Employers' and Advisors' Assessments of the Importance of Critical Thinking and Written Communication Skills Post-College

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Abstract

This study examines the importance of critical thinking and written communication skills of university graduates who are in their first year of employment or graduate school and the ability of CLA+ (a measure of these skills) to predict these outcomes. A survey was administered to employers of college graduates from spring 2014 and 2017 to follow their post-college experiences. Results show that employers/advisors deem these skills to be important. Results also show that scores on CLA+ predict ratings on these skills given to the cohort by their employers/advisors. These results offer additional support that these skills are important in career placement and workplace success (Arum & Roksa, 2014).

Objectives

The objectives of this study are two-fold: (1) to provide further evidence that employers and graduate advisors consider critical thinking and written communication skills to be necessary qualities for success in the workplace or in graduate school, and (2) to provide evidence that test scores from CLA+, a test of critical thinking and written communication skills are predictive of employers'/advisors' ratings of their employees/students on these same skills. Together, this research shows that CLA+ can be used to help identify strong job candidates or graduate school applicants with critical thinking and written communication skills, skills that are typically absent from resumes and transcripts.

Theoretical Framework

Research has shown that "generic" skills (Clanchy & Ballard, 1995) such as critical thinking and written communication are predictive of post-college outcomes as measured by employment, salary, and admission into a graduate program (Blinded, 2016). Research has also shown that employers are concerned about identifying employees with high levels of critical-thinking and communication skills in the workforce (Hart Research Associates, 2009, 2013; National Association of Colleges and Employers, 2013). However, these higher-order skills are not captured on academic transcripts, which is problematic given grade inflation over the past two decades (Eiszler, 2002; Johnson, 2003; Mansfield, 2001; Sabot & Wakeman-Linn, 1991).

Given the importance of these generic skills, and the significance given to them by employers and graduate advisors, it is crucial to have a valid way of assessing and predicting achievement in these areas. In tandem with growing employer demands, the educational community has begun to emphasize generic skills, in addition to knowledge in specific content domains (Arum & Roksa, 2011; Porter, McMaken, Hwang, & Yang, 2011; Silva, 2008; Wagner, 2008), in hopes of fostering the development of critical thinking, problem solving, communication, collaboration, creativity and innovation skills (Porter et al., 2011). This research is part of a longitudinal study which examines the validity of CLA+, an assessment of critical thinking and written communication, as a predictor of post-college outcomes for students transitioning from college-to-career. CLA+ data from students who graduated in 2014 and 2017 and survey results from their employers and advisors will help answer questions about the importance of these skills post-college and whether they can be predicted by CLA+ test scores.

Method

12,752 seniors took CLA+ in spring 2014 and 8,761 in spring 2017. A longitudinal survey was administered to these cohorts to follow their post-college experiences. The goal was to collect outcome data and demographic information to be used as validation studies for CLA+. For the 2014 cohort, surveys were administered to participants 3, 6, and 12 months following college graduation. Of the approximately thirteen thousand students, 1,585 agreed to participate in the survey, and 993 persisted through all three phases. For 2017, since the students have only just graduated, we contacted their employers and advisors immediately following graduation.

Participants

From the spring 2014 cohort, 52 employers and 23 advisors responded to the survey, for a total of 75 participants. An additional 10 employers and 4 advisors responded to the survey for the 2017 cohort for a total of 89 participants. Given the small sample size, the employers' and advisors' survey results were analyzed together. Table 1 shows the demographic information of the students whose employers and advisors responded to the survey and for all students who tested in spring 2014.

Table 1: Demographic descriptive statistics

	Employer Survey Students	All Participants
N	89	21,513
% Female	66.3	60.0
% White	66.3	59.2
% English primary language spoken at home	89.5	84.5
% Parent with at least bachelor's degree	66.2	51.9
Mean (St. Dev) cumulative GPA (out of 4.0)	3.37 (.45)	3.24 (.48)
Mean (St. Dev) SAT (or converted ACT)	1114 (153)	1066 (172)

Analysis

Descriptive statistics and chi-square tests were used to investigate whether employers and advisors care about the skills measured by CLA+. Ordinal logistic regression models were then used to illustrate the relationship between CLA+ total score and employers' and advisors' ratings of the participants on said skills, as well as the relationship between CLA+ total score and employers'/advisors' rating of how the participant ranked compared to other recent college graduates in the workplace/graduate program. (The proportional odds assumption was tested by comparing the fit of the ordinal logistic regression models with multinomial regression models. Both sets of models were found to result in very similar fit for each question.) Predicted probabilities demonstrate the probability of being rated in each of the three available response categories per question dependent on CLA+ total score.

