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Predicting Academic Performance of College Freshmen in the Philippines using Psychological Variables and Expectancy-Value Beliefs to Outcomes-Based Education: A Path Analysis

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ABSTRACT

This study aimed to verify the relationships among psychological factors, expectancy-value beliefs, and academic performance among college freshmen from higher education institutions in the Philippines. Correlation analysis revealed that these variables are interrelated with each other. Path analysis reported that help-seeking, self-esteem, self-efficacy, and social support positively impacted expectancy-value beliefs and academic performance. Conversely, academic overload and perceived stress negatively affected expectancy-value beliefs and academic performance, while expectancy-value beliefs positively influenced academic performance. Mediation analysis showed that expectancy-value beliefs partially mediated the effects of the six psychological variables on academic performance. As a result of these findings, a predictive model for academic performance under the Outcome-Based Education (OBE) approach, incorporating psychological factors and expectancy-value beliefs, was developed.

KEYWORDS: academic performance; expectancy-value beliefs; OBE; outcomes-based education; psychological variables

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1. Introduction

Attainment of higher education is an essential milestone in a person's life. However, the transition from senior high school to college can be stressful, and students' beliefs about their fate during this transition can become a source of stress. Another evolution is the adaptation of instructors in higher education institutions (HEIs) to a new pedagogy called Outcome-Based Education (OBE). In order to be at par with the global teaching-learning methods and competitiveness, the Commission on Higher Education (CHED) required the application of this teaching approach in Philippine universities and colleges in 2012 through CHED Memorandum Order No. 46. This paradigm of teaching is student-centered rather than lecture-based as in the conventional method [1]. This new approach in education is the main thrust of HEIs in the Philippines today and is adopted to ensure that students and graduates will be well-equipped and prepared for the real world.

One of the goals of the CHED is the attainment of higher human resource numbers [2]. Reducing dropout and increasing completion rates in higher education are two of the key strategies for achieving this goal. Academic failure is a significant burden, not only for society but also for the HEIs, the students, and their families. Data from the CHED revealed that enrollees in HEIs from 2001 to the present have reached 2.56 million, but the dropout rate reached an alarming 83.7 percent [2,3]. This means the Philippines produces 2.13 million college dropouts yearly, while only 500,000 students are graduating with their respective degrees. The number of dropouts is typically higher among freshmen [4]. This problem kindled some researchers to study the factors that affect students' decision to drop out, and they found a lack of self-efficacy, financial constraints, and lack of motivation as the strong determinants [5-7].

Although previous research has examined these determinants, the importance of identifying predictors of academic success should be emphasized in order to mitigate the high dropout rates prevalent in education. Psychological factors are considered stable and significant correlates of academic performance and are often suggested as prognosticators of academic achievement in HEIs [8-10].

Psychological factors that strongly correlate with academic success include help-seeking, self-esteem, academic overload, perceived stress, self-efficacy, and social support [11]. Expectancy-value beliefs, which are individuals' expectations for success and their value for succeeding, were known to be predictors of academic achievement. Expectancy-value variables directly and indirectly predict achievement-related outcomes through achievement goals [12-14]. Prior research has provided empirical evidence indicating the relationship of psychological factors such as self-efficacy to expectancy-value beliefs [15,16]. Students' expectancy-value beliefs played a mediator role between academic self-efficacy and the achievement/satisfaction relationship.

Extensive research has consistently supported the fundamental role of psychological factors in influencing academic performance, alongside the significant impact of expectancy-value beliefs on educational outcomes. Building upon this evidence, this study delved into the mediating effects of expectancy-task beliefs within the psychological-academic performance relationship.

This research aimed to predict how the OBE approach, implemented for the first time in the Philippines during the 2018-2019 academic year, affects students' academic performance, beliefs, and motivation to complete their undergraduate degrees. Unlike previous research, which primarily focused on improving instructional methods, this study explored the relationships between psychological factors, expectancy-value beliefs, and academic performance among first-year students. Path analysis, a form of structural equation modeling, was used to analyze these connections. The study's findings were intended to serve as a valuable reference for future research in this area.

