

# *Evaluate Academic Competence for College Students in China: A Case Study*

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**Abstract:** The revised ACES-college was administered to 191 students from a Finance and Economics university to evaluate their academic competence. The regression models based on data collected through the scale showed that, in general, the higher the academic competence, the higher the GPA. However, when academic competence was split into seven different types, only interpersonal skills and learning motivation had a significant effect on GPA. We also found that female students had an advantage over male students in obtaining better scores, and the massive online teaching caused by Covid-19 had brought extra learning obstacles to underachievers. The above findings warn that colleges and universities should pay special attention to cultivating academic enablers of undergraduate students and deepening their understanding of gender differences in students' academic performance.

## 1. Introduction

The regulatory authorities in China have always attached great importance to the construction of a quality assurance system for the development of higher education. The State Council, the Ministry of Education, and other departments have successively issued documents such as the Implementation Plan for the Review and Evaluation of Undergraduate Education and Teaching in Higher Education Institutions (2012-2015), the National Standards for Undergraduate Professional Education Quality in Higher Education Institutions, the Overall Plan for Deepening the Evaluation Reform of Education in the New Era, and the Evaluation Methods for the Construction of "Double First-Class" Universities (Trial), and have also released the Report on the Quality of Undergraduate Education in Chinese Universities, to further promote and improve the construction of the quality assurance system for higher education to meet the needs of social and historical development.

But, these evaluation plans, criteria, and research reports mainly focus on disciplines, majors, and universities as the evaluation subjects, that is, they mainly regulate and describe the quality of undergraduate education in China from the perspectives of curriculum design, faculty, educational funding, and scientific research output, cannot provide personal learning output information of students. In China, the evaluation of university students' learning outcomes is primarily conducted

through the grading of course assignments and exams by their instructors.

However, course grades mainly reflect the mastery of knowledge and skills, while learning outcomes should also include progress and growth in non-cognitive domains, such as improvements in behavior, motivation, and so on. In addition, the current evaluation is primarily based on summative assessment, and the absence of self-evaluation by learners prevents them from improving and optimizing their learning process in a timely manner, which is not conducive to improving the quality of talent development.

From the perspective of academic competences, this article used a student self-evaluation scale as a tool to analyze the learning outcomes of senior undergraduate students at an Economics and Finance college. Analyses were conducted to examine the relationship between students' self-evaluation scores and their GPA scores. Additionally, it discusses the impact of gender and large-scale online teaching on the academic performance of college students.

## 2. Literature Review

The history of learning outcome assessment can be traced back to the Measurement Movement and Curriculum Theory led by Thorndike E L and Tyler R W in the 1920s and 1940s in United States [1, 2]. However, academic standards of learning outcome suitable for large-scale and systematic education evaluation which have global impact originated in Europe in the late 1990s. In June 1999, ministers of education of Britain, France, Germany and other 26 European countries held a meeting in Bologna to discuss the establishment and the improvement of the common European higher education system, and signed the Bologna Declaration, which had a far-reaching impact on the United States later.

Since then, formulating comparable learning outcome standards becomes a central task in higher education evaluation all across European and North America. The Tuning Educational Structures Project sponsored by OECD and the Valid Assessment of Learning in Undergraduate Education (VALUE) initiated by American Association of Colleges and Universities (AAC&U) have adopted the strategy of defining academic competence as learning outcome in their respective practices. The Tuning project has determined competence standards in specialized learning of business administration, educational science, physics, chemistry, Civil Engineering and social science et al. [3]. While the VALUE project has developed 16 competency standards for critical thinking, reading ability, writing and communication ability et al., to articulate learning outcomes of liberal education [4].

The standards and rubrics that the Tuning and the VALUE project built for academically taught competences have been widely used for institutional, national and international level learning outcome evaluation practices. Diperna established the theory of academic competence for learning outcome assessment in the first place when it comes to individual self-assessment level [5]. Diperna developed the Academic Competence Evaluation Scales College Edition (ACES-college) based on this theory [6]. ACES-college measures academic competences from perspectives of academic skills and academic enablers. The academic skills dimension survey undergraduates' reading and writing ability, mathematical science ability, critical thinking ability, and the academic enablers aspect measure learning motivation, interpersonal skills, learning engagement and learning strategies.