Data Sources and Materials

CLA+

Students have 60 minutes to read a set of documents and respond to a prompt which asks them to analyze the information from a document library and write a solution to a real-world problem. Trained scorers evaluate the responses using scales that describe the quality of analysis and problem solving and writing effectiveness and mechanics. Students have an additional 30 minutes to answer 25 document-

based selected-response questions which are aligned to the same construct as the constructed response task. A total scale score (roughly 400-1600) is awarded to each participant.

Survey

In 2015, one year following college graduation, a survey was administered to employers and advisors of students who took CLA+ in spring 2014. The survey was also administered to employers and advisors from the 2017 cohort. It should be noted that there is bias in the sample since students self-selected to provide their employers' and graduate advisors' information. However, the students did not significantly differ demographically from the total cohort of students (Table 1).

The survey consisted of a series of questions (Table 2), regarding how important critical thinking and written communication skills are to successful performance by the student, how proficient the students are as measured by these skills, and how the students ranked in comparison to their peers in the workplace or graduate program.

Table 2: Employer survey questions

How important are the following skills to successful performance in the participant's position:	**1 = Unimportant**	**2 = Of little importance**	**3 = Moderately important**	**4 = Important**	**5 = Very important**
Analysis and Problem Solving					
Writing Effectiveness					
Writing Mechanics					
How would you rate the participant on the following skills:	**1 = Unsatisfactory**	**2 = Needs Improvement**	**3 = Satisfactory**	**4 = Good**	**5 = Outstanding**
Analysis and Problem Solving					
Writing Effectiveness					
Writing Mechanics					
Overall, where does the participant's performance rank compared to other recent college graduates in your workplace?	**1 = Well below other employees**	**2 = Below other employees**	**3 = About the same as other employees**	**4 = Above other employees**	**5 = Well above other employees**

Results

Objective #1: Importance of CLA skills

Results indicate that employers and graduate advisors indeed find critical thinking and written communication skills, as measured by analysis and problem solving, writing effectiveness, and writing mechanics, important. Table 3 shows the distribution of responses to the first three questions in Table 2. Since only a few employers or graduate advisors responded "Unimportant" or "Of little importance", these two categories and "Moderately important" were collapsed into one "Moderately important or less" category in subsequent analyses. However, for descriptive purposes, we show the original five response categories.

As might be expected given the observed percentages reported in the table, the chi-square tests confirmed that the responses are significantly different from chance (i.e., there was not an equal chance

that employers/advisors would choose any of the three responses to each question). Clearly, employers and graduate advisors deemed analysis and problem solving, writing effectiveness, and writing mechanics to be important or very important.

Table 3: Distribution of responses to "Importance" questions

Importance of	Unimportant	Of Little Importance	Moderately Important	Important	Very Important	$\chi(df)$, p
Analysis and Problem Solving	0%	0%	8%	24%	67%	132.96(4), $p < .001$
Writing Effectiveness	2%	4%	13%	34%	47%	63.93(4), $p < .001$
Writing Mechanics	5%	5%	19%	42%	30%	41.78(4), $p < .001$

Note: Row percentages might not sum to 100% due to round. Chi-square tests based on the collapsed three-category variables, not the original five-category variables shown in the table.

Objective #2: CLA+ scores predicting participants' workplace or graduate school performance
Next, we used ordinal logistic regression models to examine the predictive ability of CLA+ total score on four ratings given by the participants' employer or graduate advisor (questions 4-7 in Table 2). Given that analysis and problem solving, writing effectiveness, and writing mechanics are important or very important skills, how well does CLA+ total score predict participants' subsequent use of these skills in the workplace or graduate school? Also, how well does CLA+ score predict relative rankings of the participants by the employer or graduate advisor?