2. Methodology

This study employed the descriptive-correlational design to describe and measure the degree of the relationships between psychological factors, expectancy-value beliefs, and academic performance. In this design, subjects' scores on two variables were

calculated without manipulating any variables to determine whether there is an association.

Seventy higher education institutions (HEIs) in the Philippines were sampled. The participants of the study were the HEIs' freshmen students who entered the First Semester, Academic Year 2018-2019, and were enrolled as regular students in their respective programs. A systematic random sampling technique was employed in the study, and every 5th sample in the frame of students was selected. A power analysis using G*Power 3.1 determined the sample size needed to attain a minimum power of 0.80. Using the power analysis, 12,452 students should be recruited as respondents in the study. However, only 1,029 usable responses were obtained from students under different academic programs, resulting in an overall response rate of 8.26%.

Several quantitative self-report measures were employed to assess the independent and mediator variables. The students' academic performance as a dependent variable is conceptualized as the Weighted Point Average (WPA) which was directly obtained from the respondents. The scales used for the present study are discussed in the following:

Help-seeking was assessed using an adaptation of a six-item help-seeking attitude scale developed by Knapp and Karabenick [17]. Changes were made to the item statements and options to fit the circumstances of the study. That is, the word "tutoring" was replaced with the word "help". The answer format was a Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). Knapp and Karabenick reported a reliability of 0.74 for the 6-item scale [17].

Rosenberg's Self-Esteem Scale was utilized to measure self-esteem [18]. The Rosenberg Self-Esteem Scale consists of ten items measuring the participant's global self-esteem ($\alpha = .83$). The answer format used is a Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). The scale was scored such that a high score corresponds with a high level of self-esteem.

Academic overload was measured via the 5-item scale used by Petersen [19]. The five-point Likert scale requires respondents to indicate the extent to which the statements apply to them. Responses ranged from 'does not apply at all' to 'applies completely'. Scores on this scale ranged from 1 to a maximum of 5. Responses were scored such that a high score corresponds with a high level of academic overload. The academic requirements are perceived to be very demanding, and the student cannot cope. Petersen reported a 0.75 reliability coefficient on the scale [19].

The Perceived Stress Scale (PSS), as developed by Cohen et al., was used [20]. This scale measured the degree to which situations in one's life are appraised as stressful. The 14 items of the PSS were designed to measure the degree to which respondents found their lives unpredictable, uncontrollable, and overloading. Responses were scored such that a high score corresponds with a high level of perceived stress. Cohen et al. reported reliability coefficients between 0.83 and 0.87 for this scale [20].

The Academic Self-Efficacy Scale, developed by Klobas et al., was utilized [21]. These ten item-scale was assessed on a seven-point Likert-type scale ranging from 1 (I am definitely not able to do this) to 7 (I am definitely able to do this). The internal

consistency of this scale has been reported as 0.84 (Cronbach Alpha), which shows good internal consistency [21].

The Support Questionnaire, designed by Lozada-Santone, measures students' perception of their social support from four sources: parents, instructors, close friends, and other adults [22]. The Support Questionnaire consists of 36 items. A total score on all sources of support is tallied using a 3-point Likert scale, rated as 3 = very helpful, supportive or encouraging, 2 = sometimes helpful, or supportive or encouraging, or 1 = not helpful, supportive, or encouraging. The Support Questionnaire has a strong internal consistency; the developer of the scale reported a Cronbach's alpha of 0.912 [22].

Student expectancy beliefs and task values were measured using a modified Expectancy-Value Questionnaire and Valuing of Education (VOE) Scale [23,24]. A 5-item questionnaire was extracted from the modified Expectancy-Value Questionnaire to measure students' expectancies while a 24-item questionnaire was extracted from the VOE scale to measure the beliefs on the following task values: interest, attainment value, utility value, and relative cost. Xiang et al. have reported that the Expectancy-Value Questionnaire could produce reliable data with the Cronbach alpha coefficients ranging from 0.63 to 0.87 [2006].

