Relationships of Demographic and School Related Variables to Curriculum Improvement Skill Scales for Graduating Business Students

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Abstract

Business schools continue to monitor student perceptions of their curriculum during the ongoing pandemic. 274 graduating business seniors filled out a Spring 2022 exit survey asking their perceptions about the business school's curriculum improving their abilities on twelve goals. A factor analysis of these twelve individual items resulted in keeping all items and creating three smaller scales (items/scale): Business Problem Solving (6 items), Presentation Skills (3 items) and Team-related Skills (3 items). These three scales were found to be reliable and sufficiently distinct from each other. Overall, students perceived that the business school's curriculum improved their team-related skills significantly more than business problem solving and presentation skills. Grade Point Average or gender were not related to any scale improvement differences. Paired t-test results included finding that transfer students indicated significantly higher improvement on business problem solving and team-related skills than non-transfer students. In addition, non-quantitative majors showed higher improvement on presentation skills than quantitative majors. A stronger baseline for these three curriculum improvement scales has now been established for follow-up monitoring. Results are further discussed.

Keywords: graduating business students, curriculum-improved abilities, business problem-solving, presentation skills, team-related skills

1. Introduction

1.1 Introduce the Problem

Business problem solving skill sets, presentation skill sets, and team-related skill sets are among the most desired skill sets employers have for new college graduate students (Career Track, 2019). These sought-after skill sets have also been noted more recently by the National Association of Colleges and Employers' (NACE, 2021) To date, most prior studies have focused on individually analyzing different items or aspects of each set, e.g., *business problem solving skills* - using quantitative data to analyze business decisions, versus apply quantitative interpretations to business problems; *presentation skills* - effectively present ideas in writing, versus effectively presenting ideas orally; and *team-related skills* – work in teams, develop networks (NACE, 2021). Producing smaller skill sets by combining these individual abilities into reliable scales would make it more efficient for research. Prior studies have asked if college students feel proficient on these various skills (Bauer-Wolfe, 2018) , but not if a student feels that their curriculum improved these skills. That was a key goal of this study.

1.2 Describe Relevant Scholarship

In an earlier study, asking the degree to which their business curriculum improved on their abilities, Blau, Goldberg and Voss (2022) factor analyzed an initial list of 12 curriculum-improved abilities. The Blau et al. (2022) study used only 93 Fall 2021 business school graduates and their factor analysis produced two reliable and distinct scales, which they named quantitative skills (5 items) and professional development (4 items). However, Blau et al. (2022) also lost three items in their factor analysis due to double loading issues. Their N/K ratio (subjects/items) was only 93/12 or 7.8:1 which is less than the ideal recommended ratio of 10:1 for a more reliable factor solution (Costello & Osborne, 2005). By having a much large sample size for this Spring 2022 business school graduates this should allow a more reliable factor analysis, for producing scales. So the first

research goal of this study was to develop a stronger set of curriculum-improved ability scales by re-analyzing these same 12 abilities (Blau et al., 2022) using a much bigger sample.

Prior research has focused on testing the general relationships of these curriculum-gained skills to outcomes such as business student satisfaction and employer preparedness. For example, Quenani, MacDougall, and Sexton (2014) found that critical thinking, oral communication, and field specific skills were significantly related to higher college student self-perceived employability. Blau et al. (2022) found that perceived professional development and quantitative skills were both related to student satisfaction, but only quantitative skills were related to employment preparedness. However, less research has been done investigating demographic and school-related variables affecting these needed curriculum-improvement ability skill sets.

Previous research, however, does suggest that considering demographic variables, such as gender and race, and school-related variables, such as having a quantitative versus qualitative major, being a transfer versus non-transfer student, and grade point average (GPA), should be further explored. For example, Blau, Hill, Snell, Atwater, Halbert and Zuckerman (2016) found that quantitative majors, both men and women, had higher levels of student professional organization (SPO) meeting attendance than male and female qualitative majors. Blau, Blessley, Kunkle, Schirmer and Regan (2017) found that, although gender and GPA were not significant, both White (versus non-white) and qualitative (versus quantitative) majors had lower levels of professional development engagement or PDE (e.g., SPO meeting attendance, formal internship participation, campus job fairs). Blau, Snell, Campbell, Viswanathan, Aaronson and Karnik (2014) found that being a transfer versus non-transfer student did not impact PDE.

