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Confirming an Industry Certification Examination as an Outcome Assessment for Information System Programs

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INTRODUCTION AND LITERATURE

Since the mid-1980's educational institutions have been under increasing pressure to demonstrate measurable outcomes from academic programs (Marchese, 1998). At the same time a "parallel postsecondary universe" has evolved in a rich mosaic of industry certification programs in information technology (Adelman, 1998). This parallel world has "brought competency based education and performance assessment to a status they have never enjoyed within traditional higher education." (Adelman, 1998). For IS educators these parallel worlds have created troubling questions of exactly what role each should play in preparing future IS professionals. At the same time, there is potential for the two worlds to work together. This paper examines one possible point of sharing in the use of certification exams to assess the outcomes of traditional academic programs.

Some industry certifications are proprietary (such as Microsoft MCSE, Novell CCNA and Cisco CCNA). One certification, the Institute for the Certification of Computer Professionals (ICCP)'s Certified Computer Professional (CCP), however, is vendor neutral. The ICCP is backed by seven constituent societies, including AITP (Association of Information Technology Professionals, formerly DPMA) and ACM (Association for Computing Machinery). Some 55,000 IS professionals have completed certification through the ICCP.

The ICCP exam suite includes a core exam and a set of specialty exams. A review of the core exam reveals a broad coverage of IS topics that matches much of the course work in typical BS and MS programs in Information Systems. Review material from the core exam includes references from frequently used textbooks in IS programs (www.iccp.org).

The questions that this study addresses include "Do the results of ICCP certification exams correlate with measures of academic achievement in IS programs?" and "To what extent do undergraduate GPA, quality of undergraduate institution and years of work experience correlate with ICCP test results?"

The importance of understanding the relationship of ICCP exam scores, academic performance, undergraduate quality and work experience is clear. Educators need to demonstrate that their academic programs have measurable outcomes. Initial attempts at many schools have "remain(ed) a thin veneer on most campuses", done to please soon to arrive accreditors (Marchese, 1998). Schools, in many cases, are unable to measure students against published standards. To the extent that certification programs, such as the ICCP's, reflect industry needs, they can serve a valuable role in measuring whether academic programs impart important skills to students. Given ICCP's roots in industry, their exams certainly are certainly candidates for use by academic institutions. At the same time the ICCP can benefit from understanding what factors lead to success in their certification program.

A secondary aspect of this study comes from the perspective of faculty and administrators leading MSIS programs. Among their concerns are how to assess applicants. Which of the typical admission factors – undergraduate grades, quality of undergraduate institution and/or work experience – correlate most highly with academic success at the graduate level and, ultimately, success on ICCP exams?

A somewhat parallel situation exists in the area of graduate management admissions. The GMAT (Graduate Management Admission Test) has been administered for many years to students entering graduate study in management. The GMAC (Graduate Management Admission Council) has repeatedly conducted studies to ascertain the correlation between achievement on the GMAT, undergraduate GPA and first year grades in MBA programs (Manning, 1998). GMAC has consistently shown a positive correlation between these variables. This study is somewhat different in that the ICCP exam comes after the academic program, not before. Further, this study considers the quality of undergraduate institution and years of work experience. However, the need to establish correlation between the exam and academic performance is similar.

METHODOLOGY

Data to perform this study comes from MSIS graduates of a Midwestern U.S. university that were required to take the ICCP Core exam (but not to score at any particular level) as a graduation requirement. The sample is unique in its rich mixture of U.S. born and international students at three campus locations. The sample size is 195 students and covers graduates from 2000 to 2002.

For each student the following data was collected:

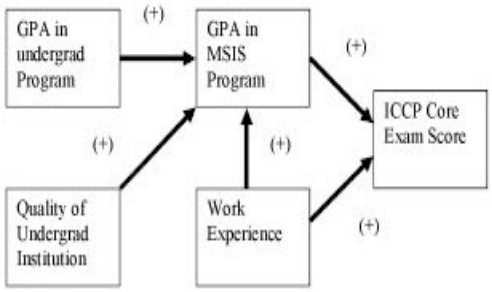
ICCP Core exam scores – Researchers recorded an overall score and five component scores (Human and Organizational Framework, Systems Concepts, Data and Information, Systems Development, Technology and Associated Disciplines) from the official ICCP exam profile.

MSIS grades – Researchers recorded an overall GPA and specific grades in database management, systems analysis, networking and capstone courses for all students. Grades were measured on a 4.0 score.

Campus location – Students in this sample attended three different campus locations. Researchers recorded data on which campus the students attended.

Undergraduate grades and degree – The researchers secured undergraduate GPAs (on a 4.0 scale) for all students who attended U.S. colleges and universities. Undergraduate major was also collected and categorized two ways. Majors were categorized into four groups – "In field majors" including computer science and information systems, business, engineer-

Figure one: Proposed model



ing and other. A second 0/1 variable was created that indicated "In-field majors" (computer science and information systems) and "out of field majors" (all others). No attempt was made to scale grades from students who attended non-U.S. schools.

Quality of Undergraduate institution – The researchers located the peer assessment score as recorded in U.S. News and World Reports annual college ranking guide for all students who graduated from U.S. schools. According to U.S. News "A school's peer assessment score is determined by surveying the presidents, provosts, and deans of admissions at institutions in a single category." (2003).

Work Experience – Researchers recorded years of work experience in the Information Systems field and total years of work experience. These were based on experience prior to matriculation in MSIS program and were recorded for students that submitted a resume to the institution.

