UNDERGRADUATE RESEARCH IS GETTING HARDER- NOT FOR PAKISTANI STUDENTS

Dr. Fayyaz Ahmad Faize, Assistant Professor
Ms. Samreen Idrees, Lecturer
COMSATS Institute of Information Technology, Islamabad, Pakistan

Abstract

Undergraduate research has gained extensive popularity in the United States and western universities. However, it is still in infancy in the developing countries like Pakistan. The problem is that the universities are geared more towards teaching than research based activities. Majority of undergraduate students opt for a job after getting their degree but perform lower in their professional career due to little exposure with research based learning. Feeling the need for promoting a rigorous undergraduate research program in higher educational institutions in Pakistan, the researchers led a preliminary study to find the perception of undergraduate students about research-based engagements. The data were collected through a questionnaire. The perception of undergraduate students identified various interesting results. It was observed that the undergraduate students were highly motivated to be involved in research based activities. However, they were not satisfied with the research work. They students were hardly involved in any faculty-led project. The male and female students expressed their willingness to travel out of city for pursuing a research activity. The finding of this study is of great help to the researchers in introducing a program of action for promoting undergraduate research in Pakistan.

Keywords: Perception, projects, promoting research, research-based engagement, Undergraduate research

Introduction

Research is about exploring new knowledge in a systematic manner (Best, 1996; Ellis, 2006). As an activity, it sharpens critical and analytical skills. It boosts the confidence level of the researcher and opens new avenues for further research. A recent term that has gained popularity in higher education is Undergraduate research (UG). This term was first introduced and integrated in Massachusetts Institute of Technology (MIT) undergraduate curricula. The institute initiated Undergraduate Research

Opportunity Program (UROP) in1969 that encouraged the students to participate in faculty-led projects or the student-led projects. The students involved in these research-based projects would either get an academic credit or some financial assistance (Cohen & MacVicar, 1976).

In 1980, the Imperial College London adopted the same scheme of program (Goodlad, 1998). A major achievement in this regard was the establishment of the Council on undergraduate Research (CUR) in 1978. The council provided support to the US educational institutions to strengthen UG research. This has significantly improved UG research programs in US universities (Katkin, 2003) and presently encompasses more than 550 colleges and universities.

Undergraduate research is about students' involvement in research and inquiry-based activities from their induction in universities till their graduation whether individually or in group (Childs et al, 2007; Gaff, 2004). Through this, the students get an opportunity to create knowledge, develop critical thinking and promote intellectual excitement (Ellis, 2006; Healey & Jenkins, 2009).

As regarding UG research, the Boyer commission (1998) in United States also urged the universities to utilize their resources for strengthening research culture at this level. Ramsden (2008) suggested a radical change in the UG curricula to meet the above criteria. According to him, the curricula should be inquiry-based, trans-disciplinary and should provide necessary skills about employment and professional career. Rammell (2006) also recommended a curricula for undergraduate that would enable the students understand the research processes, the method of performing research and the analysis of data collected.

Healey (2005) presented a more elaborate model for engaging students in undergraduate research. The model has two dimensions. The first one emphasizes on the research content while, the second one stresses on research processes and problems. Both these approaches can be applied to the extent to which the students can be treated either as active participants or as silent spectators.

Robertson and Blackler (2006) highlighted students' perception about research belonging to different disciplines. They found that students' perception differs from discipline to discipline. Science students perceive research as discovering new knowledge in a closed environment usually called the laboratory. This exploration of knowledge is possible only at a higher level of education and is usually performed by the faculty teaching in university. In comparison, the students of humanities regard research as an area of interest to be pondered on, which is not apparently visible and is usually performed in the library or in one's head. This research is performed by the university students as well as faculty.