1.3 Research Questions

Given the exploratory nature of this study, more general research questions, as opposed to specific hypotheses, were posed. The two research questions (RQ) posed and tested were:

RQ1 – can a stronger set of curriculum-improved ability scales be developed?

RQ2 – what are the relationships of demographic and school-related variables to these new curriculum-improved scales?

2. Method

2.1 Participants and Procedure

All graduating business students received an online Qualtrics survey in the Spring 2022 as they prepared to graduate. Each student received a specific survey link so that their responses could be tied to prior demographic and school-related data. Students were assured that their data would remain confidential. This exit survey is given to graduating seniors to find out their perceptions of their educational experience to see what curriculum improvements can be made. The business school is located in the Mid-Atlantic region of the United States. As part of an ongoing evaluation process, the University Institutional Review Board approved this study. Despite repeated reminder emails and an extended time for returning the survey, only 274 out of 942 (29%) of the graduating seniors completed and returned the survey,

2.2 Measures

Demographics. Three record-based variables were measured: gender, race and state residency. Gender was coded as 1 = male, 2 = female. Race was coded as 1 = Hispanic, 2 = Asian, 3 = White, 4 = African American, 5 = Multiracial, and 6 = unknown. State residency was coded as 1 = in state (Pennsylvania), 2 = out of state.

School Background. Three record-based variables were measured: student overall Grade Point Average (GPA); transfer student (where 1 = transfer, 2 = no transfer), and major, i.e., curriculum major of student.

Curriculum-improved Abilities. Twelve items were asked using the following lead statement; "please rate your agreement that the Business School's Bachelor of Business Administration (BBA) curriculum improved my ability to:…." and each item was rated using a 7-point response scale from 1 = strongly disagree to 7 = strongly agree. The 12 items were taken from the learning goals of the Business School BBA and closely match the earlier mentioned NACE (2021) list of attributes employers seek on a graduating college senior's resume. These 12 items were factor analyzed and the results are reported in Table 2 below.

2.3 Data Analyses

Exploratory factor analysis followed by correlation analysis was used to test RQ1. Two types of analyses were used to test RQ2, correlation analysis was used for continuous variables, while t-tests were used to test nominal variables. SPSS (version 28) was used for all analyses. Following Hopkins, Marshall, Batterham and Hanin

(2008), findings at a $p < .05$ or $p < .01$ value (two-tailed) will be reported as statistically "significant", while findings at a $p < .10$ value (two-tailed) will be labeled as "marginally" significant.

3. Results

3.1 Descriptive Sample Results

Table 1 below reports the descriptive sample results.

Table 1. Nominal Demographic and School Background Variables

Variable	(n = 274)
Gender	
Male	n = 145 (53%)
Female	n = 129 (47%)
Race	
Hispanic	n = 15 (6%)
Asian	n = 39 (14%)
White	n = 169 (62%)
African American	n = 30 (11%)
Multiracial	n = 8 (3%)
Unknown	n = 13 (5%)
State Residency	
In State (Pennsylvania)	n = 208 (76%)
Out of State	n = 66 (24%)
Transfer Student	
Transfer	n = 87 (32%)
No Transfer	n = 187 (68%)
Major	
Accounting	n = 38 (14%)
Actuarial Science	n = 13 (5%)
Business Management	n = 31 (11%)
Economics	n = 6 (2%)
Entrepreneurship	n = 5 (2%)
Finance/Financial Planning	n = 46 (17%)
Human Resource Management	n = 10 (4%)
International Business	n = 12 (4%)
Legal Studies	n = 5 (2%)
Management Information Systems	n = 17 (6%)
Marketing	n = 39 (14%)
Real Estate	n = 3 (1%)
Risk Management and Insurance	n = 32 (12%)
Statistics/Data Analytics	n = 10 (4%)
Supply Chain Management	n = 7 (3%)

The highest frequency categories for each variable were: male (53%); White (62%); In State (76%); No Transfer (68%) and Finance/Financial Planning Major (17%). These sample characteristics are generally comparable to the earlier smaller sample reported by Blau et al. (2022), with the exception that the percentage of White

students here (62%) is higher versus 49% (Blau et al., 2022), and transfer sample percentage here (32%) was lower (55%) versus the earlier study. Transfer students typically enter in the Fall semester.

