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ARE COURSE GRADES AND FACULTY INTUITION PREDICTORS OF SUCCESS ON PROFESSIONAL ACCOUNTING EXAMS?

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ABSTRACT

This research investigates whether faculty intuition is better than a student's grade point average (GPA) at predicting success on professional accounting exams. This study also investigates the predictive ability of: training office size, professional exam preparation, co-op experience, and case competition participation. A novel dataset is hand-collected based on Lakehead University students who pursued the Chartered Accountant designation in Ontario, Canada. The results reveal GPA as the best predictor, although faculty intuition also has predictive value. Additional analysis reveals that the GPA from courses in financial and management accounting, auditing, and taxation are all predictive of student success. In regards to the other factors, participation in case competitions is the only other factor shown to have some predictive ability. However, case competition participation may be predictive only as an extension of the students with high grades electing, or being encouraged by professors, to participate in case competitions. Overall, this study

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makes many significant contributions to a broad group of stakeholders, including professional accounting bodies, employers, students, and instructors.

Keywords: Professional accounting exams; Predictive ability of GPA; Faculty recommendations; Expert intuition

Data availability: The data used in this study will be made available by the authors for those who wish to replicate these results.

INTRODUCTION

University professors commonly serve as references for students seeking employment. Employers are often interested in a professor's opinion on a student's employability. Technical competency is a facet of employability that is commonly included in reference checks. Technical competency is not only important for completing daily job responsibilities, but also for passing the professional exams required to become a professionally certified accountant.

Faculty members likely believe that their expert opinion (i.e., recommendation) captures more than a simple metric, such as course grades. However, the reliability of faculty recommendations is unclear. This raises many questions. Is faculty intuition sufficiently different from a student's grade point average (GPA) to be useful to potential employers? Would it be better for an employer to simply look at a student's GPA in their undergraduate studies as a predictor of success, especially in regards to professional accounting exams? Are there other factors that could help predict future success on professional accounting exams?

The purpose of this study is to explore whether faculty intuition or undergraduate GPA is a better indicator of success on professional accounting exams. To make this study more robust, we investigate additional factors that may help predict a student's success, including: i) training office size; ii) post-graduate exam preparation programs; iii) summer work experience; and iv) case competition participation (CCP).

Our dataset includes all 38 students who graduated from Lakehead University between 2008 and 2011 and entered into the Institute of Chartered Accountants of Ontario (ICAO) professional program. The dataset is original and distinctive as it was hand-collected over a four year period. The nature of some of the variables makes it difficult to obtain a very large sample size (e.g., the faculty intuition variable requires faculty members to be sufficiently familiar with a student in order to provide an expert opinion). Regardless, the sample is size is sufficient for statistical inferences (Peduzzi et al. 1996; Hogg and Tanis, 2005). The data was obtained from Lakehead University's registrar in accordance with the process outlined by the University's Research Ethics Board.

The results reveal that both GPA and faculty intuition are positively associated with student success. However, GPA is a better predictor than faculty intuition. When drilling down into the composition of GPA, the results reveal that the GPA of the accounting-related courses drives the predictive ability of the aggregate GPA. The results reveal that the GPA from all accounting-related competency areas (financial accounting, management accounting, auditing, and taxation) are positively and significantly associated with student success on professional accounting exams. In regards to the other factors, participation in case competitions is the only factor that has some

predictive value. Summer work experience, training firm office size, and professional exam preparation programs were not found to be significant predictors. Case competition participation may be important because it provides students with the opportunity to develop their case writing skills in time-constrained situations. However, case competition participation may be predictive only as an extension of students with high grades electing, or being encouraged by their professors, to participate in the case competitions.

This paper is organized through the use of six subsections. The first subsection discusses the prior literature and presents the research questions. The next two subsections discuss the data and methodology. Next, the empirical results are presented. The last subsection provides a discussion of the results and conclusions.

BACKGROUND AND RESEARCH QUESTIONS

Employers rely on various metrics when selecting potential employees. It is very common for accounting faculty members to act as a reference for students during the recruiting/hiring process. Employers often ask specific questions which the faculty member is able to answer objectively (e.g., does this candidate attend class regularly?). However, references are also asked to provide insights based on their judgment and intuition. For example, questions relating to employability and technical abilities can be much more subjective.

Much has been written on the relevance and reliability of expert intuition, in general. While many recognise and acknowledge the reliability of expert intuition (Buehlman et al., 1992; Klien, 2002; Gosling et al., 2002; Gladwell, 2009), others suggest that relevant data can serve as a better predictor of a phenomenon (e.g., Taleb, 2009; Kahneman, 2011; Silver, 2012).

Seminal academic research on intuition versus metrics was conducted by Meehl (1954) who compared the accuracy of clinical predictions of medical professionals versus statistical predictions made by combining a few scores or ratings according to a rule. The researchers concluded that the statistical method was either equal or superior to informal clinical judgment. A more recent study concluded that expert opinion performed marginally better than random chance on almost all important topics from the 1980s and 1990s, such as the Gulf War, the Japanese real estate bubble and the potential secession of Quebec (Tetlock, 2005).

Different reasons have been offered as to why expert intuition is inferior to simple algorithms. Two reasons were offered by Meehl (1954). First, experts try to be clever, think outside the box, and consider complex combinations of features in making their predictions even though humans are incorrigibly inconsistent in making summary judgments of complex information. Second, simple algorithms make a consistent recommendation based on the data combinations received whereas expert intuition does not.