Traditional admission decisions into graduate programs in business and information systems have focused on factors including GPA in undergraduate study, quality of the undergraduate institution and work experience. Figure one above shows the author's proposed model along with the expected signs for correlations. To test the model correlation analysis was conducted between all variables. Further, the author created three regression models and ANOVA model.

FINDINGS

Correlation Results

Correlation results are summarized in table 1.

Several points should be noted. First, there is a significant correlation between grades in the MSIS program, and to a lesser extent undergraduate program, and ICCP test scores. Quality of undergraduate institution was significantly correlated with MSIS GPA. Finally, work experience scores were significantly correlated with ICCP scores, but not graduate GPA. The infield indicator was significantly correlated with ICCP scores, but not with graduate GPA.

Regression Model Results

The authors constructed three regression models to test the relationships in the model shown in figure one. The first regression model views the data from the perspective of academic administrators and faculty trying to predict success in an MSIS program.

Model 1 – Graduate GPA model (* denotes variables retained in the final model)

Dependent Variable: MSIS GPA
Independent Variable: Undergraduate GPA *, Work Experience, Quality of Undergraduate institution *, in-field indicator
Sample size: 36

Table 1 - Correlations

		TOTICCP	MS_GPA	UND_GPA	QUALITY	YRSWORK	YRSIT	INFIELD
ICCP Score	Pearson Correlation	1.000	.416	.376	.289	.329	.277	.292
	Sig. (2-tailed)	.	.000	.014	.079	.010	.031	.044
	N	196	195	42	38	61	61	48
MSIS GPA	Pearson Correlation	.416	1.000	.329	.437	.013	.006	.083
	Sig. (2-tailed)	.000	.	.033	.006	.920	.963	.573
	N	195	195	42	38	61	61	48
UNDER GRAD GPA	Pearson Correlation	.376	.329	1.000	-.065	-.317	.028	.162
	Sig. (2-tailed)	.014	.033	.	.702	.056	.868	.377
	N	42	42	42	37	37	37	32
UNDER GRAD QUALITY	Pearson Correlation	.289	.437	-.065	1.000	.120	-.076	-.016
	Sig. (2-tailed)	.079	.006	.702	.	.486	.659	.933
	N	38	38	37	38	36	36	30
YRS WORK EXP	Pearson Correlation	.329	.013	-.317	.120	1.000	.467	-.095
	Sig. (2-tailed)	.010	.920	.056	.486	.	.000	.549
	N	61	61	37	36	61	61	42
YRS IT EXP	Pearson Correlation	.277	.006	.028	-.076	.467	1.000	.224
	Sig. (2-tailed)	.031	.963	.868	.659	.000	.	.153
	N	61	61	37	36	61	61	42
INFIELD (Y/N)	Pearson Correlation	.292	.083	.162	-.016	-.095	.224	1.000
	Sig. (2-tailed)	.044	.573	.377	.933	.549	.153	.
	N	48	48	32	30	42	42	48

*** Correlation is significant at the 0.01 level (2-tailed).*
** Correlation is significant at the 0.05 level (2-tailed).*

Final R square: .362
F Ratio: 9.643

The second and third models view the data from the perspective of academic administrators and faculty trying to predict success on the ICCP exam. The second model looks at the entire sample of 195 students and considers only their graduate GPA and campus location.

Model 2 – ICCP Test Score model (* denotes variables retained in the final model)

Dependent Variable: ICCP Test Score
Independent Variable: MS GPA *, campus location *
Sample size: 194
Final R square: .305
F Ratio: 9.643

The third model seeks to predict ICCP test scores, but focuses only on main campus students with work experience:

Model 3 – ICCP Test Score model (* denotes variables retained in the final model)

Dependent Variable: ICCP Test Score
Independent Variable: MS GPA *, Work Experience *, undergraduate GPA, quality of Undergraduate institution
Sample size:
Final R square: .303
F Ratio: 12.58

Finally, the author used the undergraduate degree major variable in an analysis of variance (including a Bonferroni post hoc analysis) on ICCP scores and graduate GPA. This was an effort to see if any of the four degree majors were identified with significantly higher ICCP scores or GPAs. Neither ANOVA resulted in a significant finding.

DISCUSSION

This paper examines a number of variables associated with students in MSIS programs, including antecedents (undergraduate GPA, quality of undergraduate program and work experience) and outcomes (scores on the ICCP exam). The research is limited in several ways. First, this project is an attempt to confirm what is generally held to be true, namely that success in graduate school and professional certification is based on undergraduate and work experience. Such an approach can have inherent bias and needs additional theoretical foundation. Second, the work was conducted at a single Midwestern university. Third, traditional academic measures, such as grades, are by their nature imprecise. Fourth, student performance on the ICCP exam may be largely influenced by their personal motivation to do well. Students at this institution were required to sit for the exam, but not to achieve any particular score. Further study could be conducted to overcome these and other limitations.

The results are significant, however, in showing significant correlation between the variables and general support for the model shown in Figure 1. This information provides a preliminary result that should be of use to academic administrators and faculty that manage and teach in MSIS programs. For admission to a graduate MSIS program, undergraduate GPA and the quality of the institution attended appear to be the most significant factors. For success in the ICCP exam, grades (both undergraduate and graduate) and work experience are significant factors. As is common with research of this type, however, the correlations are statistically significant, but not strong. Indeed, as much as 70% of the variation in the data is not explained by the predictors. This raises the question "what other factors drive academic and certification test success?"

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