Before conducting the research, letter permissions were obtained from the HEIs to conduct the study. After confirmation, permission was then requested from the head of the programs of the college and the relevant course coordinators and lecturers to approach students in their first-year lectures to invite participants to volunteer for the study. Once permissions were obtained, students were approached in lectures by the researcher, who verbally invited students to participate in the study and briefly explained the nature of participation. After students signed the consent form, they were given the survey questionnaire to elicit responses. After retrieving the questionnaires, the responses were tabulated, analyzed, and interpreted using several statistical tools. Mean (M) and standard deviation (SD) were used to describe the sample and the basic data obtained. Tests for normality (Kolmogorov-Smirnov tests) were conducted on the data to assess whether or not the data is normally distributed for parametric tests to be used. Because the majority of the data were normally distributed, parametric tests were run, namely Pearson's correlations and multiple regression. Pearson's correlation was used to show the relationship between variables, while multiple regression was used to indicate the extent to which a predictor variable relates to and can therefore be used to predict a criterion variable.

Path analysis, which belongs to a family of statistical techniques known as structural equation modeling (SEM), was used to predict regression weights. The regression weights indicated during path analysis were then compared to the observed correlation matrix. Path analysis was chosen as the technique for this study for several reasons: for the result of this study to be replicated and extended in the future researches and as the variable of expectancy-value beliefs in the hypothesized model acts as both, a criterion of multiple independent variables and predictor variable to academic performance, alternative statistical techniques cannot be applied. Before formulating the path analysis, the following assumptions were identified first and met:

linearity, additivity, causality, measurement error, lack of multicollinearity, error term, recursiveness, measurement level, specification error, and sample size.

3. Results

Descriptive statistics of all the variables are presented in Table 1. The outcome measures indicate that the average academic performance as measured by WPA for the sample was 82.22% (SD=4.23), and the respondents reported an average of 2.99 (SD=0.32) expectancy-value beliefs to OBE, which roughly means that they sometimes believe that their academic success is attributed to OBE learning. Means and standard deviations for psychological variables are also reported in Table 1. On average, the respondents display a medium level of help-seeking (M=3.21, SD=0.21), self-esteem (M=3.33, SD=0.25), academic overload (M=3.12, SD=0.65), perceived stress (M=3.10, SD=0.34), self-efficacy (M=3.03, SD=0.54), and social support (M=2.89, SD=0.33).

Table 1 also shows the correlations among psychological variables, expectancy-value beliefs to OBE, and academic performance. Help-seeking was positively related to self-esteem, self-efficacy, social support, expectancy-value beliefs to OBE, and academic performance. In contrast, it was negatively associated with academic overload and perceived stress. Self-esteem was positively related to self-efficacy, social support, expectancy-value beliefs to OBE, and academic performance but negatively related to academic overload and perceived stress. Academic overload was negatively related to self-efficacy, social support, expectancy-value beliefs to OBE, and academic performance but positively related to perceived stress. Perceived stress was negatively related to self-efficacy, social support, expectancy-value beliefs to OBE, and academic performance. Self-efficacy was positively related to social support, expectancy-value beliefs to OBE, and academic performance. Social support was positively related to expectancy-value beliefs to OBE and academic performance. Finally, expectancy-value beliefs about OBE were positively related to academic performance.

A path analysis determined the causal effects among psychological variables, expectancy-value beliefs to OBE, and academic performance. The conceptual model, presented in Figure 1, was consistent with the empirical data. More specifically, all path coefficients were significant at the .05 level. The significant paths were as follows: expectancy-value beliefs to OBE and academic performance paths in the help-seeking, self-esteem, self-efficacy, social support, academic overload, and perceived stress ($p < 0.05$); and academic performance path in the expectancy-value beliefs to OBE ($p < 0.05$).

