

Creativity, Age And Gender As Predictors Of Academic Achievement Among Undergraduate Students

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ABSTRACT: This study examined creativity, age and gender as predictors of academic achievement. Participants (N= 153, 105 = male & 48= female) completed creativity test. Cumulative grade point average (CGPA) was used to select the participants. A multiple regression analysis revealed creativity, age and gender explained 0.143 of the variance in academic achievement. The significance level was indicated by the F- value of 8.294. Multiple regression analysis showed interaction effects between creativity, age and gender as low predictors of academic achievement. The findings also show a lower correlation of CGPA and the independent variables of this study. No significant difference between CGPA and gender was observed. However implications of the findings to investigate in creativity, age and gender are discussed. [Journal of American Science 2009;5(5):101-112]. (ISSN: 1545-1003).

KEYWORDS: Creativity, Age, Gender, Undergraduate Students

1. Introduction

Achievement is a fundamental aspect of everyday life, affecting people's work, interpersonal relationships, sense of being, and leisure (Struthers, Menec, Schonwetter, & Perry, 1996). The quintessential achievement-oriented domain in education, particularly for college students, includes high performance on tests, passing courses, and completing degrees. However, academic achievement is strongly influenced by demographic and psychological factors.

Research on academic achievement of young students (Komarraju, Karau, & Schmeck, 2008), provides no reliable and consistent indication concerning the extent of creativity, age and gender on academic achievement. A search on academic achievement studies revealed that various variables had been identified as correlates of academic achievement (Abar, Carter, & Winsler, 2008; Curcio, Ferrara, & De Gennaro, 2006; G. M. Johnson, 2008; W. Johnson, McGue, & Iacono, 2006; Layne, Jules, Kutnick, & Layne, 2008; Liew, McTigue, Barrois, & Hughes, 2008; Mizuno et al., 2008; Moller, Stearns, Blau, & Land, 2006; Parker

et al., 2004; Schlee, Mullis, & Shriner, 2008; Thompson & Zamboanga, 2004; Zhang, 2004).

Research has also suggests that academic achievement can be predicted through creativity testing (Cicirelli, 1965; Feldhusen, Denny, & Condon, 1965; Hirsh & Peterson, 2008; Struthers et al., 1996). In Iran for example, researchers have investigated psychological and demographic variables (creativity, age and gender) and academic achievement variables (MehrAfza, 2004), (Nori, 2002), (Karimi, 2000), (Mahmodi, 1998)'s research and (Behrooz, 1997). Additionally, research suggests that as students attain higher levels of education, there is an apparent decline in the relationships between academic achievement and creativity. This indicates that creativity tests account for a smaller portion of the variance in academic achievement. Furthermore, some investigators suggest that the predictive power of creativity and level of the age for academic achievement becomes almost negligible at the university level.

1.1 Definition Issues

1.1.1 Creativity

Researches have been curious about the relationship between creativity and academic achievement for numerous years. However, studies investigating the relationships between these factors have not yielded consistent consequences. (Ai, 1999) For example, studies investigating creativity and academic achievement conclude that creativity is not related to academic achievement. Other researchers established that creativity was related to academic achievement. Additionally, some studies have reported that creativity is related to higher levels of academic achievement, when such achievement needed divergent and productive ability. However, knowing the relationship between creativity and academic achievement is important for education and teaching, and there is a lack of data on the relationship between these variables among students (Behroozi, 2006).

1.1.2 Gender

one of the areas of bias study that have been particularly dynamic in recent years is scoring differences that correlate with gender (David E., 2001). Probably the most publicized differences are in the area of college aptitude, where test scores are supposed to predict the applicants' subsequent college-level performance. Generally, the tests work well, but there are exceptions (p 320). In another study (Kesel & Linn, 1996) found that, in some instances, SAT data may underpredict college- grade for women in mathematics. The scores suggest that females' performance in collage-level mathematics will be lower than they turn out to be.

1.1 3 Age

Age is an independent variable for the present study. When we refer to age relationship to academic achievement (CGPA), we are referring to relation between students at one age and students at another age. Our purpose is to examine the relationship between age and academic achievement stronger or weaker than the relationship between creativity and academic achievement. Do creativity, age and gender predict academic achievement? If yes, what's their level of prediction (low, moderate or high)? These are some questions that were pondered on in this study.

