

Exploring Research Skills among Undergraduate Students of Private Universities in UAE

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Abstract—The purpose of this paper is to explore undergraduate research skills of students from private universities in the UAE. A survey was conducted in two private universities. These are Al-Ain university of Science & Technology and Ajman University of Science and Technology. The survey questionnaire centered on the understanding of the nature of research, research process, data collection and data analysis. A total of 147 randomly selected students from the above-mentioned universities participated in the study. Data were analyzed using statistical indicators such as percentages, averages and standard deviations. The researchers hypothesized that there is no significant differences among the students of participating universities in research skills. The ANOVA table and testing hypothesis support this claim. The researchers also believed that the students' college is related to his research ability. The chi-square of independence test shows that such a relation does not exist. Males were outstanding than females in understanding the research process. Females and males reported similar results in regard to understanding of the nature of research and in regard to data collection and data analysis. Findings also indicate that the students' believe in their research ability is extremely different from their actual research skills.

Keywords- Undergraduate Students; Research skills; Private Universitie, UAE

Introduction

Research refers to the systematic method used to identify research area, to determine research problem, to formulate research questions, objectives or hypothesis, to collect data, to analyse data and reach certain conclusions towards the concerned problem.

As human being we depend heavily on research for understanding and describing a phenomenon, for interpreting and explaining a situation, for predicting a future event, and for controlling and preventing a problem. It is a powerful tool in decision making, solving commercial and industrial problems, studying social

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relationships and in seeking answers to various social problems. Therefore, an appropriate research report should contribute to the existing body of knowledge.

Universities, according to Huber [1], are “scholarly communities”, and one of the purposes of undergraduate curricula is to integrate students into that community [2]. This integration can be realized with a well designed syllabus that exposes students to research skills and encourages them to become members of a research community. In this regards, Bateman [3] created an assessment tool that can assist undergraduate curriculum planner and decision makers to determine inadequacies of current programs. Iyer and Fitzgibbon III [4] also reported one of the best integrated programs for teaching and research at the University of Houston. The authors used a research-based experimental approach to learning and exposed students to skills that are relevant to the changing world.

Certainly there are many benefits of undergraduate research not only for students, but also for the faculty mentor and the institution. Undergraduate research is an opportunity for students to develop additional skills, to connect between theory and practice, to improve self-confidence and provide satisfaction in overcoming considerable challenges. On the other hand, the benefit for institutions includes reputation, recognition received in nurturing exceptional undergraduate students, and faculty publication with students resulting [5], [6], [7]. Realizing these benefits has motivated many faculty members to work with undergraduate students.

Data Collection

The purpose of this paper is to explore undergraduate research skills in the private universities in UAE. A survey questionnaire was distributed among students in two universities. The universities are Ajman University of Science and Technology (AUST) and Al-Ain university of Science & Technology (AU). A total of 147 students

were randomly selected from two colleges, college of Pharmacy and college Business administration.

The study focused on the third and final year undergraduate students, requested them to complete a questionnaire consisted of three parts. The first part collected demographic data of participants. In the second part students self-rated their ability in performing research activities. In this purpose the researchers adopted 13 research skills from Kardash study [8]. The skills are divided into three sections; these sections are the understanding of the nature of research, knowledge of research process and data collection and data analysis. Each skill was rated on a 5 point scale ranging from 1 (not at all) to 5 (a great deal). The third part assessed and tested students' ability in identifying and recognizing appropriate research problem, research questions, research objectives, hypothesis, variables, etc. This part of the questionnaire allowed us to compare between students' self-rating result and their actual research skills.

Results and Discussions

Description of participants

Demographic information were collected in the first part of the questionnaire which consisted of ten questions. These were related to the student college, academic year, Gender, attending research course, benefits of research. The questionnaire was distributed among 86 (58.5%) students at Ajman University of Science and Technology (AUST) and 61 (41.5%) students at Al-Ain university of Science & Technology (AU). This total of 147 randomly selected students were from two colleges, 72 (49%) students from Pharmacy and 75 (51%) students from Business Administration, 58 (40.5%) in the third year and 89 (60.5%) in the fourth year, 69 (46%) were of males and 78 (54%) were of females, 81 (55%) have attended research courses and 66 (45%) have not attended any research courses.