Howver, intuitive judgement is said to outperform simple metrics in situations that reflect i) an environment that is sufficiently regular to be predictable; and ii) an opportunity to learn the regularities through prolonged practice. The recruitment techniques used by accounting firms to determine employability also includes elements of expert intuition (e.g. personal interviews) and metrics (e.g. psychological tests scores). For example, employers will often ask students to submit both a transcript and a list of references as part of their application package. Faculty members regularly provide their recommendations likely believing that their expert opinion captures more than a simple metric. Our study extends this argument by investigating whether faculty intuition is

superior to the simple metric of student GPA in predicting student success on professional accounting exams.

To the best of the authors' knowledge, there is no prior study that investigates the accuracy of faculty predictions of student success on professional accounting exams. However, there are some prior studies related to course grades as predictors of success on professional accounting exams. Prior literature investigated the competencies needed to perform well in accounting courses at the university level (e.g., Zhang, 2000; Thurnston, 2000; and Deppe et al., 1991) or the courses considered critical by auditing professionals (Uyar and Gungormus, 2011).

Researchers have investigated the link between grades and professional exam performance in both the United States and Canada. Research on the Certified Public Accountants' designation in the United States reveals a correlation between grades and success on professional exams (Reilly and Settler, 1972; Dunn and Hall, 1984). A more recent study investigated the attributes of Canadian Certified Management Accountant (CMA) candidates who performed well on CMA exams. The results reveal that the GPA in accounting courses was positively associated with success and that exposure to liberal or general education added to student performance (Kapoor and Islam, 2005). Research examining student performance on the Canadian Chartered Accountant's Uniform Final Exam (UFE) was last conducted with data from 1984. The results revealed that GPA was positively correlated with success on the UFE (Kapoor, 1998; Kapoor and Chan, 1985). However, this research is significantly out-of-date, especially considering the Canadian Institute of Chartered Accountants (CICA) moved to a competency-based assessment in 2003.

It is unclear whether the academic accounting environment, when it comes to teaching and evaluation, can be termed as predictable. Prior research has not yet established whether the academic accounting setting is such that faculty intuition is a reliable predictor of student success (i.e., an environment that is sufficiently regular to be predictable and an opportunity to learn the regularities through prolonged practice) (Meehl, 1954). Regardless, employers often require academic references from students applying for accounting positions. This line of argument can be extended to include a faculty member's ability to predict student success on professional accounting exams.

Grades are also used as a reflection of a student's competency and skill. For example, grades are used extensively as an entrance requirement to graduate programs and professional programs. They are also used as part of the hiring and recruiting process. Most accounting firms require students to submit a transcript, along with a cover letter and resume, when applying for positions.

Currently, there is no known prior literature that investigates whether accounting professors provide reliable recommendations in regards to the success of their students on professional accounting exams. Accordingly, this study's first research question is stated as follows:

> **Research Question 1**: Is faculty intuition or undergraduate grades a better predictor of student success on professional accounting exams?

In addition to faculty intuition and GPA, there are many other factors that may help predict a student's success on professional accounting exams. We posit that the following factors may contribute toward student success.

- Training office size: Larger offices may provide more facilities and opportunities for students, which may enhance a student's learning experience. For example, larger firms will have a more

diverse client base (e.g., public and private companies, non-profit entities and governmental organizations) and will likely have more specialists who can provide more specific student mentoring. Larger firms can also offer their employees more opportunities for secondments with similar offices in other cities.

- Post-graduate training: A post-graduate exam training program should be useful to a student's preparation for professional exams, and is therefore expected to be positively related to student success.
- Summer work experience: Summer work experience provides students with some practical experience during their undergraduate studies. It is unclear whether this experience results in improved performance on professional exams. On one hand, practical experience may enrich a student's understanding of the accounting and auditing concepts presented in an undergraduate program. On the other hand, accounting in practice can become murky and more confusing than in the controlled classroom environment.
- Case competition participation: The ICAO professional program exams are predominantly case-based. Participation in undergraduate case competitions should provide students with practice in a time-sensitive, stressful case-based assessment environment. Therefore, student participation in case competitions is expected to have a positive relationship with student success in professional exams.

These four factors lead to the second research question, stated as follows:

Research Questions 2: Can firm size, exam preparation programs, summer work experience or case competition participation help predict student success on professional accounting exams?

DATA SOURCES AND DESCRIPTION

The sample includes all students who graduated from Lakehead University from 2008 to 2011 and entered into the ICAO professional program. The ICAO professional program is selected because the exam results are made available publicly. Therefore, it is possible to track alumni as they progress through their professional careers. The resulting sample size is based on 38 student observations. This sample, although not large in size, is unique, robust and novel, as it was hand collected over a four year period.

The data regarding faculty intuition was obtained based on a questionnaire. The questionnaire is discussed in the following section. The student's GPA data was obtained from Lakehead University's Registrar after approval from the University's Research Ethics Board. The remaining information was obtained from publicly available sources.

Background on ICAO Professional Program

The ICAO professional program led to the CA designation as issued by the CICA (note that the ICAO professional program ceased in 2015 and was replaced by the CPA Canada Professional Education Program). The ICAO professional program included a combination of education and experience components that were organized around the CICA competency map (CICA, 2012):

Competency Area	Approximate Competency Weight
Governance, Strategy and Risk Management	5%
Performance Measurement and Reporting	25%
Assurance	30%
Finance	10%
Management Decision-Making	15%
Taxation	15%

The educational component required students to successfully complete three exams:

- Core-Knowledge Exam: A multiple choice question exam with approximately 100 questions that focused mostly on technical knowledge. The questions were distributed based on the weights of each respective competency area. For example, a student could expect approximately 30 of the 100 questions to be from the assurance competency. This exam was offered twice a year (January and May).
- School of Accountancy Exam: A two-day case exam that was held at the end of a three-week long summer school program in Toronto, Ontario. The exam covered all of the competency areas. The first day was a five hour exam, which consisted of a single, comprehensive case covering most competency areas. The second day was a four hour exam, which consisted of three multi-competency area cases. All cases required students to integrate technical knowledge across competencies and to display professional capabilities. The exam was offered once a year (June).
- Uniform Final Examination: A three-day case exam that covered all of the competency areas and was written uniformly by all candidates across Canada. The first day was a single, comprehensive case. Students had five hours to prepare a response to the comprehensive case. The second and third days consisted of three multi-competency area exams with four hours to prepare a response. The UFE had a rigorous assessment scheme that required candidates to display depth of knowledge in performance measurement and reporting and assurance, and breadth in the remaining competency areas. The exam was offered once a year (September).