3.2 Testing Research Question (RQ)1

Exploratory Factor Analysis (EFA) was used to test RQ1, i.e., *developing a stronger set of curriculum-improved ability scales*. The results of this EFA are reported in Table 2 below. As shown, there are no double loadings issues on any items, unlike the previous study (Blau et al., 2022). The stronger N/K (subjects to items ratio) of over 20:1 contributed to this (Costello & Osborne, 2005). In addition, the strength of the factor loadings on each factor is also worth mentioning. Beavers, Lounsbury, Richards, Huck, Skolits, and Esquivel (2013) noted that if a factor has loadings of .60 or higher, one can be more confident in the reliability of the factor solution versus loadings of .40 or less. All bolded items in Table 2 show loadings greater than .60. Costello and Osborne (2005) also argued for less reliance on having an eigenvalue of greater than 1, and instead focusing more on the scree test, as well as factor interpretability. The scree test "break" was at three factors.

Table 2. Exploratory Factor Analysis for 12 Curriculum-improved Ability Items Using a Three-factor Extraction and Oblique Rotation

The Business School BBA curriculum improved my ability to: [a]	1[b]	2[b]	3[b]
1. Apply a core body of discipline-specific knowledge to business problems	**.83**	.04	-.09
2. Use integrated business knowledge to identify problems, generate solutions	**.75**	.23	-.12
3. Understand the ethical, legal, and social responsibilities of individuals and organizations	**.73**	.07	.05
4. Apply quantitative analysis and interpretations to business problems	**.79**	-.12	.19
5. Use quantitative data to analyze business decisions	**.83**	-.04	.10
6. Use software to analyze and implement business decisions	**.67**	.10	.11
7. Effectively present ideas in writing	.18	**.78**	-.06
8. Effectively present ideas orally	-.05	**.81**	.19
9. Effectively present ideas visually	.07	**.81**	.07
10. Effectively work in teams	-.10	.20	**.77**
11. Technical abilities and skills (i.e., use of technology, software) relevant to your discipline	.22	-.03	**.73**
12. Professional development (i.e., development of networking, leadership, skills)	.15	.03	**.70**
Initial Eigenvalues[b]	6.78	.93	.80
Percentage of variance accounted for	56%	8%	7%

Note. N = 273. Pattern Matrix

[a] Responses using 7-point scale: 1 = strongly disagree to 7 = strongly agree.

[b] Factor 1 =   Business Problem Solving;   Factor 2 = Presentation Skills;   Factor 3 = Team-related Skills

*factor loadings above .6**0 bolded**

In addition, oblique rotation was used in this study, assuming the factors would be correlated (Costello & Osborne, 2005). The results showed three scales, with no deleted items. These *scales* (items involved) were named: *Business Problem Solving Skills Improvement* (items #1, 2, 3, 4, 5 & 6); *Presentation Skills Improvement* (items #7, 8 & 9), and *Team-related Skills Improvement* (items # 10, 11 & 12). Overall, 71% of the variance was accounted for by these three scales. When converting these items into scales using SPSS (version 28), good internal consistency alpha reliability estimates were found. They were: Business Problem Solving - .90; Presentation Skills - .86 and Team-related Skills = .77

3.3 Further Testing Research Question (RQ)1

Table 3 presents the results for testing the relationships among these three curriculum-improved skill scales. Each scale was divided by the number of items to use the initial response scale. The results show that although they are related to one another, no relationship exceeds the .80 threshold for multicollinearity (Thompson, Kim, Aloe & Becker, 2017) used for scale redundancy. The highest overlap is $(.71)^2 = 50\%$ between Business Problem Solving and Presentation Skills. This distinctiveness allows scale each to be separately analyzed.