ACES-college has been widely accepted by the western academia. Many scholars have carried out studies based on the scale [7-12]. However, Chinese scholars' research on academic competence mainly focuses on master and doctoral students [13-18], university teachers and scholars [19-22]. Their definitions of academic competence are very close to the definition of academic research, which means most of them consider academic competence as an independent and systematic scientific research ability.

This is why Chang's research, which examined the impact of curricula design on the academic competence of English majors, is the only recent academic literature in China that focuses on undergraduates [23]. However, in his study, Chang used the original ACES-college to assess the evaluate academic competences of the respondents. we believe that the items used to measure academic skills in the original ACES-college are not applicable to contemporary Chinese university students. Zhang et al. noticed these deficiencies and used the relevant VALUE rubric to revise the items in the ACES-college that measure academic skills [24], which provides an efficient tool for articulate learning outcomes in this study.

### 3. Empirical Study Based on Data Collected Through the Questionnaire

#### 3.1. Sample Demographics and Study Variables

The study recruited 203 senior college students from a Finance and Economic university using convenience sampling strategy and obtained 191 valid questionnaires. Sample demographics and study variables are displayed in Table 1. Of the sample, 91 females and 100 males, 68 students were recruited in Fall 2019, 59 students were recruited in Fall 2020; and 64 students were recruited in Fall 2021. ZTOTAL, as well as ZT1 through ZT7 representing the total scores of the overall scale and the seven subscales respectively. GENDER is a binary variable with a value of 1 denoting females and a value of 0 representing males, and YEAR is a nominal variable with a value of 1, 2, and 3 assigned to students enrolled in 2017, 2018, and 2019, respectively.

Table 1: Sample demographics and study variables

Study variable	Measure	Count	Percentage
GENDER	Male=0	100	52.40
	Female=1	91	47.60
YEAR: Year of enrollment and recruitment	Enrolled in 2017 Fall, and recruited in 2019 Fall	68	35.60
	Enrolled in 2018 Fall, and recruited in 2020 Fall	59	30.89
	Enrolled in 2019 Fall, and recruited in 2021 Fall	64	33.51
ZTOTAL	Total Academic Competence		
ZT1	Study Skill		
ZT2	Motivation		
ZT3	Engagement		
ZT4	Interpersonal Skill		
ZT5	Critical Thinking Skill		
ZT6	Reading/Writing Skill		
ZT7	Quantitative/Scientific Skill		

#### 3.2. Descriptive Statistical Analysis

Table 2 displays the mean values of academic competence, indicating that the dimensions of study skills, motivation, engagement, and interpersonal skills have higher average scores per item (3.55, 3.40, 2.89, and 3.63) on a scale of 1 to 5, while critical thinking, reading and writing, quantitative, and scientific skills have lower values (3.03, 2.83, 2.82, and 2.82). It is also noteworthy that the mean score per item for the total academic competence scale is 3.09. Moreover, female students have a slightly higher mean score per item than males.

In summary, the average score for three out of the seven kinds of academic competences is lower

than 3, indicating a low-intermediate level of learning outcomes in general education for undergraduates in this college. Our findings suggest a less optimistic reality in general education in China, even considering that the Chinese might be more modest and cautious in their self-evaluation compared to most Westerners.