The first two exams were written by professional accounting students in Ontario, while the UFE was written by all professional accounting students across Canada (note: students in Western Canada, Quebec, and Eastern Canada all had a different professional program, which culminated with the UFE).

The experience component of the ICAO professional program required students to obtain work experience across the competency areas. Approximately two to three years were required to complete the educational and experience requirements of the ICAO professional program.

METHODOLOGY

Variable Measurement

Measuring Student Success (Dependent Variable)

As discussed above, students were required to successfully complete three exams in order to obtain the Chartered Accountant designation through the ICAO. Successful completion of these three professional exams forms the basis for measuring the dependent variable. For the purpose of this study, success is defined as passing all three exams on the first attempt. Since approximately

90% of students successfully complete all three exams after multiple attempts, passing the exams on the first attempt is the best possible outcome for a student. Approximately 51% of the observations in our dataset are in the success category and labeled as a "1". Students who were unsuccessful in any of the three exams in the first attempt have been labeled as a "0".

Measuring Faculty Intuition (Independent Variable)

Faculty intuition is measured based on data obtained from a questionnaire (Appendix I). The questionnaire allows a professor to rank each student's potential for professional accounting exam success on five metrics: 1) problem solving/analytical thinking; 2) technical skills; 3) professional skills; 4) professional motivation; and 5) overall assessment. It has been established that these factors contribute significantly to perceived student performance in accounting courses (Kealey et al., 2005; Jackling and Calero, 2006, Ulyar and Gungormis, 2011).

The questionnaire employs a 5-point Likert Scale ranging from 1 (strongly disagree) to 5 (strongly agree). The maximum a student can score on the faculty intuition questionnaires is 50 (5 questions on a five point scale measured by two faculty members). The faculty intuition score was converted into a percentage by dividing the student's score on the questionnaire by 50. The faculty intuition score is converted into a percentage in order to maintain a consistency with the GPA variable measurement.

Two faculty members (the two authors) completed the questionnaire relating to faculty intuition during the student's fourth year courses, but before the final exams, to ensure that faculty intuition is not exceedingly influenced by a student's final grade in respective courses. Both faculty members were quite familiar with the students through experiences both inside and outside of the classroom because the number of accounting students in the program is comparatively small. Faculty members taught the students in a minimum of two courses, and up to a maximum of five courses.

Both faculty members had no information about student's performance in courses other than those taught by the faculty member at the time of completing the questionnaire. Therefore, it is unlikely that a faculty member would have been influenced by overall GPA.

Faculty members who completed the questionnaire have more than five years teaching experience, hold accounting designations, and are actively involved in their professional body's educational activities. They were considered to have the required qualifications to offer professional judgment on student success in an accounting professional exam.

Measuring Course Grades (Independent Variable)

The GPA variable is based on the third and fourth year courses, which comprise an accounting major's ICAO's undergraduate course requirements, as follows:

Financial Accounting:
- Intermediate Accounting II
- Advanced Financial Accounting
- Topics in Financial Accounting

Management Accounting:
- Cost Accounting
- Controllership

Auditing:
- Auditing I
- Auditing II
- Information System Auditing

Taxation:
- Taxation I
- Advanced Corporate Taxation

Strategy:	Accounting Theory:
Strategy I	Accounting Theory
Strategy II	

All of the accounting courses in the analysis are part of the course prerequisites for entrance into the ICAO professional program and enable students to write the professional exams. The two non-accounting courses are business strategy courses, which are part of the business degree requirement. Therefore, all students in the sample have taken all of the courses listed above.

The GPA is measured as a percentage, which represents the student's average grade across all of the above-noted courses. Note that in Canada, GPA is not typically presented on a four point basis scale. Presenting GPA as a percentage is a customary practice.

Measuring Other Factors (Independent Variable)

The four additional independent variables are measured as dummy variables as follows:

- Firm Size = a dummy variable with a value of 1 if a student worked with a large firm or 0 otherwise. An accounting firm that is part of a national firm is considered to be large (e.g., Ernst & Young, Grant Thornton, BDO Dunwoody, etc.) as opposed to a local firm that operates in a single city or region.
- Exam Preparation Program = a dummy variable with a value of 1 if a student was enrolled in an examination preparation program or a value of 0 otherwise. An example of an exam preparation program is a case writing program offered by local academics / professionals.
- Summer Experience = a dummy variable with the value of 1 if the student has summer work experience in a public accounting firm during their undergraduate studies or a value of 0 if they did not have work experience in a public accounting firm prior to graduation.
- Case Competition Participation = a dummy variable with the value of 1 if the student participated in one or more case competitions during their undergraduate studies or 0 otherwise.