1.2 Past Research

Creativity has been subjected to many different definitions. Academic achievement or academic ability, on the other hand, is relatively more easily defined, measured and interpreted (A. K. Palaniappan, 2005). A myriad of factors have been identified as being related to academic achievement, the three fundamental of which will be addressed in this study: creativity , age and gender (A. K. Palaniappan, 2005; Palaniappan, 2007a, 2007b). In current years, diverse investigators have shown growing interest in the relationship between creativity, gender, age and academic achievement, but there is a lack of data on the relationship between age and academic achievement.

According to Struthers et al (1996)'s study , there is a relationship between creativity and student's performance. The participants were 313 male and female introductory psychology students at The University of Manitoba. This study examined the relationship between students' attributions, action control and creativity and their subsequent motivation and achievement. The study shows the levels of action control and creativity in the unstable attribution condition translated into significantly different grades in students' introductory psychology course. Despite initially being relatively high in motivation (unstable attributions), students who were either state-oriented and low in creativity, or state-oriented and high in creativity, produced lower course grades compared to action-oriented, highly creative students.

This finding indicates a relationship between causal attributions, creativity, and action control orientations and students' performance. Specifically, this shows that students who made unstable attributions for poor academic performances and who were highly creative and action-oriented, were buffered from performance deficits. In contrast, the students who made unstable attributions and who were high in creativity and state-oriented were inhibited from performance increments.

In another study, Fodor & Carver (2000) examined undergraduate students of both sexes in engineering and science from Clarkson University, a predominantly technological university. Students completed the Thematic Apperception Test (TAT), which was scored for achievement motivation and

also for Power motivation. They later participated in the experiment. There were 144 experimental participants, 48 in each of three experimental conditions: positive, negative, or no feedback concerning prior performance on an engineering problem. Achievement motivation correlated positively with creativity score in the positive and negative-feedback conditions ($r_s = .43$ and $.38$) but not significantly in the no-feedback condition ($r = .10$). Power motivation correlated positively with creativity in the positive-feedback condition ($r = .32$), and negatively in the negative-feedback condition ($r = -.25$), but not significantly in the no-feedback condition ($r = .17$).

However, Aitken Harris (2004) examined 404 adults of participants (203 men and 201 women) completed four scales of a timed, group administered, intelligence test, 10 personality scales, and a creativity measures. Finding this study shows achievement has been small to moderate positive correlations with an intelligence factor (which included the creativity scales).

Finally, age is an independent (demographic) variable and is employed as such in our analyses (Ng & Feldman, 2008) refereed Previous research has produced mixed results between age and performance. According to (Ng & Feldman, 2008) there are three most cited quantitative reviews of this literature: one researcher found a moderate positive relationship between age and performance (Waldman, 1986). McEyoy (1989), on the other hand, found that age was largely unrelated to performance, while Sturman (2003) found that the age and performance relationship took an inverted-U shape. Ng & Feldman (2008), however, found that age was not significantly related to creativity.

1.3 Previous Research in Iran

Over the last ten years in Iran, numerous psychological studies have shown that formation of a stable and positive creativity is one of the major developmental challenges of students. (MehrAfza, 2004) conducted a research entitled: "The study of creativity and academic achievement among 384 of students (boys and girls) examined in Tabriz high schools". This research has been done in random and the data collected by Abedi's questionnaire of

creativity and CGPA is used for educational evaluation. The statistical data analysis shows that there is no difference in the overall creativity scores between boys and girls. However, in middle of section boys are statistically higher than girls, but girls are statistically higher in flexibility than boys. Boys and girls are different in academic achievement and the average of academic achievement in girls was more than in boys.

In another investigate, Nori (2002) studied the sex difference according to the type of relationship between creativity and academic achievement among high school of students in Shiraz city. There were 306 high school students (150 boys and 156 girls) in the research. To measure the rate of creativity she used Abedi questionnaire and CGPA for academic achievement. The result was analyzed by CGPA for academic achievement. It revealed that there is no significant relationship between creativity and academic achievement, but the result was different in the sex difference. The finding shows the significant difference in academic achievement of boys and girls. Academic achievement was more in girls than in boys and it is significant ($p < \% 1$).