Table 4 shows the ordinal logistic regression coefficients, their standard errors, 95% confidence intervals, and the *t*-statistics ($p < .001$ for all analyses). The regression coefficients can be interpreted as the log-odds of being rated higher given a 1-point increase in CLA+ total score. For instance, in the analysis and problem solving model, the estimated coefficient is given as .0033. Thus, for a 1-point increase in CLA+ total score, the log-odds of "jumping" to a higher rating category ("Good" instead of "Satisfactory or worse," or "Outstanding" instead of "Good") increases by .0033. The regression coefficients are small because CLA+ total scores are on a large scale (400-1600), so one extra point is not expected to make much of a difference. Two factors would increase the interpretability of the results: (1) using a more meaningful score increase, such as 50 points, and (2) converting the log-odds to odds by exponentiating the coefficient. Thus, if one student scores 50 points higher than a second student, the log-odds of being rated one category higher than the second student is 50*.0033 = .165, and the odds are exp(.165) = 1.18. This first student is 18% more likely than the second student to be rated one category higher ("Good" rather than "Satisfactory or worse," or "Outstanding" rather than "Good") due to the higher CLA+ total score.

Table 4: Ordinal logistic regression models for predicting participants' post-college performance

Covariate	Est. Coefficient	Std. Error	*t*-statistic	95% CI	
				Lower	Upper
		Analysis and Problem Solving			
CLA+ Score	.0033	.0002	14.33	.0029	.0038
		Writing Effectiveness			
CLA+ Score	.0043	.0002	18.36	.0039	.0048
		Writing Mechanics			
CLA+ Score	.0046	.0002	19.33	.0041	.0051
		Rank Comparison of Participant			
CLA+ Score	.0049	.0002	22.18	.0045	.0053

Note: Estimated coefficients are log-odds of being rated one category higher given a one-point increase in CLA+ total score.

To further illustrate the relationship between CLA+ total score and employers' or graduate advisors' ratings of the participants, Figure 1 shows a plot of CLA+ total score and the predicted probabilities of being given each rating. In each graph, for a given point on the x-axis (a given CLA+ total score), the line that is "highest" corresponds to the rating that would be predicted for that participant, as this corresponds to the most probable rating category. Thus, for the question asking advisors and employers to rate participants on their writing mechanics, a CLA+ score of 1050 or less would correspond to a participant given a "Satisfactory or worse" rating, a score of 1060-1300 would correspond to a participant given a "Good" rating, and a score of 1310 or greater would correspond to a participant given an "Outstanding" rating. Naturally, as CLA+ total score increases, there is always an increasing probability of being rated "Outstanding" and always a decreasing probability of being rated "Satisfactory or worse." Where the red and blue lines intersect, it is equally likely that the participant would be given the highest or the lowest rating; however, this is always where the line for "Good" peaks, so this is the rating that would be predicted in this score range.

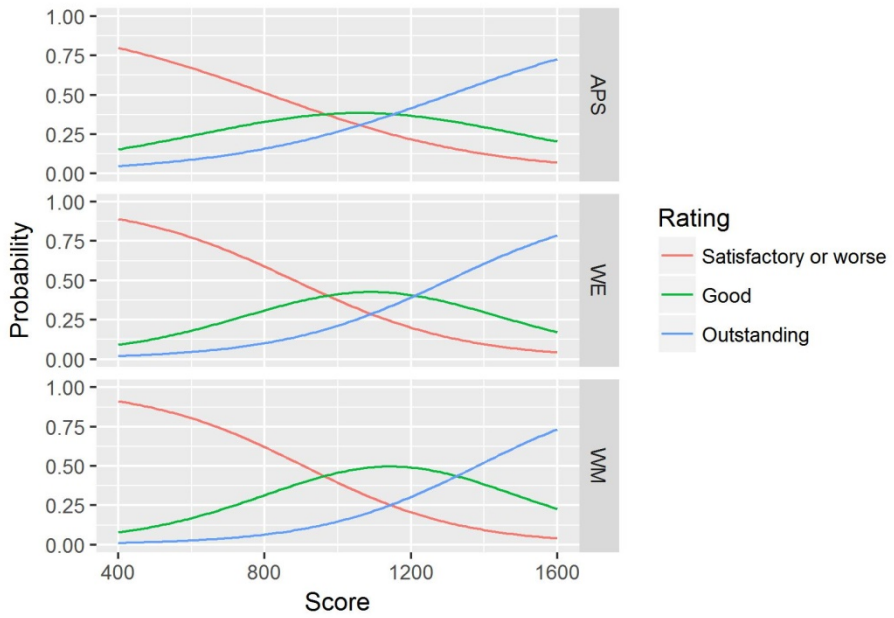

Figure 1: Probability of obtaining each skill rating as a function of CLA+ score

Students' ranking compared to other recent graduates

Table 4 also shows the results of an ordinal logistic regression model to predict employers' or graduate advisors' rankings of the participants compared to other recent college graduates, based on CLA+ total score. The results are much the same as those discussed in the previous section: there is a clear relationship between increasing CLA+ total score, and increasing relative rankings of participants. Figure 2 shows the predicted probabilities from this model for each of the rating response categories.