Research Design

The study employs a quantitative methodology that is based on correlation analysis and logistic regression. In order to answer the first research question, the following logistic regression equation is estimated:

$$Success_i = \beta_0 + \beta_1\ GPA + \beta_2\ FI\_Score + \varepsilon_{i,t} \quad (1)$$

Where,

Success = a dummy variable that receives a value of 1 if the student successfully completes all three professional exams on the first attempt and a 0 otherwise;

GPA = a continuous variable measured as the student's overall grade point average percentage across accounting and non-accounting courses;

FI_Score = a continuous variable measured as the percentage average from a survey completed by two faculty members.

Theoretically, it is possible that a faculty member may be influenced by the student's performance in their class when providing a recommendation. In addition, it is possible that a student who does well in one course is likely to do well in other courses. Whether this translates into an empirical association between GPA and intuition is debatable. Firstly, faculty members are likely to go beyond grades and take into account other characteristics when providing recommendations. Secondly, the courses taught by an individual faculty member should not have a large impact on a student's overall GPA. Lastly, a student's performance in a particular competency area does not necessarily mean that the student will perform well in other areas.

Regardless, the potential for multicollinearity must be addressed because its presence can result in unstable regression coefficients and render individual explanatory variable coefficients difficult to interpret (Berenson, Levin, and Goldstein, 1983). Multicollinearity is assessed by calculating variance inflation factors (VIF) (e.g., Kapoor and Islam, 2005).

The second research question is presented as Equation 2. It is estimated to analyze whether any of the other factors, in isolation, are good predictors of student success on professional exams.

$$Success_i = \beta_0 + \beta_1 \text{ Other Factor} + \varepsilon_{i,t} \quad (2)$$

Where, the other factors are defined as:

Success = a dummy variable that receives a value of 1 if the student successfully completes all three professional exams on the first attempt and a 0 otherwise;

Firm_Size = a dummy variable that receives a value of 1 if the student worked with a large, national firm and a 0 otherwise;

Prep_Program = a dummy variable that receives a value of 1 if the student was part of an exam preparation program and a 0 otherwise;

Work_Exp = a dummy variable that receives a value of 1 if the student had a summer work experience with an accounting firm prior to graduating and a 0 otherwise:

CCP = a dummy variable that receives a value of 1 if the student participated in a case competition during his/her undergraduate program and a 0 otherwise.

As discussed, the sample size is small due to the nature of the variables. It is not possible to have an overly large sample size due to the faculty intuition variable. Broadly speaking, the following equation can be used to evaluate a logistic regression's sample size:

$$n = 10k/p \quad (3)$$

Where n equals sample size, k equals number of covariates and p equals minimum percentage between the negative or positive outcomes (Peduzzi et al., 1996).

In this research, p is approximately 49% (the percentage of observations that were not successful). Therefore, k will be set to a maximum of two covariates in order to require a sample size

of approximately 40.8[1], which approximates this study's sample size of 38. Including a maximum of two explanatory variables per estimation will help control for any bias that may arise from the sample size. It addition, the sample size is also greater than the minimum of 30 required for statistical inference (Hogg and Tanis, 2005).

EMPIRICAL RESULTS

Table 1 presents the descriptive statistics for the dependent and independent variables. Approximately half of the observations in the sample were successful on their professional exams, revealing that the dependent variable has a high degree of variability. The mean GPA and faculty intuition score percentages are 79% and 71.4%, respectively. In regards to the other factors, most students were exposed to an exam preparation program while case competition participation is the

TABLE 1

Descriptive Statistics

	Success	GPA	FI Score	Firm Size	Prep Program	Work Exp	CCP
Mean	.05263	0.7903	0.7712	0.7631	0.7894	0.4736	0.3947
Median	1.0000	0.7917	0.7720	1.0000	1.0000	0.0000	0.0000
Standard Deviation	0.5060	0.0506	0.1240	0.4300	0.4130	0.5060	0.4953
Skewness	-0.1054	-0.1573	-0.0954	-1.2380	-1.4201	0.1054	0.4307
Kurtosis	-1.9889	-0.3690	-0.6027	-0.4674	0.0166	-1.9889	-1.8145

Each variable is defined as:

Success: a dummy variable that receives a value of 1 if the student successfully completes all three professional exams on the first attempt and a 0 otherwise;

GPA: a continuous variable measures as the student's overall grade point average percentage across accounting and non-accounting courses;

FI_Score: a continuous variable measured as the percentage average from a survey completed by two faculty members;

Firm_Size: a dummy variable that receives a value of 1 if the student worked with a large, national firm and a 0 otherwise;

Prep_Program: a dummy variable that receives a value of 1 if the student was part of an exam preparation program and a 0 otherwise;

Work_Exp: a dummy variable that receives a value of 1 if the student had a summer work experience with an accounting firm prior to graduating and a 0 otherwise;

CCP: a dummy variable that receives a value of 1 if the student participated in a case competition during his/her undergraduate program and a 0 otherwise.

[1]Equation 2, which employs a single covariate, requires a sample size of approximately 21 observations.

TABLE 2

Correlation Matrix

		Pearson Correlation						
		Success	GPA	FI Score	Firm Size	Prep Program	Work Exp	CCP
Spearman Correlation	Success	1	0.529**	0.475**	0.091	0.027	0.056	0.335*
			0.001	0.003	0.585	0.871	0.740	0.040
	GPA	0.541***	1	0.863**	0.303	0.044	0.536***	0.455**
		0.005		0.000	0.064	0.793	0.001	0.004
	FI_Score	0.491***	0.838**	1	0.052	-0.011	0.601***	0.435**
		0.001	0.000		0.755	0.947	0.001	0.006
	Firm_Size	0.091	0.279	0.037	1	0.168	0.032	0.323*
		0.585	0.089	0.827		0.314	0.845	0.048
	Prep_Program	0.027	0.059	-0.024	0.168	1	-0.156	0.153
		0.871	0.726	0.888	0.314		0.348	0.359
	Work_Exp	0.055	0.512**	0.606**	0.032	-0.156	1	0.204
		0.740	0.001	0.000	0.845	0.348		0.219
	CCP	0.334*	0.454**	0.474**	0.323**	0.152	0.204	1
		0.039	0.004*	0.003	0.048	0.359	2.218	