Karimi (2000)'s research was about the study of relationship between creativity, sex and academic achievement among secondary school students. The result shows significant relationship among these variables is as follows:

There is a 25 relationship in level ($p < \% 1$) between total creativity and academic achievement. Also, the comparison between girls and boys in creativity is indicative of the significant difference between these two sexes. The boys are strikingly excelled the girls in creativity. Besides, the parents' education is significantly related to creativity.

Mahmodi (1998)'s research entitled "personality features, creativity and academic achievement" was done among 106 students in Tehran. The result showed a significant relationship between creativity and academic achievement. Behroozi (1997) studied the relationship between personal features and creativity and also between creativity and academic achievement among 187 university students through Cattell questionnaire of creativity. The result showed no significant relationship between creativity and others variables.

1.4 This Study

The major objective of this study was to examine creativity, age and gender as predictors of undergraduate students' academic achievement. The present study will provide a better estimate of the true association between academic achievement, creativity, age and gender by having creative perception inventory test as predictors and cumulative grade point average (CGPA), applied to undergraduate students. Hence the following hypothesis is examined this study is:

- Controlling for age and gender, creativity explains a significant proportion of the variance in academic achievement.

2. Research Method

2.1 Participants

In the present study we visited 153 students who were tested at ages of 18 to 27 years old. One hundred and fifty three Iranian undergraduate students in Malaysian Universities (31.4% females and 68.6% males) were recruited as respondents in this study. Their ages ranged from 18 -27 years for females and 19-27 years for males.

2.2 Measures

2.2.1 Khatena-Torrance Creative Perception Inventory (KTCPI)

Creative perception was examined using KTCPI (Khatena-Torrance Creative Perception Inventory) (A. K. Palaniappan, 2005). The Khatena-Torrance Creative Perception Inventory is based upon the rationale that creative functioning is reflected in the personality characteristics of the individual, in the way they think or the kind of thinking strategies they employ, and in the products that emerge as a result of

their creative strivings. The scale presents statements to which subjects are required to respond. The responses reflect the extent to which the subjects function in creative ways (A. K. Palaniappan, 2005).

The KTCPI consists of 50 items for some things

2.2.2 Cumulative Grade Point Average (CGPA)

For the purposes of this study, Cumulative Grade point Average (CGPA) has been used as a proxy of academic achievement. The CGPA is calculated by dividing the total amount of grade points earned by the total amount of credit hours attempted. The student's academic achievement used based on their mid year examination result. It is the aggregate or the total grade points in the mid year examination. In this examination, each university subject is graded along one hundred (or four)-point scale, the best grade point being one hundred (or four) and the lowest being zero. Hence the aggregate would range from 75 to 100 (3 to 4); it should be written that the lower the aggregate, the better is the academic achievement (Figure1).

Cumulative Grade Point Average Students (CGPA)		
(3/5- 4) A	85 – 100	High Level
(3- 3/49) B	75 – 84/99	Good Level
(2/49 -2/99) C	60 – 74/99	Satisfactory
(2- 2/ 48) D	50 - 59	Weak
(1/99- 0) F	49/99 and below	Fail

Figure .1 ;CGPA

2.3 Procedure

Undergraduate students participated in this study. The research questions posed for the study required identifying and analyzing the distributions and correlations of certain Khatna-Torrance creative perception inventory test best addressed in the form of a descriptive study. Intelligence levels were assessed by self- report instruments. They were assessed by result of administration office of universities (described below), divided by gender, and calculated by total scores and subscales. The women samples (18-27 years) and men (19-27years) were selected during the regular course time.

Instructions were given written and oral for all participants, and they were ready to answer the upcoming questions in the class. Since multiple significance tests were conducted, data were analyzed by multiple regression. The participants replied the tests and were free to anonymous.

Students received no rewards but they were given the results in the form of a self- referenced level of abilities. Scores for creativity scale's total score were calculated by the SPSS statistical program.

3. Results

The data were analyzed on the basis of academic achievement, and reported descriptive statistics variables and also predictor variables as well as normal P-P plot in tables and figures below.

3.1 Descriptive Statistics

Table.1 shows descriptive statistics of creativity. Finding this result has been shown that the females' mean(33.21) score was greater than the males' mean(31.90) for Creativity, but the standard deviations between females and males were not higher differences (males=4.36& females=4.55). In other words also the ranges of scores between two groups were same (18).