Research Hypotheses

Data were analyzed using Statistical Package for Social Scientists (SPSS). The analysis was based on three main hypotheses:

1. There is no significant difference among the students of participating universities in research skills. In this regard we investigated the existence of differences based on students' colleges, universities, gender, attending research course and their believes for future benefits of research. The ANOVA table and t-test were used to test these claims.

2. The Students' perception and overall evaluation are linearly related. To analyze the relationship between these factors we conducted a simple regression analysis.
3. College of student is related to his research ability. The chi-square test of independence was used to test the existence of such relation.

Nature of Research, Process and Analysis

For testing the first hypothesis we divided the questions in the second part of the questionnaire into three sections. One section is for the questions related to the understanding of the nature of research (N), the second section is for the knowledge of research process (P), and the third section is for understanding the data collection and data analysis procedures (A). Then to decide whether the averages for all students in these three sections are equal or at least two of them differ we stated the following null hypothesis:

$$H_0 : \mu_N = \mu_P = \mu_A$$

The ANOVA table (Table 1) below produced a large p-value (Sig. = 0.639). This indicates that there are no significant differences in the perception of the students in regard to the understanding of the nature of research, knowledge of research process and data collection and data analysis.

TABLE 1: ANOVA results for the significance of students perceptions in regard to the research skills.

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.486	2	.243	.448	.639
Within Groups	237.365	438	.542		
Total	237.851	440			

The researchers conducted series of T-tests to determine whether each of the demographic factors, such as the gender, the college, the academic year, attending research course, and the student' believe in the benefits of research, have an effect on the perception of the students in regard to the three research skills (a. understanding the nature of research, b. knowledge of research process, c. and data collection and analysis). The T-tests produced no significant effect of these factors on the three research skills. Table 2 shows the differences between male and female students (Gender) in regards to their perceptions of three research skills.

TABLE 2: Perceptions of males and females in regards to the research skills.

	Gender	N	Mean	Std. Deviation
Nature of Research	male	69	3.2065	.67649
	female	78	3.1218	.75673
Research Process	male	69	3.1860	.67370
	female	78	2.9893	.67971
Data collection & Analysis	male	69	3.1787	.78918
	female	78	3.0470	.81424

TABLE 3: Two independent Samples test

Independent Samples Test		T	Df	Sig. (2-tailed)
Nature of Research	Equal variances assumed	.712	145	.478
	Equal variances not assumed	.717	144.981	.475
Research Process	Equal variances assumed	1.758	145	.081
	Equal variances not assumed	1.759	143.118	.081
Data collection & Analysis	Equal variances assumed	.993	145	.322
	Equal variances not assumed	.995	143.776	.321

The above two independent samples test yields to large p-values (See Sig. (2-tailed) in Table 3). This indicates that there is no significant difference between males and females perceptions in regard to the three sections. However, the finding may be different in the process section if we use 10% level of significance instead of default 5%. As mentioned above, the same results are obtained when we compared the averages of the other demographic factors presented in this study.

Moreover, we tested whether the students' self-rating results are different from their actual research skills test. Since the same subject (student) is involved in the two measurements, they are paired. The SPSS output for this case is presented in the following table (Table 4):

TABLE 4 : Difference between self-rating result and actual research skills test

		Mean	N	Std. Deviation
Pair 1	test_mod5	2.4514	147	.78049
	Aver	3.1125	147	.62798

TABLE 5: P-Value of self-rating result and actual research skills test

		Mean	t	df	Sig. (2-tailed)
Pair 1	test_mod5 – Aver	-.66110	-8.834	146	.000

The p-value for the paired test is computed to be almost zero (see Table 5) which indicates that the two means are not equal. This is confirmed from the above paired samples statistics in which we can easily see that the average of the self-rating evaluation is 3.1125 whereas the average of the test of students' ability in research is 2.4514. This indicates that the students' believe in their research ability is extremely different from their actual research skills.