*** Significant at the 0.01 level ** Significant at the 0.05 level * Significant at the 0.10 level

Each variable is defined as:

Success: a dummy variable that receives a value of 1 if the student successfully completes all three professional exams on the first attempt and a 0 otherwise;

GPA: a continuous variable measured as the student's overall grade point average percentage across accounting and non-accounting courses;

FI_Score: a continuous variable measured as the percentage average from a survey completed by two faculty members;

Firm_Size: a dummy variable that receives a value of 1 if the student worked with a large, national firm and a 0 otherwise;

Prep_Program: a dummy variable that receives a value of 1 if the student was part of an exam preparation program and a 0 otherwise;

Work_Exp: a dummy variable that receives a value of 1 if the student had a summer work experience with an accounting firm prior to graduating and a 0 otherwise;

CCP: a dummy variable that receives a value of 1 if the student participated in a case competition during his/her undergraduate program and a 0 otherwise.

variable with the least student involvement. The kurtosis and skewness measures for the dependent and independent variables suggest a reasonably normal distribution in order to satisfy the regression estimation assumptions.

Table 2 presents a correlation matrix of the dependent and independent variables. Both Spearman and Pearson correlations are presented because the independent variables related to other factors are binary/ordinal. Both the GPA and faculty intuition variables are positively and significantly related to student success. CCP is the only other factor that is positively associated with student success.

Table 2 also reveals that there are significant correlations between the independent variables. For example, GPA and faculty intuition are shown to be both positively correlated with each other and with summer work experience and CCP. The correlation between GPA and faculty intuition may indicate the presence of multicollinearity when estimating Equation 1, which employs both measures as independent variables. As discussed, VIF testing will be employed in order to investigate the presence of multicollinearity.

The correlation matrix also shows that CCP is positively associated with firm size, suggesting that students who participate in case competitions tend to find summer work experience with larger firms, or, students with summer experience tend to participate in case competitions.

Table 3 presents the logistic regression results from estimating Equation 1 and Equation 2. The results from the logistic regression on Equation 1 suggest that GPA is a better predictor of success on professional exams than faculty intuition. Faculty intuition is shown to have no additional explanatory power over GPA (i.e., GPA is significant at the 10 percent level while faculty intuition is not). The VIF values (not tabulated) reveal that multicollinearity is not present in the regression estimation.

The main conclusion that GPA is a better predictor than faculty intuition is corroborated by analyzing GPA and faculty intuition predictors in isolation. The logistic regressions with the individual covariates reveals that both GPA and faculty intuition are significant and positively associated with student success; however, GPA correctly predicts more student success (73.7%) than faculty intuition (71.1%), and has a higher adjusted count R^2, log likelihood ratio, and McFadden R^2.

We have also included the Akaike Information Criterion (AIC) as an additional test for the Goodness of Fit for each logistic regression. The AIC is recognized as an index that makes a trade-off between model fit (likelihood) and parsimony (number of variables in the model). The AIC value alone does not provide any information about how close a given model is relative to the true model; however, the AIC can be used to compare a series of models. The model with the lowest AIC value is essentially the best among the models specified (Akaike, 1974). The AIC estimations corroborate the conclusion that GPA is the best predictor of student success because the regression with GPA as the only independent variable results in the lowest AIC[2].

In regards to the four other factors, CCP is the only other factor that can help predict student success in professional exams. Consistent with the correlation analysis, none of the other factors

[2]We have also estimated two additional goodness of fit tests: Hannan-Quinn information criterion and the Bayesian (Schwarz) information criterion. Both of these additional tests are consistent with the main findings from the AIC analysis.

(firm size, preparation program, and summer experience) are shown to have any significant predictive ability. Note that when all four covariates are included in the logistic regression (results not tabulated), only the CCP covariate is positively and significantly associated with student success.

It is important to note that the correlation between GPA and CCP is 0.45. Therefore, it is not surprising that GPA and CCP are both positively associated with student success. However, the results of the regressions do not allow us to conclude if student success is impacted by case competition participation or if students with high grades choose to participate in case competitions[3]. A logistic regression with both GPA and CCP (results not tabulated) suggests that the latter is the case as only GPA variable is a significant predictor of success. This suggests that the CCP does not provide any additional predictive ability over GPA.

GPA SUB-COMPONENT ANALYSIS

The main logistic regression results reveal that GPA is the best predictor of success on professional accounting exams. Therefore, further analysis is conducted on the GPA variable in order to better understand how GPA is related to student success. Specifically, the following two sub-component analyses are conducted:

1. Analyzing the predictive ability of the accounting versus non-accounting course GPAs; and
2. Analyzing the predictive ability of the GPA of competency areas.

Analysis of GPA at the Accounting vs. Non-Accounting Course Level

The first analysis on the GPA decomposes the aggregate GPA into: 1) the GPA based on accounting-related courses; and 2) the GPA based on the two strategy (non-accounting) business courses. Note that the correlation between the two variables is 0.40, which is significant at the 5% level. Table 4 presents the results of the logistic regressions with the two GPA variables.

Table 4 reveals that the GPA of the accounting courses is the driving force behind the aggregate GPA's predictive ability. The two strategy courses are not found to be associated with future success on professional accounting exams.

