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Short Communication

Persistence, Retention and Completion of BS Agriculture Students in the University of the Philippines

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ABSTRACT

The study used correlational research design to identify factors that explained persistence and retention of BS Agriculture students in the University of the Philippines. The findings reveal a significant relationship between persistence and retention. The results of ordinal logistic regression prove that student satisfaction increases student retention. The Nagelkerke's pseudo R^2 value indicates that classroom-related factors explain a large proportion of variation in the student persistence. As persistence goes hand in hand with retention, higher agricultural education can make use of these influential factors by providing the best educational services and learning experiences to students who found the right choice in agriculture.

Keywords: Agriculture education, completion, degree, persistence, Philippines, retention

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INTRODUCTION

The Philippines, being an agricultural country continues to depend on agricultural science and agricultural college education for the development of the country's agricultural sector. But the agriculture sector today suffers from a lack of human resources. One reason is that its higher education sector has been experiencing a serious decline in the number of graduates from the field of agriculture since the year 2000 (Commission on Higher Education,

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2016). In fact, the number of students attending college continues to grow, but the problems of improving graduation and the completion rates in this field remain a challenge.

Table 1 shows the enrolment and graduates by discipline group in the Philippine higher education. In the Philippines, as presented, agriculture and its related courses lag far behind those of their allied degree programs being offered by the state universities and colleges all over the country.

Several issues point to the role of student persistence and institutional retention in improving graduation and completion rates of the agriculture students in college. But the question is, how do these two major variables really contribute or in particular, which persistence and retention factors are indeed influential to the success of every student in college?

By capturing the experiences of the students who persist and remain in their chosen degree program as well as those who successfully complete the program, this study will uncover factors that explain the persistence and retention of college students in pursuing the Bachelor of Science in Agriculture until the end.

To clarify persistence, it refers to the aspiration of Bachelor of Science in Agriculture (BSA) students to complete the four-year bachelor's degree program in agriculture and one's chosen field of specialization. This student aspiration is supported by items related to personal, academic and career disposition of agriculture students as well as their experiences towards institutional- and classroom-related factors. Retention, on the other hand, refers to agriculture students who are institutionally retained, meaning they remain enrolled at the same institution until graduation.

The study reported in this paper will specifically determine the relationship between persistence and retention; as well as determine which factors really contribute to persistence, retention, and completion of the BS Agriculture program by the students.

Table 1

Higher education enrolment and graduates by discipline group, academic year 2012-13 to 2014-15

Discipline Group	Enrolment			Graduates	
	2012-13	2013-14	2014-15	2012-13	2013-14
Agricultural, Forestry, Fisheries, Vet Med.	81,740	96,164	125,526	13,796	13,986
Arts and Sciences	447,007	482,193	517,725	70,263	72,838
Business Administration and Related	915,191	970,558	990,676	164,541	169,846
Education and Teaching Training	536,854	624,254	725,183	86,903	98,277
Engineering and Technology	811,644	849,559	896,933	132,278	136,515
Medical and Allied	243,285	228,484	224,897	57,427	50,513
Other Disciplines	281,544	312,184	330,786	39,561	43,313
Total	3,317,265	3,563,396	3,811,726	564,769	585,288

Note: *Graduates AY 2014-15 -not available*

Retrieved August 30, 2016, from *http://www.ched.gov.ph/central/page/ched-statistics*

While exploring the factors that explain persistence, retention and completion of agriculture students, this study serves as a step toward understanding the mechanisms through which the university influences, and other factors that affect persistence, retention of college students in pursuing BS Agriculture course towards their degree completion. It further illuminates the ways in which students are supported and challenged in their academic pursuits in BS Agriculture program.

This study likewise serves as an eye-opener to different colleges and universities all over the country so as to gain an understanding of the barriers encountered by students in completing their degree and devise means for addressing those barriers and the unmet needs of this student population. Better understanding of the student body can lead to improved projection of enrollment patterns and overall improvements to the enrollment management. The school administrators, particularly the future implementers of the institution may have a basis in assessing the program and plan for its improvement, which is geared towards funding stability of the institution (i.e., low retention rates negatively impact an institution's budget due to lost revenue (services, tuition, residence etc..); promoting institutional reputation (i.e., low retention rates can negatively impact the institution's reputation); strengthening alumni relations (i.e., fewer graduates = fewer alumni = reduced number of prospective future donors); as well as with the government relations (i.e., funding transfers and accountability: with governments and taxpayers).