The hypothesized conceptual model with path coefficients was generated and is now presented in Figure 2. The model fits well with the following indexes: Chi-square of Minimum Discrepancy Test (9.06), $p < 0.000$; CFI = 0.952; GFI = 0.971; NFI = 0.977; SRMR = 0.065, RMSEA = 0.03.

The outcome of primary interest was academic performance: the determinant with the largest total causal effect is expectancy-value beliefs to OBE (.93), followed by academic overload (-.88), perceived stress (-.86), social support (.78), help-seeking (.73), self-esteem (.65), and self-efficacy (.78). It can be gleaned that academic overload and perceived stress exerted a negative influence on academic performance while help-

Table 1. Means, standard deviations, Cronbach's alphas, and correlations.

Variables	α	M	SD	1	2	3	4	5	6	7	8
1. Help-Seeking	.89	3.21	.21	-	.81	-.84	-.85	.74	.79	.69	.77
2. Self-Esteem	.95	3.33	.25		-	-.81	-.91	.69	.69	.72	.69
3. Academic Overload	.92	3.12	.65			-	.71	-.77	-.70	-.78	-.92
4. Perceived Stress	.90	3.10	.34				-	-.67	-.69	-.81	-.90
5. Self-Efficacy	.92	3.03	.54					-	.82	.91	.69
6. Social Support	.91	2.89	.33						-	.69	.84
7. Expectancy-Value Beliefs	.88	2.99	.32							-	.97
8. Academic Performance		82.22	4.23								-

seeking, self-esteem, self-efficacy, social support, and expectancy-value beliefs to OBE exerted a positive influence on academic performance. The model explains approximately 89% of the variance in academic performance.

Another outcome of secondary interest is expectancy-value beliefs to OBE itself: the determinant with the largest total causal effect is self-efficacy (.87), followed by perceived stress (-.77), academic overload (-.74), self-esteem (.68), help-seeking (.65), and social support (.65). It can be gleaned that academic overload and perceived stress exerted a negative influence on expectancy-value beliefs to OBE, while help-seeking, self-esteem, self-efficacy, and social support exerted a positive influence on expectancy-value beliefs to OBE. The model explains approximately 83% of the variance in the expectancy-value beliefs to OBE.

A mediation analysis was conducted to determine the mediating effects of expectancy-value beliefs on the psychological factors-academic performance relationship. When expectancy-value beliefs to OBE variable is included as a mediator in the model, all psychological variables and expectancy-value beliefs to OBE significantly influence academic performance ($p < 0.05$). This indicates that expectancy-value beliefs to OBE partially mediate the effects of the six psychological variables, namely help-seeking, self-esteem, self-efficacy, social support, academic overload, and perceived stress, on academic performance.

4. Discussion

The main objective of the present study was to explain the relationship among psychological factors, expectancy-value beliefs, and academic performance. Additionally, the study sought to determine the mediating effects of expectancy-value beliefs on the psychological factors-academic performance relationship. The main outcome of the study was the development of a model that would predict the academic performance of students under OBE approach using psychological factors and expectancy-value beliefs.

Consistent with previous research, the findings of the study indicate that help-seeking, self-esteem, self-efficacy, and social support positively influence expectancy-value beliefs and academic performance [15]. These positive associations would suggest that students who sought more help with difficulties they experienced during the year, displayed high self-esteem and self-efficacy, and received more support from others will likely have higher expectancy-value beliefs and achieve a higher academic

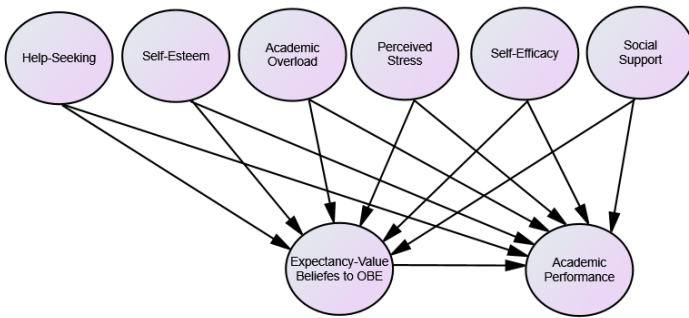


Figure 1. Conceptual model.

