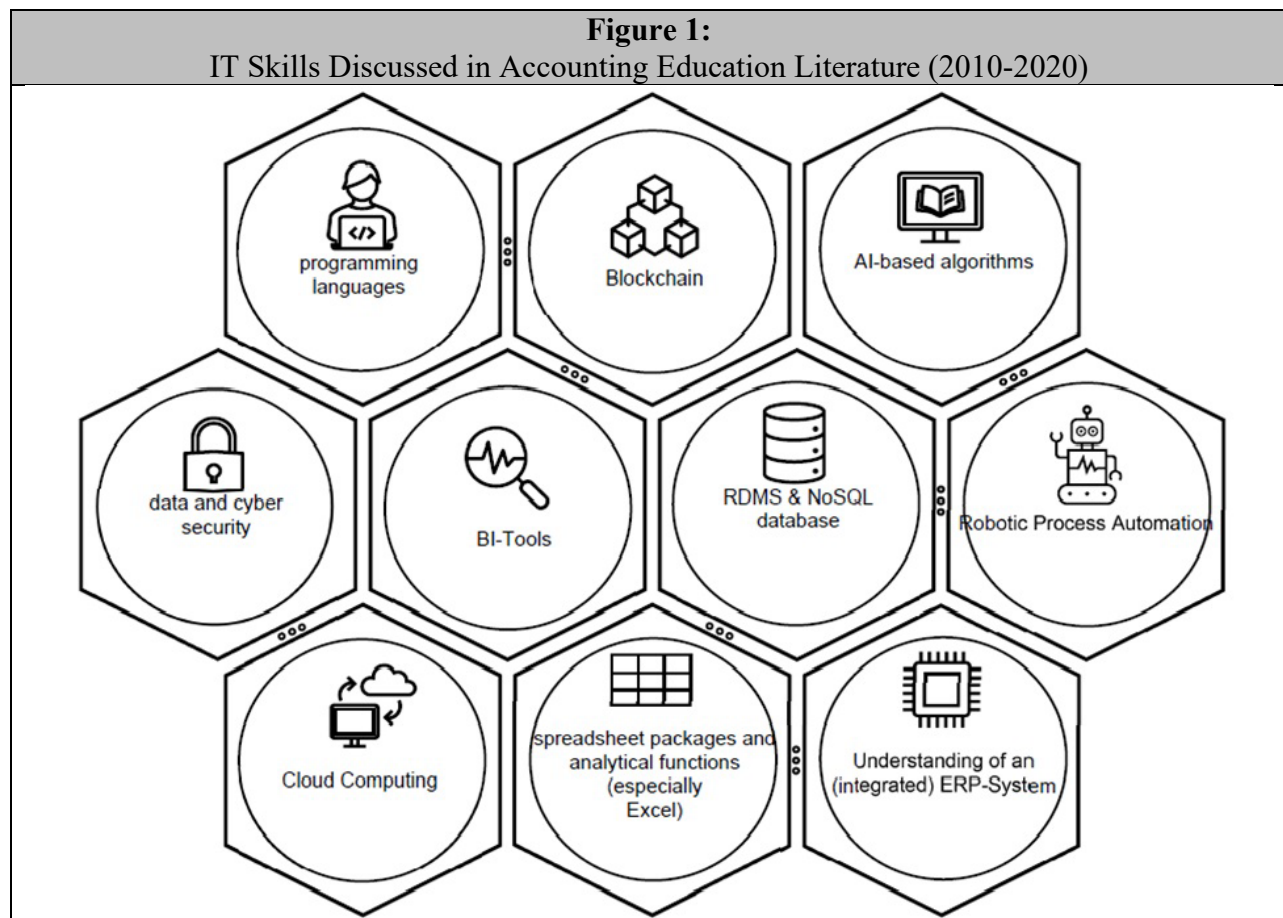
A more recent study is one conducted by academics from Austria (Leitner-Hanelseeder, Susanne; ; Eisl, Christoph; Knoll, Carina; Lehner, Othmar M 2021). The authors used a structured literature review (SLR) to explore what IT skills have been required the last decade and conclude whether these skills meet the requirements of an advanced (semi-autonomous) accounting organization. Their study shows that the accounting education literature identifies the need to integrate advanced IT skills into educational programs.

The search process was organized in a manner to get the best data. They performed a keyword search within the full text of the articles using the publishers' websites and, in case the publishers' websites did not provide an advanced search option, Google Scholar. Several search criteria were defined to select the relevant articles. The search was limited to articles in English language published between 2010 and 2020, as it is assumed that IT skills as an emerging research field gained relevance in the last ten years. The results are in table 3 below.

