

# Factors that Students Consider when Selecting their Electives: Discrete Choice Experiment

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**Abstract:** - This study identified and examined the factors considered when selecting elective courses of the students of University of Ghana, Department of Statistics and Actuarial Science. Discrete Choice Experiment was used to capture responses of 30 students from the above-mentioned department. Respondents were presented with 28 choice sets made of 2 hypothetical courses each. Each course was made up of five attributed (factors). Data were analysed using STATA14. Probit regression model was generated. Models restricted by females and males were also estimated. The key attribute that influence elective course preference is Follow Career Path which had the highest coefficient among all the attributes estimated in both the full and the restricted models. The result revealed that, students of University of Ghana, Department of Statistics and Actuarial Science, do not have much interest in Reading courses. Generally, Reading are traded-off by other attributes like Follow Career Path, Calculation and Learn New Thing.

**Keywords:** Discrete Choice Experiment, Probit, STATA14

## I. INTRODUCTION

Elective courses are courses in which much attention is given to by most students in the tertiary level across the country. This is because, students are being given the chance to select some amongst the ones available. There are a lot of factors in which students consider when selecting their elective courses. The Study will help us understand the key factors that have influence on choices of elective courses. University students choose their elective courses for many reasons. The factors that affect this decision include the ease of getting an 'A', recommendations from colleagues and so on. It is not uncommon to conclude that students pick courses that they find less demanding. However, little is known about why students choose specific courses; this is an inconvenient truth that course selection can have an effect on students' engagement, way of learning, career prospects and post-education job marketplace (Hedges et al., 2014). The aim of this study is to assess the range and relative important of alternative course attributes that influence students' choices of elective courses at the University of Ghana, Department of Statistics and Actuarial Science. This research work will help present a case study to acquire information that would enhance knowledge of student choice mechanisms. The results for this study will serve as a basis for further research. This study required data from entire students of University of Ghana, Department of Statistics and Actuarial. Nevertheless, due to time constraints and limited This research work will help present a case study to acquire information that would enhance knowledge of student choice mechanisms. The results

for this study will serve as a basis for further research. This study required data from entire students of University of Ghana, Department of Statistics and Actuarial. Nevertheless, due to time constraints and limited resources, the researcher decided to limit the study to thirty (30) randomly sampled from the University of Ghana Department of Statistics and Actuarial Science.

## II. LITERATURE REVIEW

Discrete choice experiments (DCEs) had been employed by many researchers in the field of environmental economics, transportation economics, and marketing and recently been implemented in wellbeing health economics (Clark et al., 2014). Over the years, DCE has been a common tool used by researcher to explicitly determine consumer preferences. Though, others are in a firm conviction that the hypothetical choices made by respondents in DCEs might not relate to actual choices made in real life scenario because of fixed attributes (de Bekker-Grob et al., 2012; Ryan & Watson, 2009). Apart from health economics, there have been series of studies conducted to compare stated preferences with actual behavior (Adamowicz et al., 1997a; Ben-Akiva & Morikawa, 1990; Hensher & Bradley, 1993; Louviere et al., 2000). These researches construed that, stated preferences has the tendency to depict actual behavior in various study conditions (Adamowicz et al., 1997b; Ben-Akiva & Morikawa, 1990; Hensher & Bradley, 1993; Louviere et al., 2000). In the area of student's preference on course selection, little or no research have been conducted so far.

## III. METHODOLOGY

This section deals with a description of the methods used for this study. This study was centered on only students from the Statistics and Actuarial Science Department. This study employed the random sampling technique to gather data from a sample size of 30.

### *Determinants of Sample Size*

The sample for this study was computed using (Johnson & Orme, 2003; Orme, 1998) formula as shown below:

$$n \geq 500c/ta,$$

n = number of respondents; t = number of is the number of tasks; a = number of alternatives per task; c = number of analysis cell

According to this study;  $t = 28c = 2a = 2$ ; hencen  $\geq (500*2)/28*2$ ;  $n \geq 17.8$

the optimal number of respondents should be more than 17.