Analysis of Competency Area GPA

The second analysis decomposes the GPA of accounting courses into the competency areas identified in the CICA Competency map. Accordingly, the GPA is decomposed into the following competencies: 1) financial accounting; 2) management accounting; 3) auditing; and 4) taxation[4]. In addition, we have included the GPA from the accounting theory course.

The accounting theory GPA has been analyzed separately from the other competencies for various reasons. First, although the accounting theory course focuses on financial accounting, the philosophical approach to the course is significantly different from the other financial accounting courses. Specifically, the accounting theory course focuses on the "why" as opposed to the "how" of accounting. Second, accounting theory has never been an integral part of the CICA competency

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[3]It could also be possible that faculty members encourage students with higher GPAs to participate in case competitions.

[4] Sufficient GPA data for the other competency areas was not available.

TABLE 3

Logistic Regression results with student success as the dependent variable

	Equation 1 Coefficient z-score (VIF)			**Equation 2** Coefficient z-score			
Constant	-20.943 -2.326**	-22.369 -2.836***	-7.339 -2.569**	-0.223 -0.333	-0.001 -0.001	-0.001 -0.001	-0.442 -1.034
GPA	25.100 1.681* (3.92)	28.471 2.850*** (n.a.)					
FI_Score	1.609 0.268 (3.92)		9.683 2.623*** (n.a.)				
Firm_Size				0.430 0.561			
Prep_Program					0.133 0.167		
Work_Exp						0.223 0.342	
CCP							1.453 2.009**
Count R^2 (Number of cases 'correctly predicted')	76.3%	73.7%	71.1%	55.3%	52.6%	52.6%	65.8%
Adjusted count R^2	47.37%	42.11%	36.84%	5.26%	0.00%	0.00%	26.32%
Likelihood ratio test	12.285***	12.216***	9.515***	0.316	0.028	0.117	4.387**
McFadden R^2	23.4%	23.2%	18.1%	1%	0%	0%	8.3%
N	38	38	38	38	38	38	38
Akaike Information Criteria (AIC)	46.28	44.35	47.05	56.25	56.54	56.45	52.18

*** Significant at the 0.01 level ** Significant at the 0.05 level * Significant at the 0.10 level

(continued)

TABLE 3 (continued)

The variance inflation factor (VIF) test [$VIF_j = 1/(1 - R_j^2)$, where R_j is the multiple correlation coefficient between variable j and the other independent variables] was run for a regression with more than one independent variable. The results of the VIF test reveal that multicollinearity was not present in any of the regression estimations. In general, a VIF greater than 10 indicates the possibility of multicollinearity (Neter, Wasserman, and Kutner, 1985).

Each variable is defined as:

Success:	a dummy variable that receives a value of 1 if the student successfully completes all three professional exams on the first attempt and a 0 otherwise;
GPA:	a continuous variable measured as the student's overall grade point average percentage across accounting and non-accounting courses;
FI_Score:	a continuous variable measured as the percentage average from a survey completed by two faculty members;
Firm_Size:	a dummy variable that receives a value of 1 if the student worked with a large, national firm and a 0 otherwise;
Prep_Program:	a dummy variable that receives a value of 1 if the student was part of an exam preparation program and a 0 otherwise;
Work_Exp:	a dummy variable that receives a value of 1 if the student had a summer work experience with an accounting firm prior to graduating and a 0 otherwise;
CCP:	a dummy variable that receives a value of 1 if the student participated in a case competition during his/her undergraduate program and a 0 otherwise.

TABLE 4

Logistic Regression Results with Student Success as the Dependent Variable and Accounting vs. Non-Accounting Course Grades as the Explanatory Variables

	Coefficient z-score (VIF)	Coefficient z-score	Coefficient z-score
Constant	-19.1566	-19.7413	-11.2249
	-1.713*	-2.848***	-1.224
AccGPA	25.555	25.3594	
	2.735***	2.865***	
	(1.196)		
Strategy Course (NonAccGPA)	-0.892		13.0701
	-0.060		1.236
	(1.196)		
Count R^2 (Number of cases 'correctly predicted')	73.7%	73.7%	65.8%
Adjusted count R^2	42.1%	42.1%	26.32%
Likelihood ratio test	12.373***	12.368***	1.6205
McFadden R^2	23.5%	23.5%	3.1%
N	38	38	38
Akaike Information Criteria (AIC)	46.20	44.20	54.95

*** Significant at the 0.01 level
** Significant at the 0.05 level
* Significant at the 0.10 level

The variance inflation factor (VIF) test [$VIF_j = 1/(1 - R_j^2)$, where R_j is the multiple correlation coefficient between variable j and the other independent variables] was run for a regression with more than one independent variable. The results of the VIF test reveal that multicollinearity was not present in any of the regression estimations. In general, a VIF greater than 10 indicates the possibility of multicollinearity (Neter, Wasserman, and Kutner, 1985).

Each variable is defined as:

Success: a dummy variable that receives a value of 1 if the student successfully completes all three professional exams on the first attempt and a 0 otherwise;

AccGPA: a continuous variable measured as the students overall grade point average percentage across accounting courses (financial accounting, management accounting, auditing, taxation, and accounting theory);

NonAccGPA: a continuous variable measured as the students overall grade point average percentage across non-accounting business courses (business strategy courses).

map requirement and was an optional course for entry into the ICAO professional program (note – an accounting theory course was not mandatory for entry into the ICAO professional program). The newly formed Canadian CPA does not include accounting theory as part of their entrance

requirements. Third, accounting theory is not limited to financial accounting and includes elements of economics, finance, assurance and management accounting. Therefore, the course is much more integrative than any other course. Lastly, the accounting theory course has a much more academic focus, as opposed to the hands-on approach of other accounting courses.