TABLE 3:	
Results From SLR Articles Related to IT Skills in Relevant Journals (2010-2020)	
REMAINING RECORDS AFTER FULL TEXT SCREENING	24
Accounting Education	10
Advances in Accounting Education	4
Issues in Accounting Education	0
Journal of Accounting Education	8
The Accounting Educator's Journal	2

A perusal of the research on the future of accounting education has at least one commonality which is technology. If that is so important, what can be deduced by the fact of the top five major academic journals on education all together average 2 articles a year? Add to that the Issues in Accounting Education has none. It would seem intuitively obvious that technology is not being discussed in accounting education journals at the level of the need for that skill in accounting. This statistic is profound.

The authors provided a figure to identify the subtopics of technology that were the subject of those 24 articles (see Figure 1 below). It is worth a review to compare even these skills with what is included in each of our own accounting curriculums.



A recent AICPA-National Association of State Boards of Accountancy (NASBA) gap analysis survey provides some insights into needed changes. The survey suggests that there are "significant gaps between what practice is demanding and what students are learning in accounting programs, especially when it comes to systems, data analytics, and digital acumen," said Carl Mayes, CPA, associate director—CPA Quality and Evolution, at the AICPA (Vien,2021).

"Our most recent AICPA Trends Report showed that from 2014 through 2018, what the firms told us is they're hiring 29% fewer accounting graduates. The firms are demanding skills in data analytics and cybersecurity and IT audit and these other areas. Many graduates coming out of accounting programs don't have those skills, so they have to look elsewhere for that talent."

AICPA-National Association of State Boards of Accountancy (NASBA) gap analysis survey of 317 accounting departments. Around half (53%) of them had 1–50 accounting students; 22% from departments with 51–100 students; and 25% from departments with more than 101 students.

TABLE 4: Results of IT-related Topics coverage, often in AIS course, but NOT necessarily classes
<ul style="list-style-type: none"> • Data Analytics (63%) • IT Audit (63%) • IT risks and controls (43%) • IT governance (41%) • Predictive analytics (40%) • Cybersecurity (40%) • Digital acumen (23%) • Systems and Organization Control (SOC) engagements (23%)

It is interesting that SOC report and digital acumen are least covered but both are very prevalent in both public accounting, business and industry. In addition, less than half of curricula have any coverage of cybersecurity yet it is ubiquitous in public accounting and business and industry.

The appealing thing about this article is that all of these can potentially be incorporated into an accounting curriculum either as a standalone class (e.g., IT Audit), as a part of some survey course (e.g., IT for accountants that includes IT risks and controls, IT governance, Cybersecurity, SOC), or a component in one or more courses (e.g., IT risks and controls). Therefore, making these changes is achievable, even making changes that include ALL of the topics is possible.

To summarize, the topics proposed in the above particular research studies into two general groups. One group would be technical skills that should be able to be incorporated into any accounting curriculum (e.g., the figure above). That may be a course, a subtopic in a course, or outsourced to the business technology department but as a required course.

The second would be skills that while important but not a good fit for a course or subtopic in a course. In some cases, it is a skill that can be incorporated into any accounting course. For example, writing, teams, and analytical thinking mentioned earlier. Others may be better delivered in a different department. Still others may not be achievable in any course but rather encourage students to get some training. For instance, time management might be difficult to do in as a subject in an accounting course. It also may not be offered as part of the Management department. Either way, it is not a valid candidate for modifying accounting curriculum.

PROPOSED FRAMEWORK

Using the AICPA-NASBA article as the foundation, and experience at one of the universities represented by the authors, a framework to accomplish changes is proposed.

First, the literature review shows a consistent appearance of technology across time as a skill that needs to be incorporated in the accounting curriculum. Second, a consideration for what public accounting firms are doing suggests skills and topics as well. One expert for the AICPA put it this way:

“Technology is helping firms continue to build out their advisory practices”, said Jim Bourke, CPA/CFF/CITP, CGMA, managing director, advisory services with Withum, who works out of the firm’s Red Bank, N.J., office.

One of the authors worked for a regional public accounting firm for 12 years as line leader for advisory practices. His experience and knowledge is being leveraged to concentrate on those services and technologies related to advisory services provided at that firm (e.g., business valuations, fraud investigations, AUP, SOC reports) to modify accounting curriculum to include topics heretofore not taught at his university.

Therefore, we took the list from the most recent AICPA-NASBA paper, combined it with Bourke’s comment, and the experience of an author from public accounting and developed an approach to incorporating some of these skills and topics. First we identified some methods of incorporating the topics (Figure 2). Then, for each topic, we offer a suggestion as to which of the methods are likely possibilities that should be effective for incorporated that topic into the curriculum.