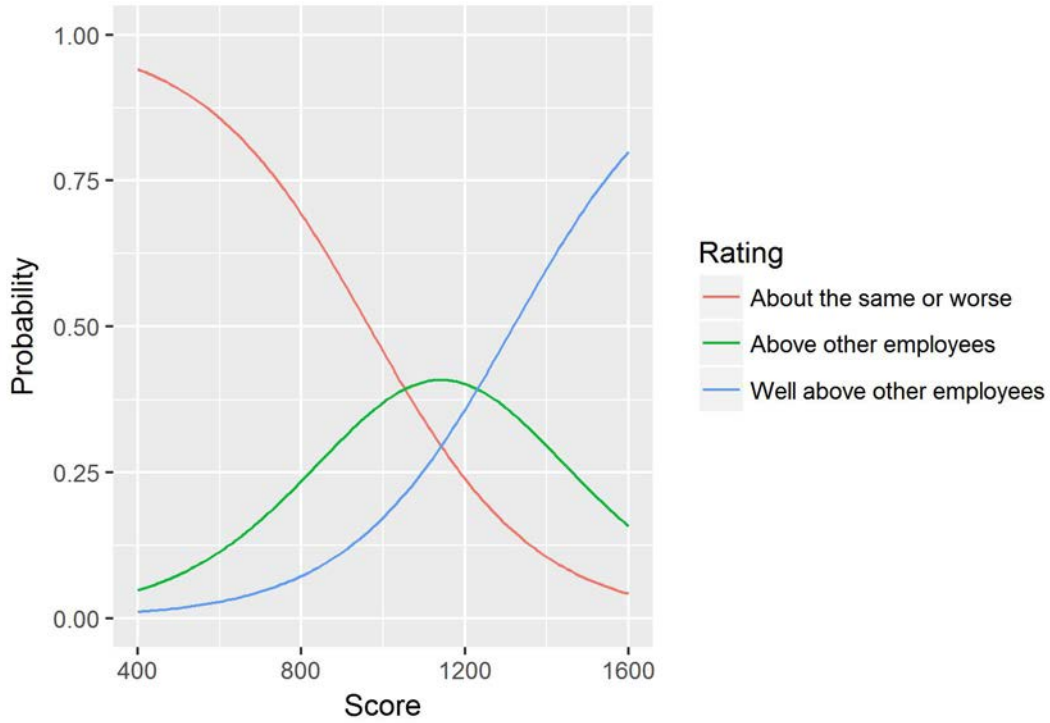

Figure 2: Probability of obtaining each relative ranking as a function of CLA+ score

Scientific Significance

Employers and advisors find critical thinking and written communication skills to be important or very important for entry-level positions in the workforce and graduate programs. CLA+ is predictive of positive post-college outcomes as measured by employers' survey responses. This is important to note because despite approximately 1.8 million individuals graduating each year (Hussar & Bailey, 2014), employers are still finding a skills gap (Hart Research Associates, 2015). Recent graduates struggle to find appropriate entry-level jobs and wonder if they are getting a good return on their investment (Abel, Deitz, & Su, 2014). And traditional career services and job-search resources typically do not provide students with a platform to demonstrate higher-order skills to employers.

Findings from this study offer support for the conclusion that critical-thinking and written-communication skills are important in predicting career placement and workplace success (Arum & Roksa, 2014). Additionally, the CLA+ can serve as both an effective instrument for not only identifying those high-achieving students but also for making their critical thinking and written communication skills more visible to prospective employers and graduate school admissions officers.

Future research studies include structured interviews with employers and graduate advisors in an effort to collect more in-depth qualitative data surrounding students' critical thinking and written

communication skills. Additionally, the original 2014 cohort will continue to be surveyed longitudinally in order to investigate how these skills are important in post-college success 5+ years after graduation.

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