Table 2: Mean Value of academic competence in different dimensions

Dimensions	Mean score per item
Study Skill	3.40
Motivation	3.25
Engagement	2.89
Interpersonal Skill	3.65
Critical Thinking Skill	3.03
Reading/Writing Skill	2.83
Quantitative/Scientific Skill	2.82
Total Academic Competence	3.09
female	3.087
male	3.085

### 3.3. Regression Analysis

Table 3: Results of three regression models

Variable	Model 1		Model 2		Model 3		
	Coef.	T	Coef.	T	Quantile	Coef.	T
C	-1.2116	-6.2932	-0.6878	-4.8885	0.27	-2.0617	-6.8701
					0.50	-0.9676	-3.0899
					0.73	-0.4816	-2.1762
GENDER	0.4837	4.6421	0.2970	2.8030	0.27	0.3207	2.0280
					0.50	0.6674	4.5861
					0.73	0.5675	4.8417
YEAR	0.4666	5.6675	0.2594	4.3725	0.27	0.6014	4.7062
					0.50	0.3593	2.7908
					0.73	0.4323	4.7122
ZTOTAL	0.2562	3.6778			0.27	0.2000	1.9517
					0.50	0.2604	2.6561
					0.73	0.3510	4.1528
ZT1			-0.0048	-0.0681			
ZT2			-0.0726	-1.0454			
ZT3			-0.0172	-0.2363			
ZT4			0.1690	-2.9992			
ZT5			0.0020	0.0314			
ZT6			0.2653	3.6538			
ZT7			0.0972	1.3349			
R <sup>2</sup>	0.1309		0.1835		Wald Test		20.67293

Table 3 presents the econometric estimation results of three regression equations that were estimated using the natural logarithm of GPA as the dependent variable. The independent variables include the natural logarithm of the total academic competence (ZTOTAL) as well as the subscale academic competences, which are labeled as ZT1 through ZT7 in Table 2. In addition, GENDER and YEAR are also incorporated as control variables.

Model 1 indicates that both the GENDER and ZTOTAL variables have significant impacts on GPA scores. Additionally, the nominal variable YEAR was found to have a statistically significant

impact too, indicating that online learning has an effect on learning outcomes. In Model 2, we estimated the impact of different types of academic competences on GPA scores, while controlling for gender and year of enrollment. Results show that only "interpersonal skills" (ZT4) and "learning motivation" (ZT6) have statistically significant impacts on GPA scores.

Model 3 employs a quantile regression approach, with quantiles set at 0.27, 0.50, and 0.73. The Wald test indicates that there are significant variations in the effects of independent variables on GPA among different student groups. Firstly, female students have an advantage over male students in achieving higher GPAs, particularly in the medium and low GPA groups. Secondly, the impact of online learning on the GPA of lower-performing students is much greater than that of higher-performing students. For instance, the marginal effect of YEAR for the top 27% group students is 0.6014, which is almost twice that of the medium-level group and 1.4 times that of the bottom 27% group, implying that online or mixed-mode teaching may present additional learning obstacles for underachievers. Thirdly, higher academic competence is associated with higher GPAs for all undergraduate groups. However, the marginal effect of ZTOTAL on GPA for the 0.73 quantile group is 0.3510, which is 1.75 times greater than that of the 0.27 quantile group, suggesting that improving academic competence is particularly crucial for lower-performing students seeking higher GPA scores.

#### 4. Conclusion and Discussion

In recent years, there have been increasing reports in the Chinese media of college students dropping out of school due to poor academic performance. Many people in China are confused as to why the nation's most academically gifted students are struggling to complete their studies. Our research sheds some light on this issue: strong interpersonal skills and a positive learning motivation are more important factors affecting academic performance than mere reading, writing, calculating, and reasoning abilities. This highlights the need for students to prioritize the cultivation of these academic enablers alongside the acquisition of knowledge and skills. Higher education institutions in China should also recognize the importance of developing students' academic enablers and academic skills equally. Currently, more effort should be made to cultivate students' academic enablers.

Our empirical analysis also shows that top students may be better adapted to online teaching than intermediate and lower-performing students, as evidenced by their higher grades. This highlights the need for teachers and higher education institutions that implement online teaching to pay special attention to the needs of less academically accomplished students. Without sufficient interaction and supervision, these students' learning ability and experiences may be further weakened, possibly resulting in academic performance polarization in higher education in China. Gender differences in academic performance have also been confirmed in our study. While it is not necessary to exaggerate this gender opposition, it is important for teachers and administrators to deepen their comprehension of how educational evaluation, resource allocation, and other factors work differently between genders, in order to promote equal accumulation of human capital between sexes.

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