FIGURE 2: Delivery Methods	
Delivery Method	Description
A standalone course	Like any other course
A special topics “Gap” course	A course with multiple topics (see example) that serves as temporary way to deliver those topics that either become a course or get divided into courses. An effective way to deliver needed skills immediately until a better approach is put into place. Could be delivered as “Special Topics” initially.
Outsource / Cross list	Coordinate with Stats or IT department in business school
Add to existing AC course	Add to an existing AC course with minimal coverage

FIGURE 3: Topics to Include	
Accounting Education Change	Delivery Options
Data Mining & Analytics for Accountants	Course, outsource/stats, or add to AIS
IT (IS) Audit	Course*
IT Risks & Controls	Part of IT Audit, part of “GAP” course, part of AIS
IT Governance	Course, cross list with CIS, part of GAP course
Predictive Analytics	Part of Data Mining, outsource to stats, add to GAP
Cybersecurity	Course, cross list with CIS, add to GAP
Digital Acumen	Course, add to some course, outsource to CIS/Stats
SOC Reports	GAP, Add to financial audit (MAc level)
Advisory Services provided by public acct (AUP, BV, Fraud, Special audits (PCI, HIPAA), cybersecurity, IT consulting)	GAP course
Database	Outsource/Cross list with CIS
IT for Accountants (List of 10 IT topics (AICPA-NASBA figure)	Course, GAP course (“disruptive technologies”), outsource to CIS
*Too much content, too important to do any less	

It would be a difficult challenge to implement all of these at one time and may not even be necessary to do them all. Like similar projects of this nature, it is best to make one or two changes a semester or year until all of those needed have been added. The good news if there is a suitable instructor, it can be done quickly with “Special Topics” or some other unused course.

There are obstacles in trying to implement these changes and today finding a faculty member who can teach these topics is challenging. One possibility is to hire a Ph.D. in accounting who is also a CPA with experience in those areas either in public accounting or business and industry. Hiring adjuncts with the relevant skill set is also a possibility.

CONCLUSIONS

For decades, academics and practitioners have proposed significant changes to accounting education to keep up with changes in the accounting profession. A literature review shows a long list of subject knowledge, skills and abilities that was suggested as changes for accounting education. In fact, one subject seems to be persistent – technology.

In an article in 2018, authors made a conclusion of the following:

“The accounting profession is predicted to experience a significant change in the future, due to technological development, which lead to a transformative effect on accounting practice because of automated and integrated workflows. Therefore, accounting education should include more contemporary technological features, especially IT skills, to meet the demands of employers in the digital era.”
(Htaybat/Alhtaybat/Alhatabat, 2018)

Specifically, we draw from Mintchik et al. (2021) to emphasize the importance of cultivating

the analytical/digital mindset to remain tech-savvy but also agile in adapting to new technological developments. The ability to remain lifelong learners is crucially important to keep up with new and changing technologies relevant to accounting.

Using a combination of some of the lists and some ideas from contemporary practitioners, this article addresses two related concepts: a framework of what should be considered, and a strategy of how to make progress towards change.

Hopefully, accounting education as a whole will adjust to the current needs for change. However, this subject is likely to be around in future years as new technology continues to transform the profession. Indeed these changes promise to be so dramatic and profound that the profession hardly can be traced back to its historical origins in the 19th century.

REFERENCES

- Albrecht, W. Steve and Sack, Robert. "The Perilous Future of Accounting Education". *The CPA Journal*, Vol. 71, Issue 3 (March 2001), p. 16-23.
- Al-Htaybat, Khaldoon; von Alberti-Alhtaybat, Larissa; Alhatabat, "Educating digital natives for the future: accounting educators' evaluation of the accounting curriculum.". *Accounting Education*, Vol. 27, Issue 4 (2018), pp. 333-357,
- Burnett, Shannon. "The Future of Accounting Education: A Regional Perspective". *Journal of Education for Business*, January 2003.
- Johnson, Gregory. "Computerized CPA Exam Only Months Away". *Journal of Accountancy*, September 2003.
- Kermis, George and Kermis, Marguerite. "Professional Presence and Soft Skills: A Role for Accounting Education". *Journal of Instructional Pedagogies*, January 2010,
- Lawson et al. (2014). Focusing Accounting Curricula on Students' Long Run Careers. *Issues in Accounting Education* (2014) 29 (2): 295–317.
- Leitner-Hanetseder, Susanne; Eisl, Christoph; Knoll, Carina and Lehner, Othmar M. "Need for Advanced IT Skills for Accountants – What Does Accounting Education Literature Tell Us?". *Business Education and Accreditation*, Vol.3, No.1 (2021), pp.57-69.
- Mintchik, N., Ramamoorti, S. and Gramling, A.A. 2021. Mindsets as an Enhancement of 21st Century Accounting Education. *Issues in Accounting Education*, 36 (4): 87–118.
- Russell, Keith; Kulesza, C.S.; Albrecht, Steve; Sack, Robert. "Charting the Course Through a Perilous Future". *Management Accounting*, Fall 2000.
- Vien, C. "Wanted: More Systems and Analytics Training for Accounting Students," *Journal of Accountancy*, March 12, 2021