The findings will help teachers generate insights that may lead to the enrichment of the teaching materials and techniques to provide better training tools to produce capable agriculture students who will complete the program. The findings will also help parents identify the needs of their children and find ways and means to make them work together with their teachers which in turn facilitate the motivation of college students toward school and consequently increase school attendance and participation leading to degree completion.

Furthermore, this study will help students realize the weight of their education in a number of ways including better use of their time and resources. This realization encourages them to complete their degree program; thus increase their contribution to the economic development of the country. Finally, this study will serve as a springboard for a series of studies directed towards strengthening the agriculture program in the higher education system in the Philippines.

METHODS

Research Design

This study used the correlational research design to address the persistence and retention factors that influenced agriculture students in pursuing their Bachelor of Science in Agriculture program until its completion.

Respondents of the Study

The sample consisting of BS Agriculture students of the academic year 2014-2015 were randomly selected. The study employed the stratified random sampling with proportional allocation of the respondents which represented 47.7% of the total research population. Specifically, the subject was composed of 58 student respondents from second year, 70 from third year and 82 from fourth year levels for a total of 210 student respondents in all. This study identified persistence and retention factors of agriculture students during their first year of college as they moved on to second year, third year and fourth year by the selected demographic characteristics including age, gender, enrolment status and major.

Data Gathering Instrument and Procedure

This study used student's self-administered questionnaire, which received a 100 per cent response rate. Persistence and retention are measured using researcher-made survey questionnaires. Persistence factors are composed of fifteen-item (15) student-related, seventeen- item (17) institution-related, and eighteen-item (18) classroom-related factors, a total of 50 perception statements in all. Retention factors are composed of 20-item survey questionnaire answered by the students in relation to their perception towards institutional issues, characteristics (i.e., programs and curricular offerings), and services as well as their evaluation of the institution's ability to maintain the enrolment by implementing some student retention "best" practices. This student assessment was measured using a four-point degree scale ranging from "no contribution" (1) to "major contribution to my retention" (4). Both sets of persistence and retention instrument were validated by experts and pilot tested to 10 BS Agriculture students who were not part of the respondents.

Tools for Data Analysis

The study used the Statistical Package for the Social Sciences (SPSS) software version 16 in analysing the data. This study employed descriptive analysis (i.e., frequencies) in determining persistence and retention factors and chi-square test for independence, also called Pearson's chi-square test in determining significant relationship between two categorical variables (i.e., persistence, retention, and year level).

The study also used Ordinal Logistic Regression (OLR) (often just called 'ordinal regression'), in particular the cumulative odds ordinal regression with proportional odds to predict an ordinal dependent variable given one or more independent variables.

Methods of Analysis

Analysing data using ordinal regression requires passing its four assumptions (https://statistics.laerd.com/spss-tutorials/ordinal-regression-using-spss-statistics.php 15 July 2016), which the study met. In this study the dependent variables (i.e., persistence and retention) were measured at the ordinal levels, whereas, independent variables (student-related, classroom-

related, institution-related factors, student academic performance, year level, and gender) are continuous, ordinal or categorical (including dichotomous) variables. Dummy variables for three categorical variables (i.e., student grade performance were coded "0" for grade range between 1.00–1.49–Excellent, "1" for 1.50–2.00–Very Good, "2" for 2.01-2.49-Good, and "3' for 2.50-3.00-Satisfactory; year levels were coded "1" for 2nd year, "2" for 3rd year, and "3" for 4th year; gender was coded "0" for male and "1" for female) were created. Also, it made use of proportional odds, which is a fundamental assumption of this type of ordinal regression model. The assumption of proportional odds means that each independent variable has an identical effect at each cumulative split of the ordinal dependent variable. All variables were tested at 95% confidence, with r-squares being calculated.

The Nagelkerke pseudo r-square test for strength of association was also employed. All estimates were reported in the form of an odds ratio, a ratio indicating the probability of the occurrence of an event (Rudas, 1998 as cited in Wood & Williams, 2013). In this case, the events of interest were persistence and retention towards degree completion.