Table 3. Means, Standard Deviations and Correlations of Continuous Study Variables insert text

Variable Name	M	SD	1	2	3	4
1. Grade Point Average[a]	3.40	.34	(NA)[c]			
2. Business Problem Solving Improvement[b]	3.47[f]	1.81	.06	(.90)		
3. Presentations Skills Improvement[b]	3.54[e]	1.99	.01	.71**	(.86)	
4. Team-related Skills Improvement[b]	3.75[d]	1.81	-.04	.69**	.65**	(.77)

Note. N = 271. * $p < .05$; ** $p < .01$ (both two-tailed)

[a] GPA (grade point average), based on a 4-point scale

Item improvement lead in: The Business School Curriculum Improved My Ability to:

[b] Business Problem Solving, Presentation Skills, Team-related Skills, 1 = strongly disagree to 7 = strongly agree

[c] Internal Consistency Reliability Estimate, NA = not applicable

[d,e,f] using paired sample t-tests of means:

[d-f] Team-related Skills higher than Business Problem Solving, $t(270) = 3.18$, $p < .01$.

[d-e] Team-related Skills higher than Presentation Skills, $t(270) = 2.14$, $p < .05$.

All three perceived curriculum improved skill scales had slightly below average means on a 1 to 7 scale. However, there were scale mean differences. Using paired t-tests, as shown above, the Team-related Skills Improvement was rated higher than both the Business Problem Solving Skills Improvement and the Presentation Skills Improvement. Collectively, the factor analysis results in Table 2, combined with the scale reliability estimates, scale inter-correlations, and final differences in means all provide support for RQ1, i.e., *developing a stronger set of curriculum-improved ability scales.*

3.4 Testing Research Question (RQ)2

Research Question 2 asked: "what are the relationships of demographic and school-related variables to these new curriculum-improved scales." It was surprising that GPA did not show any significant relationships to the curriculum-improved scales. Independent t-tests were then performed to see if there any demographic relationships to the scales. Using gender first, there were no significant differences between male versus female students on the means for any curriculum-improved scales. Given the heterogeneity of the racial breakdown of the sample, no test was performed. Donner (1987) has recommended separate sample size groups of at least 40/group for more reliable Analysis of Variance (ANOVA) results, and only Whites exceeded a sample size of 40. Collapsing all the other racial groups into a general "other" category (compare White vs Other) for an independent t-test comparison was not done, because if a difference was found, it would be impossible to further isolate what "Other" meant. There was one difference found for state residency such that, In State Residents perceived higher Team-related Skills Improvement ($M = 3.93$) than Out-of-State Residents ($M = 3.18$), $t(269) = 2.92$, $p < .01$.

Looking at school-related variables, there were several other group differences for both transfer versus non-transfer students and by major. Transfer students had higher perceived Business Problem Solving Skills Improvement ($M = 3.83$) than Non-transfer students, ($M = 3.31$), $t(269) = 2.21$, $p < .05$; and also higher Team-related Skills Improvement ($M = 4.08$) than Non-transfer students, ($M = 3.60$), $t(269) = 2.01$, $p < .05$. For major, given the individual major heterogeneity shown in Table 1 and the need to further investigate, it was necessary to collapse individual majors into more general quantitative versus non-quantitative major categories. Following Blau et al. (2022) *quantitative majors* were represented by: Finance/Financial Planning, Accounting, Risk Management and Insurance, Management Information Systems, Actuarial Science, Economics,

Statistics/Data Analytics, and Supply Chain Management. *Qualitative majors* were represented by: Marketing, Business Management, Human Resource Management, International Business, Entrepreneurship, and Real Estate. A percentage breakdown of Quantitative (n= 169/274) /Qualitative (n = 105/274) majors was 62%/38%. This general category percentage quantitative/qualitative major breakdown is similar to what Blau et al. (2022) found using their smaller Fall sample. Non-quantitative majors had higher perceived Presentation Skills Improvement (M = 3.81) than quantitative majors, (M = 3.38, t(269) = -1.75, p < .10, which is marginally significant (Hopkins et al., 2008).