Table 5 presents the Pearson correlation matrix for student success and the competency area GPAs (we have also included the business strategy GPA in the correlation matrix). Table 5 reveals that student success is positively (and significantly) correlated with the GPAs from courses in financial accounting, auditing, management accounting and accounting theory. The GPA from courses in taxation and business strategy do not show a statistically significant correlation with student success.

Table 6 presents the results from the logistic regressions between student success and the accounting related competency area GPAs. The logistic regression is estimated in order to augment the results from the correlation analysis. Although both the correlation analysis and the logistic regressions are univariate analyses, the logistic regressions provide further insights by revealing the number of cases correctly predicted and the R^2 values (e.g., adjusted count R^2 and McFadden R^2). The results reveal that the GPAs from each of the accounting related competency areas (financial accounting, management accounting, taxation, auditing, and accounting theory) are significant predictors of student success on professional accounting exams.

Accounting theory is shown to be the best single predictor (competency area) of success on professional exams (e.g., predicts 76.3% of all cases correctly). The fact that accounting theory is the best predictor is interesting in many respects. First, accounting theory does not fit neatly into any single competency area on the competency map and is not explicitly tested in the professional exams. Accordingly, it is unclear why this course would be the most predictive. One possible explanation is that there may be some path dependency due to prerequisites, especially since accounting theory is offered in the final semester of the fourth year. Secondly, the predictive ability of accounting theory is interesting in light of the fact that the newly formed Canadian Chartered Professional Accountants (CPA) professional body has very little, if any, coverage of accounting theory on the CPA Competency Map.

Financial accounting and assurance are the two largest competencies and together comprise up to 60% of the competency map coverage. The results from Table 6 reveal that both financial accounting and auditing courses are predictive of student success (i.e., they predict 71.1% and 65.8% of all cases correctly, respectively). This result is consistent with the CICA competency map, which is weighted mostly towards financial accounting and auditing.

Table 6 also reveals the GPA from the management accounting courses is significant at the one percent level (i.e., predicts 68.4% of all cases correctly), while the GPA from the taxation courses is significant at the ten percent level (i.e., predicts 65.8% of all cases correctly). While overall results related to the taxation competency area are somewhat mixed (i.e., correlation analysis is non-supportive while regression analysis is supportive at the ten percent level), the management accounting course GPA is much more clearly linked with student success.

CONCLUSIONS AND IMPLICATIONS

The purpose of this paper is to investigate whether course grades or faculty intuition is a better predictor of student success on professional accounting exams. In regards to the GPA

TABLE 5

Correlation Matrix between Student Success and Competency Level GPAs

	Success	Financial Accounting GPA	Auditing GPA	Taxation GPA	Management Accounting GPA	Accounting Theory GPA
Financial Accounting GPA	.463** 0.003	1.000				
Auditing GPA	.477** 0.002	0.590** 0.000	1.000			
Taxation GPA	0.318 0.052	0.637** 0.000	0.530** 0.001	1.000		
Management Accounting GPA	0.488** 0.002	0.698** 0.000	0.680** 0.000	0.517** 0.001	1.000	
Accounting Theory GPA	0.526** 0.001	0.651** 0.000	0.750** 0.000	0.617** 0.000	0.779** 0.000	1.000
Business Strategy GPA	0.205 0.217	0.328* 0.044	0.251 0.129	0.262 0.113	0.554** 0.000	0.368* 0.023

** Significant at the 0.01 level (2-tailed) * Significant at the .05 level (2-tailed)

Each variable is defines as:

Success: a dummy variable that receives a value of 1 if the student successfully completes all three professional exams on the first attempt and a 0 otherwise;

Financial Accounting GPA: a continuous variable measured as the student's overall grade point average percentage across financial accounting courses (Intermediate accounting II, Advanced financial accounting, and Topics in financial accounting);

Auditing GPA: a continuous variable measured as the student's overall grade point average percentage across auditing courses (Auditing I, Auditing II, and Information systems auditing);

Taxation GPA: a continuous variable measured as the student's overall grade point average percentage across taxation courses (Taxation 1 and Advanced corporate taxation);

Management Accounting GPA: a continuous variable measured as the student's overall grade point average percentage across management accounting courses (Cost accounting and Controllership);

Accounting Theory GPA: a continuous variable measured as the student's overall grade point average percentage in Accounting theory;

Business Strategy GPA: a continuous variable measured as the student's overall grade point average percentage across business strategy courses (Strategy I and Strategy II).

predictor, additional analysis is conducted to better understand how the composition of the aggregate GPA varies across individual courses and competencies. This paper also explores other factors that may predict student success on professional exams.

The results reveal that both GPA and faculty intuition are predictors of student success on professional accounting exams; however, GPA is a better predictor. Further analysis was conducted with the GPA from the courses related to different competency areas. The results reveal that the GPA rom all accounting-related competency areas (financial accounting, management accounting, auditing, and taxation) are positively and significantly associated with student success on professional accounting exams.

In regards to the other factors, participation in case competitions is the only factor that has some predictive value. Case competition participation may be important because it provides students with the opportunity to practice their case writing skills in time constrained situations. However, case competition participation may be predictive only as an extension of the students with high grades choosing, or being encouraged by their professors, to participate in the case competitions.

This research makes several significant contributions to the existing literature on accounting education. This is the first known academic study to investigate whether course grades or faculty intuition is a better indicator of future success on professional accounting exams. Accordingly, this study extends the stream of research on the forecasting ability of simple metrics versus professional intuition.

Even though this research is set within the Canadian accounting environment, stakeholders from across the globe can benefit from the perspective presented in this paper. Employers can better appreciate the importance of grade point average as opposed to faculty recommendations, or their own intuition, in assessing a prospective employee's ability to pass professional exams. The paper also draws attention to the potential use of data-driven assessment in the recruitment process.