RESULTS AND DISCUSSION

This section presents the detailed discussion of results through the data gathered which were organized according to the objectives of the study. Quantified data were tabulated, analyzed and interpreted.

For better understanding, the data were presented in tabular form and generalizations were developed to determine the factors that explain persistence and retention of BS Agriculture students towards degree completion.

Table 2 shows the demographic characteristics of the student respondents in terms of age, gender, major, enrollment status, and self-assessment of academic performance in terms of grade point average.

There were 210 student-respondents in all; 96 or 46% were male and 114 or 54 % female. Majority of these full-time students are between 18 to 20 years of age. Three (3) students or 1.4% were specializing on agricultural systems, 42 or 20% on agronomy, 57 or 27% on animal science, 24 or 11.4% on crop protection and plant pathology, 20 or 10 % on entomology, 32 or 15 % on horticulture and another 27 students or 13 % on soil science. Only 5 students or 2 % belong to other specialization including agricultural extension and weed science.

In terms of college academic performance, 127 students or about 60% of the respondents' grade point average fall on the grade range between 2.01-2.49. This means that most agriculture students have good perception of their academic performance.

Result of chi-square test on Table 3 reveals significant relationship between persistence and retention of BS Agriculture students towards degree completion $x^2(6, n=210) = 48.824_a$, $p<0.01$. This implies that students' persistence to complete their

Table 2

Demographic characteristics of BS Agriculture students

Age	Year Level						All	
	2nd		3rd		4th		Levels	
17	6		0		0		6	
18	41		7		0		48	
19	10		43		10		63	
20	0		15		39		54	
21	1		2		19		22	
22	0		2		7		9	
23	0		1		3		4	
24 >	0		0		4		4	
n	58		70		82		210	
Gender	M	F	M	F	M	F	M	F
	29	29	34	36	33	49	96	114
n	58		70		82		210	
Major								
Agricultural Systems	0		2		1		3	
Agronomy	5		21		16		42	
Animal Science	16		15		26		57	
Crop Protection and Plant Pathology	5		10		9		24	
Entomology	4		9		7		20	
Horticulture	16		6		10		32	
Soil Science	12		6		9		27	
Others	0		1		4		5	
n	58		70		82		210	
Enrolment Status								
Full-Time	58		68		77		203	
Part-Time	0		2		5		7	
n	58		70		82		210	
Academic Performance								
Grade Range								
1.00-1.49	1		1		2		4	
1.50-2.00	21		8		18		47	
2.01-2.49	28		52		47		127	
2.50-3.00	8		9		15		32	
n	58		70		82		210	

degree changes (either increase or decrease) as the level of institution's retention practices changes. Agriculture students who find their personal attributes, faculty trait and college experiences relevant and meaningful to their chosen degree, and they realize that these persistence factors are supported by the institution's way of implementing the student retention practices in providing better education; are more likely to develop

definite aspiration towards completing the four-year bachelor's degree in the same institution. A significant relationship is also found between year level and persistence x^2 (6, n=210) = 13.643_a, p<0.05. This attests findings from Levy (2009) as cited in Hart (2012), who proposed that college status and graduating term were related factors. That is, the closer to graduation, the more persistent the student. This is being as how prior educational experience may augment confidence through increased familiarity with the environment (Levy, 2007, 2009, as cited in Hart, 2012; Dupin-Bryant, 2004 and Bunn, 2004 [as cited in Hart, 2012]).

In addition to test of association, ordinal logistic regression in particular the cumulative odds ordinal regression with proportional odds was also run to predict an ordinal dependent variable given one or more independent variables in the regression, holding all other variables constant.

Results of the ordinal logistic regression for persistence and retention are reported in Table 4, including the odds-ratio, which is the magnitude of the change in the probability for a 1-unit change in an independent variable. If the odds-ratio is less than 1, an increase (decrease) in the independent variable leads to a decrease (increase) in the probability of student persistence and retention towards degree completion. If the odds-ratio is greater than 1, an increase (decrease) in the independent variable causes the probability of being retained or graduating to increase (decrease). Table 3 provides the significance level, or *p*-value, for each independent variable. *P*-values less than 0.05 indicate that the coefficient has a statistically significant impact on the probability of student persistence and retention towards degree completion.

The following section presents the major (statistically significant) results, focusing on the odds-ratio, which is the relative likelihood of a student persisting or being retained compared to not persisting or being retained.