Students' perception and overall evaluation

The researchers hypothesized that the self-rating (Students' perception) and the test of students' ability in research (overall evaluation) are linearly related. A simple linear regression analysis was run to examine whether the self-rating was predicative of students' grades in the research ability test. So that we modeled the test of students' ability in research as a linear function as follows:

$$y_i = \beta_0 + \beta_1 x_i + \varepsilon_i$$

where y_i is the student's i grade in the research ability test, x_i is the student's self-rated result, and ε_i is the white noise. The SPSS results are presented in the following table (Table 6):

TABLE 6: Coefficients

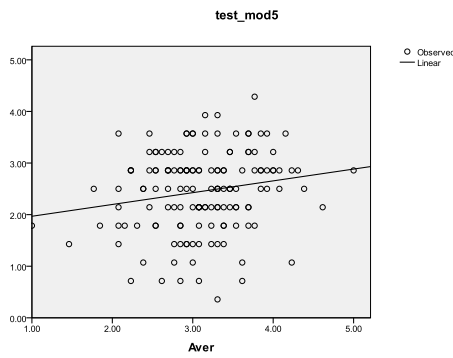
Model	R	R Square	Adjusted R Square
1	.184 ^a	.034	.027

TABLE 7

Model		Coefficients		
		B	t	Sig.
1	(Constant)	1.740	5.401	.000
	Aver	.229	2.254	.026

a. Dependent Variable: test_mod5

Graph 1



The above scatter plot presented in the Graph 1 indicates that the student grade in the research ability test and the student's self-rating result are slightly linear positive related to each other. The estimated regression model is:

$$\hat{y}_i = 1.740 + 0.229x_i$$

The p-value (Sig. = 0.026) in Table 7 indicated that the student's self-rating result is a good predictor for the student grade in the research ability test and the above estimated model fit the data well, but the small R-square ($R^2 = 0.034$) says that about 3.4% of the variation in the student grade in the research ability test about its mean is explained by variations in the student's self-rated result. The remaining 96.4% of the variation is due to other factors not listed in the model.

Table 8 presents the means of students' ratings of their research skills. As can be seen in the table, comparison of students' skills rating reveals striking similarities. In fact, AUST and AU students both gave their highest ratings to identifying a specific question, observing and collecting data, analyzing data, orally communicating the research of research projects (all ratings were greater than or equal to 3.12). Similarly both university students rated as moderate the skills of making use of primary research literature, formulating research hypothesis, research design, and publishing research report (all ratings were less than or equal to 2.98). However, the AUST students feel more confident than AU students in understanding contemporary concepts (3.50 and 3.21 respectively).

TABLE 8: Comparing students rating of research skills according to the universities

Statement	Averages	
	AUST	AU
Understand contemporary concepts in your field	3.50	3.21

Make use of the primary scientific research literature in your field (e.g. journal articles)	2.88	2.98
Identify a specific question for investigation based on the research in your field	3.12	3.05
Formulate a research hypothesis based on a specific question	2.90	3.02
Design an experiment or theoretical test of the hypothesis	2.77	2.85
Understand the importance of "controls" in research	3.01	3.38
Observe and collect data	3.45	3.48
Statistically analyze data	3.24	3.33
Interpret data by relating results to the original hypothesis	3.00	3.20
Reformulate your original research hypothesis (as appropriate)	2.98	2.95
Relate results to the "bigger picture" in your field	3.20	3.15
Orally communicate the results of research projects	3.37	3.16
Write a research paper for publication	2.97	2.82

Note: Each item completes the question "To what extent do you feel you can.....? Items were rated on a five point scale ranging from 1 (not at all) to 5 (a great deal).