TABLE 1
Comparisons of Creative Perception Inventory Scores of Males and Females (50 items)

Measure	N	Minimum	Maximum	Mean	SD	Range
Total Score	153	21	41	32.31	4.45	20
Male	105	21	39	31.90	4.36	18
Female	48	23	41	33.21	4.55	18

TABLE 2
Descriptive Statistics of CGPA

Measure	N	Minimum	Maximum	Mean	SD	Range
Total Score	153	1.21	4.00	2.97	0.54	2.79
Male	105	2.09	4.00	3.00	0.53	1.91
Female	48	1.21	3.73	2.89	0.56	2.52

Table. 2 shows the females' mean(2.89) score was lower than the males' mean(3.00) for cumulative grade point average; but the standard deviations between females and males were not highly different (males=0.53& females=0.56). In another word the range scores female (2.52) grater than male (1.91).

However, the histogram of dependent variable and Normal P-P Plot graphs (Expected Cumulative Probability by Observed Cumulative Probability) were obtained for CGPA scores are shown in Figure 2 &3.

Normal P-P Plot of Regression Standardized Residual

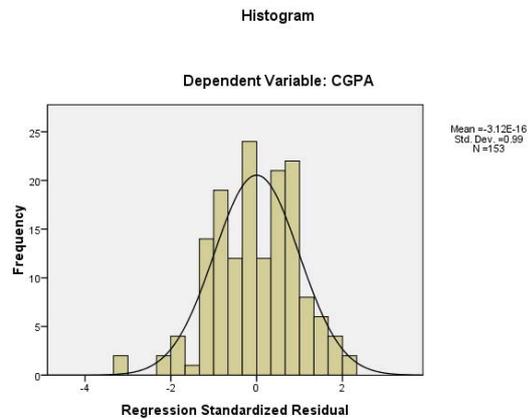
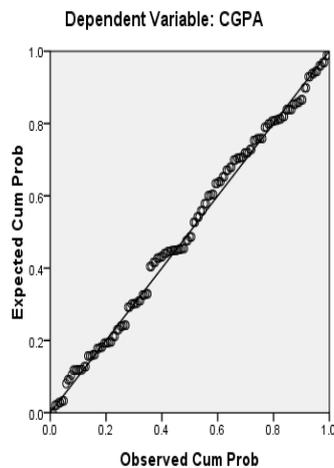


Figure 2. Normal P-P plot of Regression Standardized Residual Figure 3. Dependent Variable; academic achievement (CGPA)

3.2 Academic achievement predictors

The following tables show multiple regressions (standard) between CGPA and scores of the creativity, age and gender. Table 3 shows variables entered. Both independent variables (age, gender and creativity) together explain .143 of the variance (R squared) in academic achievement (CGPA), which is significant, as indicated by the F-value of 8.294 in the table 4&5. Finding has been indicating lower correlation CGPA and independent variables this study (scores of the creativity and age). However, table 6 shows t-values indicates that creativity contribute to the CGPA. There were significantly relation creativity to CGPA ($t=2.011$, $p=0.046$) and age to CGPA ($t=4.269$, $p=0.000$).

3.3 Partial correlations

Partial correlations in table 6 showed that independent variables (creativity scores and gender) was not significantly related to academic achievement (CGPA) at $P < 0.05$. According this table correlation creativity to CGPA was (*Zero-order* = .157, $P < 0.05$), and correlation age to CGPA was (*Zero-order* = .345 $p < 0.05$).

3.4 Gender differences in CGPA

Table 7 shows the independent sample of t-test for males and females on scores for CGPA. According to this table, males and females did not differ significantly on CGPA ($t= -1.167$ and $sig=.295$).