The student-related factors including personal, academic and career disposition have an odds-ratio (1.862) greater than 1, but not significantly different from 0 (p=0.364). This indicates that the odds of being retained grow by 86.2 %for each level increase in the student evaluation of their personal, academic and career disposition, though this pattern was not statistically significant in student retention. On the other hand, the odds-ratio for classroom-related factors (0.016) and institution-related factors (0.019) are less than 1, and both

Table 3

Relationship between paired variables

Variables	*X²-value*	*p* – value
Persistence and Retention	$48.824^{a}{}_{(df=6)}$	0.000*
Persistence and Year Level	$13.643^{a}{}_{(df=6)}$	0.034*

significantly different from 0 (p=0.002; 0.000 respectively) indicates that when agriculture students have increased level of experiences toward institutional processes, academic and co-curricular procedures, as well as faculty and the entire curriculum their odds of being retained decreased by 1.6% to 1.9 % or the students are less likely to be retained. Truly, student satisfaction, particularly with the campus climate, can increase student retention (NASFAA, 2010 as cited in Dela Cruz, 2016).

In terms of student-demographics, only gender is found to be statistically significant in student retention as opposed to academic performance and year level.

The Nagelkerke's pseudo R^2 value indicates that retention accounted for 26.9 % of the variance in the persistence, whereas persistence accounted for 19.1 %of the variance in the retention. Specifically, persistence factors such as student-related accounted for 2.4%, classroom-related accounted for 21.5% and institution-related accounted for 15.3% of the variance in the retention. Conversely, the analysis on each of the persistence factors indicates that it is the classroom-related factors (42.4%) that explain a relatively large proportion of the variation in the student persistence towards degree completion. However, pseudo R^2 values of selected student demographics such as academic performance, gender, and year level suggest a relatively small proportion of the variation in the persistence and retention of agriculture students towards degree completion. This is just as expected because there are numerous student, family and school characteristics that impact on student persistence and retention. Many of which are much more important predictors of persistence and retention than any simple association with student academic performance, gender, and year level.

Table 4

Summary of OLR model for persistence and retention, odds-ratio, p-value, and pseudo R square

	Persistence	Retention				
	Odds Ratio	95%CI	Nagelkerke	Odds Ratio	95%CI	Nagelkerke
Persistence Factors				0.037	0.011-0.127	0.269
				.000**		
Student-Related			0.178	1.862	0.487-7.128	0.024
				0.364		
Classroom-Related			0.424	0.016	0.001-0.198	0.215
				0.001**		

Table 4 *(Continued)*

	Persistence	Retention				
	Odds Ratio	95%CI	Nagelkerke	Odds Ratio	95%CI	Nagelkerke
Institution-Related			0.385	0.019	0.002-0.160	0.153
				0.000**		
Retention	0.000	0.000-0.000				
	0.000**					
Academic Performance	1.155	0.526-2.534	0.017	0.898	0.515-1.566	0.005
	0.720			0.705		
Gender	0.433	0.138-1.358	0.007	3.820	1.659-8.799	0.017
	0.151			0.002**		
Year Level	0.705	0.360-1.379	0.021	1.030	0.644-1.647	0.002
	0.307			0.903		

CONCLUSIONS

The result of this study affirms the significant relationship between student persistence and institutional retention. The way agriculture students aspire to pursue their academic degree still depends on how their educational institution fits to their educational goals and aspirations as well. This points to the classroom-related factors that are indeed crucial to the persistence of the students.

The classroom experiences that start from the quality of teaching to the student engagement or their exposure to active learning sum up their meaningful academic experiences that contribute to student overall satisfaction.

Truly educational institutions play a vital role in improving student persistence. As persistence goes hand in hand with retention, higher agricultural education can really make use of this influential factors that they have and invest by providing the best educational services and learning experiences to students who find the right choice in this field of agriculture. This should therefore be more than just a vision of an educational institution as a whole but a commitment of its constituents. For this is the very essence of agricultural education as an agent of change for the future of coming generation of a distinct population of agricultural practitioners.

Authors' Contributions

RODC, the first and corresponding author, conceived the idea, designed the project and wrote the manuscript. MATQ, the co-author, participated in the design of the study and helped in writing the manuscript. All authors read and approved the final manuscript.

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