This study is also useful for business schools. With the heavy focus placed on the assurance of learning process by accrediting bodies (e.g., the Association to Advance Collegiate Schools of Business), business schools can use the methodology developed in this study as part of their assurance of learning process and the results presented in this study in benchmarking.

Students and advisors can also utilize these findings. Since the paper shows a clear link between academic performance and success in professional exams, students can better assess their chances of success based on their undergraduate performance, and determine the extent of further efforts. These results can also be used by students and advisors as part of an early intervention strategy.

This study is also important for the newly formed CPA Canada, along with professional accounting bodies from across the globe, who can also utilize these results to better understand how universities can help prepare students for professional careers in accounting. Historically, the ICAO has had a strong relationship with Ontario universities. The relationship involved various levels of accreditation and professional development. These results reveal that relationships between professional bodies and universities can be mutually beneficial. Professional accounting bodies can benefit by having universities help educate future members of their profession. Universities can also receive many benefits beyond developing programs that help students achieve professional success.

TABLE 6

Logistic Regressions with Student Success as the Dependent Variable and Competence Area GPAs as the Explanatory Variables

	Coefficient / z-score				
Constant	-10.389 -2.494**	-18.649 -2.561**	-9.067 -1.860*	-14.743 -2.720***	-16.429 -2.867***
Financial Accounting GPA	13.706 2.535**				
Auditing GPA		24.518 2.579***			
Taxation GPA			11.345 1.881*		
Management Accounting GPA				18.525 2.738***	
Accounting Theory GPA					20.674 2.892***
Count R^2 (Number of cases 'correctly predicted')	71.1%	65.8%	65.8%	68.4%	76.3%
Adjustment count R^2	36.84%	26.32%	26.32%	31.58%	47.37%
Likelihood ratio test	9.136***	9.922***	4.012**	9.941***	11.857***
McFadden R^2	17.4%	18.9%	7.6%	18.9%	22.5%
N	38	38	38	38	38
Akaike Information Criteria (AIC)	47.43	46.65	52.56	46.63	44.71

*** Significant at the 0.01 level. ** Significant at the 0.04 level. * Significant at the 0.10 level.

(continued)

TABLE 6 (continued)

The variance inflation factor (VIF) test was not run in these regressions because there is no concern of multicollinearity in a univariate analysis.

Each variable is defined as:

Success:	a dummy variable that receives a value of 1 if the student successfully completes all three professional exams on the first attempt and a 0 otherwise;
Financial Accounting GPA:	a continuous variable measured as the student's overall grade point average percentage across financial accounting courses (Intermediate accounting II, Advanced financial accounting, and Topics in financial accounting);
Auditing GPA:	a continuous variable measured as the student's overall grade point average percentage across auditing courses (Auditing I, Auditing II, and Information systems auditing);
Taxation GPA:	a continuous variable measured as the student's overall grade point average percentage across taxation courses (Taxation 1 and Advanced corporate taxation);
Management Accounting GPA:	a continuous variable measured as the student's overall grade point average percentage across management accounting courses (Cost accounting and Controllership);
Accounting Theory GPA:	a continuous variable measured as the student's overall grade point average percentage in Accounting theory;
Business Strategy GPA:	a continuous variable measured as the student's overall grade point average percentage across business strategy courses (Strategy I and Strategy II).

Professional bodies can also provide faculty members with access to professional development, research grants, and networking opportunities.

The results presented in this study are unique and based on a novel, robust, hand-collected dataset. This dataset gives rise to the uniqueness of the study, but also results in some limitations. First, the total number of student observations is not overly large, which could result in some estimation biases. Future researchers could strive to collect a much larger dataset with more diverse (geographic, time series, etc.) observations. The development of a larger database could be led by a professional accounting body, which may already have much of the data.

Second, the observations are based on students from the same university, which could limit the overall generalizability of the results. However, the generalizability issue is limited by the fact that the institution was accredited by the ICAO to provide the 51-credit hour pre-requisite courses, and also accredited by both CMA Ontario and the Certified General Accountants (CGA) of Ontario. Third, student success was defined based on the three professional exams taken by students pursuing the Chartered Accountant designation through the ICAO. The overall average on each exam is not available in the form of a discrete variable. Rather, pass / fail binary data is utilized. In addition, the data set does not include student success on the CMA and CGA exams. Including data from these other two professional bodies could have changed the results (e.g., strategy courses may be a better predictor of success on the CMA exam). Data from the CMA and CGA exams is not included because it was not publicly available. Future researchers can aim to obtain data from the CMA and/or CGA professional bodies to conduct a similar study for these professional bodies.

Fourth, the non-accounting courses are based on two general business strategy grades. The results suggest that these business courses are not reflective of student success on professional accounting exams. Future researchers are encouraged to explore other courses as measures of non-accounting courses. For example, non-accounting courses such as business-ethics, information systems, and finance courses could be explored in addition to non-business courses such as economics, political science and/or critical thinking.

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APPENDIX
Faculty Intuition Questionnaire

Question	Strongly Disagree				Strongly Agree
1. Does the student have the required problem solving/analytical skills to be successful on professional accounting exams?	1	2	3	4	5
2. Does the student have the required technical skills to be successful on professional accounting exams?	1	2	3	4	5
3. Does the students have the required professional skills to be successful on professional accounting exams?	1	2	3	4	5
4. Does the student display the required motivation to be successful on professional accounting exams?	1	2	3	4	5
5. Overall, based on your experience with this student, do you believe that he/she will successfully complete all professional exams on their first attempt?	1	2	3	4	5