4. Discussion

Using a much bigger graduating senior sample for the Spring (n = 274) than in the Fall (n = 93), this study provided stronger scale support for three perceived curriculum-improved scales: Business Problem Solving Improvement; Presentation Skills Improvement, and Team-related Skills Improvement. All twelve items used were retained in the factor analysis, versus in the Blau et al. (2022) study, where three items were deleted. A smaller sample size to number of items ratio made the Blau et al. (2022) factor analysis less reliable (Costello & Osborne, 2005). Having now established a stronger "baseline" of three distinct, reliable curriculum improvement scales in this study, this will allow for more valid scale improvement comparisons in future graduating business student exit survey assessments of these three scales.

Similar to what Blau et al. (2022) found, GPA was not significantly related to any of the curriculum-improved scales. Thus a lower GPA should not hinder a student from skill set improvement. It was useful to show that there were no gender differences on any of the curriculum-improvement scales. The difference on Team-related Skills improvement showing in-state residents to be higher versus out-of-state residents was unexpected and in need of further investigation.

Transfer students had higher perceived Business Problem Solving Skills Improvement and Team-related Skills Improvement than non-transfer students. This suggests that there was more "added valued" on these skill sets to the education of these transfer students once they enrolled versus non-transfers. This added value of curriculum skills improvement for transfer versus non-transfer students is a question for future research to monitor. Such skill set improvements should benefit these transfer students as they enter the job market (NACE, 2021).

Overall, when comparing mean levels, the Team-related Skills Improvement was rated higher than both the Business Problem Solving Skills Improvement and Presentation Skills Improvement. These results reinforce continued efforts by faculty to involve students in team-related projects when possible. As many employees return to the office from working remotely during the pandemic, team-related skills become very important (Smart, 2022). Greater teamwork can increase employees' feelings of belongingness to the organizations which should increase employee retention (Herbert, 2022), an important issue many companies have struggled with during the pandemic.

In addition, non-quantitative majors perceived higher Presentation Skills curriculum improvement than quantitative majors. From a teaching standpoint this suggests that presentation skills should continue to be emphasized across the business course curriculum, but perhaps even more so for non-quantitative majors. An alternative explanation is that if presentations are used more often in non-quantitative courses, this could result in greater perceived improvement. Regardless, as noted in the Introduction, all three skill sets: business problem solving skills; presentation skills, and team-related skills are highly desired by employers as recent college graduates job search (Career Track, 2019).

4.1 Study Limitations and Future Research

Despite repeated email attempts for participation, including reaching out to the professors teaching graduating seniors, the participation rate of 29% was disappointing. With a larger participation rate, race could have been more carefully analyzed by individual categories (Donner, 1987). As noted, this study established a stronger baseline for now monitoring continued skill set scale improvements for succeeding classes of graduating business students than previous research (Blau et al., 2022). The impact of these skill set improvements on subsequent employment by graduating students would be ideal to collect. To assess faculty perceptions of their student's curriculum improvement on these scales would be an interesting comparison to make. Two of the three curriculum improvement scales are general, i.e., presentation skills and team-related skills, while the business problem solving scale is focused on business students. The validity of these three curriculum scale improvements on other student samples is important to test for generalizability, i.e., the two general improvement scales (presentation and team-related) on non-business students, and the business problem solving scale on other business student samples.

4.2 Conclusion

Business schools need to continually monitor student perceptions of how well the curriculum improves their abilities. This study compressed 12 individual items into three reliable curriculum improvement scales: Business Problem Solving Skills, Presentation Skills, and Team-related Skills. Working with three scales should lead to greater research efficiencies in linking such improvement scales to outcome variables, such as impact on subsequent student employment perceptions. Collectively, perceived improvement on all three scales should benefit graduating students as they transition into the job market, particularly team-related skills, to help with employees' transition from remote to office work (Smart, 2022).

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