Thirty students were requested to pick between pairs of hypothetical courses from the combinations of attributes and attribute levels. Descriptions for each and every course were considered to be the main factors that influence Students choices on elective courses. In the final, there were a lot of instances where a student may select a course over the other but had to trade off less elicited factors.

*Selection of Attributes*

The researcher interviewed 40 students from the Statistics and Actuarial Science Department. Respondents were asked to provide factors that they consider when selecting their electives. Table I summarizes the result of the study. Based on the result, the Researcher selected five of the factors which were dominant in their responses. However, inter-attribute correlational statistics was considered in other not to have attributes which are closely associated.

TABLE I: SELECTED ATTRIBUTES AND THEIR LEVELS

ATTRIBUTE	LEVEL	
Course Difficulty	Not Easy A	Easy A
Career Path	Not Follow Career Path	Follow Career Path
Friends Influence	No Friend at all	At least a friend
Nature of Course	Reading	Calculation
Learn Something New	No new thing	Learn Something New

Source: Field Work

TABLE III: PROBIT REGRESSION

ATTRIBUTES	COEFFICIENT	STD ERR.	Z VALUE	P> Z	[95% Conf.	Interval]
EASY A	.389095	.0980728	3.97	0.000	.1968758	.5813142
FOLLOW CAREER PATH	1.843227	.1073487	17.17	0.000	1.632827	2.053626
FRIENDS INFLUENCE	.1195697	.0980135	1.22	0.222	-.0725333	.3116727
CALCULATION	.8587783	.1008635	8.51	0.000	.6610895	1.056467
READING	-.8587783	.1008635	-8.51	0.000	-1.056467	-.6610895
LEARN NEW THING	.6115824	.104904	5.83	0.000	.4059743	.8171904
CONSTANT	.6115824	.1423175	-13.43	0.000	-2.190063	-1.632189
NUMBER OF OBSERVATION	960					
LIKELIHOOD RATIO $\chi^2$	447.29					
Prob> $\chi^2$	0.0000					
Pseudo R <sup>2</sup>	0.3361					

Source: Fieldwork

The result above established that there exists goodness of fit of the model. The model recorded likelihood ratio chi-square of 447.29 and a p-value of 0.000 which indicates that the model is statistically significant. All estimated coefficients have the expected sign and are significant at the 5% significant level. Friends Influence was seen to be statistically insignificant (p-value  $0.222 > 0.05$ ). Course attributes like Follow Career Path, Calculation and Learn New Thing relatively increase the

TABLE II: A SAMPLE OF THE CHOICE SETS

ATTRIBUTES	COURSE A	COURSE B
DIFFICULTY	NOT EASY "A"	EASY "A"
CAREER PATH	NOT FOLLOW CAREER PATH	FOLLOWS CAREER PATH
FRIENDS INFLUENCE	NO FRIEND	AT LEAST A FRIEND
NATURE OF COURSE	CALCULATION	READING
LEARN SOMETHING NEW	NO NEW THING	NEW THING
CHOOSE ONLY ONE COURSE	<input type="checkbox"/>	<input type="checkbox"/>

Source: Field Work

STATA14, Statistical Software, was used to analyse the data. It was commanded to estimate the probability of selecting a particular course when the other alternative was held constant. The linear and additive model is as follows

$$P(Y=I|X) = \alpha_0 + \alpha_1 \text{Difficulty\_easyA} + \alpha_2 \text{follow\_career} + \alpha_3 \text{friend\_influence} + \alpha_4 \text{calculation} + \alpha_5 \text{reading} + \alpha_6 \text{learn\_newthing} + \epsilon$$

$\alpha_0, \dots, \alpha_6$  are the parameters for Difficulty\_easyA, follow\_career, friend\_influence, calculation, reading and learn\_newthing respectively and  $\epsilon$  is the error term and Y is the dependent variable, choice.

IV. RESULTS AND DISCUSSION

utility of student choices and thereby increase the probability of an elective course selection by 1.843227, 0.8587783 and 0.6115824 respectively. Easy A was the least among the factors that a student may consider when selecting an elective course. On the other hand, reading courses decrease the utility associated with elective course choice, although it was significant.