Inter-dependence between colleges and research ability

In this part of the study the researchers investigated the inter-dependence of the student college and the research ability. The students grades in the research ability test were classified on a scale of 1 (for grades ranging from 0 to 1.99), 2 (for grades ranging from 2 to 3.35), and 3 for grades ranging from 3.36 to 5). A student with scale 1 is considered as weak, 2 as moderate and 3 as strong student in research. The participated students in this study were from two colleges Pharmacy and Business administration. A chi-square test of independence was performed to examine the relationship between the student college and the research ability. According the following SPSS outputs presented in Table 10 we concluded that these variables are independent from each other ($\chi^2(2,147) = 3.275$, $p < 0.194$). This means that the grades of the students in research ability test are not related to the student college.

TABLE 9: College versus knowledge Crosstabulation

		knowledge		
		weak	moderate	strong
Pharmacy	Count	14	48	10
	Expected Count	18.6	45.1	8.3
Business	Count	24	44	7
	Expected Count	19.4	46.9	8.7

TABLE 10: Chi-Square Test

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.275 ^a	2	.194
Likelihood Ratio	3.308	2	.191
Linear-by-Linear Association	3.020	1	.082
N of Valid Cases	147		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.33.

Conclusions and future work

Needless to say findings of this study are important in promoting and supporting undergraduate research. Undergraduate research is an essential tool to prepare future scholars and ensure their contributions to the existing body of knowledge.

The paper is a starting point for further research work on the assessment of undergraduate research in the UAE. The researchers intend to continue this project by covering a large number of private and public universities in the UAE.

Findings of the Analysis of Variance (ANOVA) table and testing hypothesis indicate no significant difference among the students of participating universities in research skills.

Similarly, results of the study revealed that no relationship between the student's college and his research ability. The chi-square of independence test proves that such a relation does not exist.

On other hand, the study found male students outstanding than female students in understanding research process. Interestingly, both male and female students reported similar results in regard to the nature of research, data collection, and data analysis. However, results show extreme difference between students believe in their research ability (Average: 3.11) and their actual research skills (Average: 2.45).

References

- [1] M. Huber, "What individuals can do to develop teaching and research links", paper presented at the American Association for higher education Conference, Washington DC, 14-17 March, 2003.
- [2] J. Willison, and K. O'organ, "Commonly known, commonly not known, totally unknown: a framework for students becoming researchers", *Higher Education Research & Development*, Vol. 26, no. 4, pp. 393 – 409, 2007.
- [3] C. R. Bateman, "A philosophical and strategic approach for restructuring and undergraduate marketing curriculum : a practical application of Boyer commission report directives", Proceedings of

the Academy of Educational Leadership, Vol. 14, no. 1, pp. , 2009.

- [4] R. S. Iyer, and E. Fitzgibbon III, "Building the future biotechnology workforce: a University of Houston mode", *Journal of Commercial Biotechnology*, Vol. 15, no. 2, pp. 171-182, 2009.
- [5] A. J. Fenn, D. K. N. Johnson, M. G. Smith, and J. L. Simpert, "Doing publishable research with undergraduate students", *The Journal of Economic Education*, Vol. 4, no. 3, pp/ 259-274, 2010.
- [6] C. Craney, T. Mckay, A. Mazzeo, J. Morris, C. Prigodich, and R. de Groot, "Cross- discipline perceptions of the undergraduate research experience", *The Journal of Higher Education*, Vo. 20, no. 10, pp. 1-21, 2009.
- [7] S. H. Russel, M. P. Hancock, and J. McCullough, "Benefits of undergraduate research experiences" *Science*, Vol. 316, pp. 548-549, April 2007.
- [8] C. A. M. Kardash, "Evaluation of an undergraduate research experience: perceptions of undergraduate interns and their faculty mentors", *Journal of Educational Psychology*, Vol. 92, no. 1, pp. 191-201, 2000.