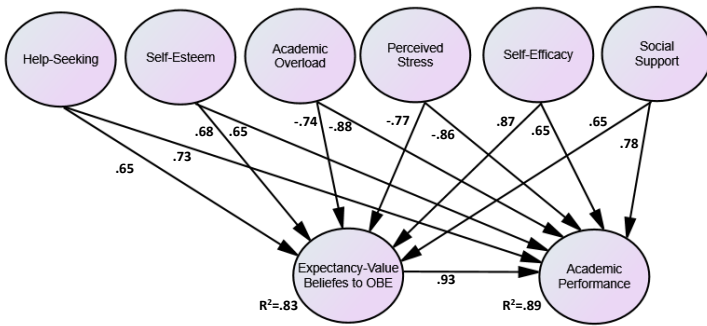


Figure 2. Path diagram of the conceptual model.

performance. Conversely, students who sought less help with difficulties they experienced during the year, displayed low self-esteem and self-efficacy, and received less support from others will likely have lower expectancy-value beliefs and will achieve a lower academic performance.

The results showed that academic overload and perceived stress negatively influenced expectancy-value beliefs and academic performance. The findings, consistent with prior research, suggest that students who displayed high levels of academic overload and perceived stress will show lower levels of expectancy-value beliefs and achieve a lower academic performance [15,26]. Conversely, students who displayed low levels of academic overload and perceived stress will show higher levels of expectancy-value beliefs and achieve higher academic performance.

Consistent with prior studies, the present study revealed that expectancy-value beliefs positively influenced academic performance [12,15]. This indicates that students with high expectancy-value beliefs will tend to achieve higher academic performance.

On the other hand, students with low expectancy-value beliefs will tend to achieve a lower level of academic performance.

The findings of the mediation analysis revealed that expectancy-value beliefs to OBE partially mediate the effects of all psychological variables in the model, namely help-seeking, self-esteem, self-efficacy, social support, academic overload, and perceived stress, on academic performance. In other words, help-seeking, self-esteem, self-efficacy, social support, academic overload, and perceived stress directly explain the variation in academic performance and indirectly via the expectancy-value beliefs to OBE.

This study aimed to establish connections between psychological factors, expectancy-value beliefs, and academic performance among college freshmen enrolled in a lecture-based introductory class. However, the findings are limited to this specific context. To understand how expectancy-value beliefs relate to the OBE approach and academic performance, future research should expand its scope to include different teaching methods (e.g., seminars) and educational institutions beyond Filipino universities.

While path analysis has helped clarify causality claims, future studies could employ a time-sequence design to better establish the chronological order of relationships, such as examining the link between self-reported psychological factors and expectancy-value beliefs measured at different points in the academic year.

It is worth noting that this study relied on students' self-reported assessments of their psychological factors and expectancy-value beliefs regarding OBE. Future research could explore alternative methods to enhance the accuracy of these measurements.

Despite these limitations, the findings align with previous research in shedding light on the roles of psychological factors and expectancy-value beliefs within the context of OBE. While this study does not conclusively determine a positive or negative impact on academic performance, it does suggest potential strategies for improvement.

To enhance academic performance without compromising learning objectives, measures should be taken to alleviate students' academic burden and reduce perceived stress. Simultaneously, initiatives promoting help-seeking, self-esteem, self-efficacy, and social support could be implemented to foster a conducive educational environment.

Furthermore, it is crucial to enhance instructional materials and provide teacher training and ongoing quality monitoring to strengthen expectancy-value beliefs related to OBE. This paper underscores the importance of intensifying school programs and initiatives related to these psychological variables and expectancy-value beliefs in OBE, ultimately contributing to improved student academic performance.

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Conflict of Interest Statement

The author declares no conflict of interest.

Author Contributions: The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation. The author has approved the final version of this manuscript.

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