TABLE IV: PROBIT MODEL RESTRICTED BY MALE

ATTRIBUTES	COEFFICIENT	STD ERR.	Z VALUE	P> Z	[95% Conf.	Interval]
EASY A	.406509	.1154436	3.52	0.000	.1802438	.6327743
FOLLOW CAREER PATH	1.75646	.1255409	13.99	0.000	1.510404	2.002515
FRIENDS INFLUENCE	.065608	.1150967	0.57	0.569	-.1599774	.2911935
CALCULATION	.744005	.1172732	6.34	0.000	.5141537	.9738562
READING	-.744005	.1172732	-6.34	0.000	-.9738562	-.5141537
LEARN NEW THING	.6871846	.1237441	5.55	0.000	.4446505	.9297186
CONSTANT	-1.829883	.1654557	-11.06	0.000	-2.15417	-1.505596
NUMBER OF OBSERVATION	672					
LIKELIHOOD RATIO $\chi^2$	293.47					
Prob> $\chi^2$	0.0000					
Pseudo R <sup>2</sup>	0.3150					

Source: Field Work

All the coefficients estimated were significant at the 5% significant level with the exception of Friends Influence which was insignificant with respect to male students. Follow Career Path, Calculation and Learn New Thing increase the utility for picking up an elective by 1.75646, 0.744005 and 0.6871846 respectively. This means that for elective choice selection,

male students prefer courses which follows their career path, courses vested in calculation and with the intension of learning something new. Moreover, all the significant attributes are in line with those estimates in the previous (full) model.

TABLE V: PROBIT MODEL RESTRICTED BY FEMALE

ATTRIBUTES	COEFFICIENT	STD ERR.	Z VALUE	P> Z	[95% Conf.	Interval]
EASY A	.3452162	.1897597	1.82	0.069	-.026706	.7171385
FOLLOW CAREER PATH	.2145796	.2201217	9.75	0.000	1.714366	2.577227
FRIENDS INFLUENCE	.2746746	.1921037	1.43	0.153	-.1018416	.6511909
CALCULATION	1.215399	.2093642	5.81	0.000	.8050523	1.625745
READING	-1.215399	.2093642	-5.81	0.000	-1.625745	-.8050523
LEARN NEW THING	.4358731	.2030627	2.15	0.032	.0378774	.8338687
CONSTANT	-2.208479	.2925607	-7.55	0.000	-2.781888	-1.635071
NUMBER OF OBSERVATION	288					
LIKELIHOOD RATIO $\chi^2$	162.37					
Prob> $\chi^2$	0.0000					
Pseudo R <sup>2</sup>	0.4067					

Source: Field Work

According to the above result, all estimated coefficients were significant at 95% confidence level with the exception of Friends Influence and Easy A which has no significant effect on elective course choice by female students. Calculation, Learn New Thing and Follow Career Path increase the utility and uptake probability associated with elective course choice by 1.215399, 0.4358731 and 0.2145796 respectively. This means that for elective course choice, female students prefer courses with the following attributes Calculation, Learn New Thing and Follow Career Path. Also, Reading decrease the utility associated with elective course choice.

## V. CONCLUSIONS

The aim of this study was to access the factors students consider when selecting their electives. The study considered students from the Department of Statistics and Actuarial Science in the University of Ghana. The sample used for the study was 30 students of which 21 were male with a percentage of 70 whilst the remaining 9 were females of 30 percent. The dependent variable used was Choice whilst Easy A, Calculation, Reading, Learn New Thing, Follow Career Path and Friends Influence were independent variables that were used. In conclusion, it was revealed that attributes; Follows Career Path, Calculation and Learn New Thing play a vital role in the choice decision of students from the

Department of Statistics and Actuarial Science with regards to selection of elective courses. The magnitude of the estimated parameters showed that courses that follow students' career path contributed most in their elective course choices. It was also observed students are not interested in reading courses.

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