TABLE 3

Variables Entered Removed^b

Mode	Variables Entered	Variables Removed	Method
1	Gender, Age Creativity		Enter

- a. All requested variables entered
- b. Dependent Variable: CGP

TABLE.4
Model Summary

Mode	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.378 ^a	.143	.126	.501

- a) Predictors: (Constant, Creativity , Age, Gender)
- b) Dependent Variable: CGPA

TABLE.5
ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig
1	Regression	6.268	3	2.089	8.294	0.000 ^a
	Residual	42.130	149	0.252		
	Total	43.806	152			

- a. Predictors: (Constant, Creativity, Age, Gender)
 - b. Dependent Variable: CGPA
- * p< 0.01

TABLE.6
Coefficients ^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations	
	B	Std.Error	Beta			Zero-order	Partial
1 (Constant)	.632	.487		1.298	.196		
Creativity	.019	.009	.154	2.011	.046*	.157	.163
Age	.071	.017	.331	4.269	.000**	.345	.330
Gender	.059	.090	.051	.658			

a. Dependent Variable : CGPA

*P< 0.05

**P<0.01

TABLE.7

Gender Differences in CGPA- Independent Sample t-test

	Levene's Test for Equality Of Variances		Sig	t*	df	Sig.(2-tailed)
	F					
CGPA	.079		.779	-1.167	151	.245

* P<0.05

4. Discussion

By and large, we found creativity, age and gender low predictors ($R=.378$, $R^2=.143$) by academic achievement (CGPA) in the sample. But there is significance relation ($F= 8.294$, $sig=0.000$, $P<0.01$) between those variables and academic achievement. Another finding the relationship between age and academic achievement is decreased ($r=.345$). We also found the relationship between creativity ($r=.157$) is lowered by academic achievement in the sample, at the same time in the present study there was no significant differences between gender and academic achievement ($t= -1.167$ $sig= .245$).

Generally, previous research has produced mixed results between creativity, age, gender and academic achievement. (Aitken Harris, 2004) found that there existed a small to moderate positive correlation with an intelligence factor (which included the creativity scales), however (Asha, 1980) suggested that the relation between creativity and academic achievement could be different for males and females. According this finding there was highly significantly relation between creativity and academic achievement of males. However her study shows less significant than that for males, also include for females. Asha (1980) also found that creativity is related to academic achievement for both males and females. But in other words, (Nori, 2002) in her study has explained that there was no significant relationship

between creativity and academic achievement, unlike (Mahmodi, 1998)'s research (1998), (Karimi, 2000)'s study and (Behroozi, 1997)'s investigation have mentioned: there was a relation between creativity and academic achievement.

Previous finding shows different relation result between age and achievement. (Waldman, 1986) refereed the positive relationship between age and performance, but in another study (McEvoy, 1989) found that the age was largely unrelated performance.

Previous study also mentioned that boys and girls are different in academic achievement. According to (MehrAfza, 2004)'s study there was a significant difference between boys and girls. Her study shows the average of academic achievement in girls was more than in boys. (Nori, 2002) also found the significant different in academic achievement of boys and girls. Academic achievement was more in girls than in boys.

5. Conclusion and Limitation

In the present study, demographic variables (age and gender) and psychological variable (creativity) were examined. However, there are many other variables that could affect the preference for academic achievement which should be studied in the future: these variables include internal and external locus of control and others are self esteem, self efficacy and cognitive ones (e.g. fluid and crystallized intelligence, emotional intelligence).

The present study was conducted in Kuala Lumpur (capital city) and metropolitan area (Selangor) at Malaysian universities. Thus the extent to which results apply to other cities universities is not known. Therefore, conclusions need to be verified by conducting similar studies

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across other universities in Malaysia. Next, academic achievement was measured using cumulative grade point average (CGPA) in general, this research needs to be extended to include grades given by subjects in mathematics, language, science, others subjects and standardized achievement examination scores. As a final point, as with any cross-sectional researches, such as this one the findings should be viewed with caution.

To conclude, the current study shows that creativity, age and gender the predictors as academic achievement. It may vary by gender and the creative perception inventory and academic achievement (CGPA) measure used. If probable, follow-up study is supposed to appear at other issues that are significant for a better understanding of creativity. For example, what is the creativity measure used in this research really assessment? Will a student's educated parents and social economic status have any effect on his or her predictors as academic achievement? Are there any gender significant differences in creative perception inventory (Habibollah et al., 2009; Palaniappan, 2000)

Acknowledgment

We thank administration officers at University Putra Malaysia, University Malay, University Multimedia, University Lim KokWing, University Tenga Malaysia and University APIT for giving us information about Iranian students at their University. We also appreciate Iranian Undergraduate students for participating in this research who allowed us to collect the necessary data for the PhD study.

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