The universities are regarded as main centers of research. The university faculties besides their involvement in research projects also take the responsibility of training the young graduates in performing research-based activities. However, not all the university students get an opportunity of performing research during their enrolment period especially in developing countries. The students in Pakistan are not an exception. The universities in Pakistan are more focused on teaching than research. The university teachers geared their teachings on theoretical knowledge with little emphasis on research led activities. The research output is less than 13 percent in terms of number of publications against the total faculties of the universities. In 2010, the number of publication was 5013 for a total of 128 universities and degree awarding institutions ("Pakistani Universities Lack Research", 2011).

As regarding students, the research area is even more neglected. The student of MS and PhD are taught the research courses with little emphasis on the practical aspects. The students of these levels undertake actual research when they complete the course work and start writing their dissertation. With little or no prior experience of research work, these students perform below standard and face various kinds of technical and professional problems. The reason is that students' prior research experience helps them in conducting postgraduate research (Reinders, Kropmans & Cohen-Schotanus, 2005) which is lacking here.

Another problem is the lack of students' interest in research based activities. Munir and Bolderstone (2009) conducted a study on seventy students of nuclear medicine to find their perception about research. They observed that the students showed disinterest for research work and reported having no intention to pursue research in future. This reveals a negative attitude of students towards research. Other barriers to conducting research in higher education includes the shortage of research supervisors, lack of research courses, gender difference, shortage of time availability with students and faculty and the dearth of sufficient funds (Ghamdi et al., 2013).

The question is how we can promote research among students. Khan and Khawaja (2007) suggested including research as a compulsory component in curriculum, holding regular students' conferences and workshops, giving research based assignments to students and reserving a separate section for students led research in indexed journals.

UG research plays an important role in students' learning experiences (Kardash, 2000; Lopatto, 2003). The UG students in Pakistan hardly have any exposure to research based activities. After completing their UG program, majority of the students opt for a job while, very few get enrolled in MS program in Pakistan. These undergraduate students come across countless challenges and problems in their career consuming more

energy, time and resources. This arises due to the lack of research activities during studies making the professionals unable to apply research findings to actual situations (Munir & Bolderston, 2009; Brancati, Mead, Levine, Martin, Margolis, & Klag, 1992, Healey, Jordan, Pell & Short, 2010). Feeling the need for promoting undergraduate research in Pakistan, the researchers initially conducted a preliminary study to find the perception of undergraduate students about research based involvements. As the students are the primary stakeholders in the undergraduate research, it is important to identify their views and attitudes before implementing any program of action for undergraduate research.

Methodology

The researchers selected a degree awarding institution in Islamabad, the federal capital of Pakistan. The institution was COMSATS Institute of Information Technology, which was declared No. 1 in ranking in the field of computer science and technology by the Higher Education Commission (HEC) Islamabad, a statutory body established for regulating higher education. The present strength of the institution is about 12000 students studying in different programs (2013).

Data were collected from UG students of science and arts through a questionnaire. The questionnaire was designed by the researchers and then validated by a panel of seven experts for face and content validity. The questionnaire was then piloted on 40 UG students. The questionnaire was designed on a five point Likert scale (Likert, 1932) containing the option of 'Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree'. In order to make analysis clearer and simple, the researchers combined the students' responses of strongly agree and agree to make one column of agree. Similarly, the responses on strongly disagree and disagree were added to make one column of disagree.

The students were asked to tick one box for each item according to their level of agreement. The responses for each item were then combined as a frequency count and statistical analysis were performed to draw conclusion. The last item in the questionnaire was open ended asking the students how UG research can be promoted in the universities in Pakistan. The total number of questionnaires received was 272 against 311 that were distributed. There were missing items as well in some questionnaires. Data were analyzed using Chi-Square test for homogeneity at 0.05 significance level using SPSS PASW 18.0 (registered) version.

Analysis And Discussion

Below is a summary table of the items asked in the questionnaire and the frequency of students' responses.

Table 1. Case Processing Summary of the items and responses

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Gender * You Like Research	256	94.1%	16	5.9%	272	100.0%
Gender * Satisfied with present state of research	272	100.0%	0	.0%	272	100.0%
Gender * Ready to travel out of city for research	240	88.2%	32	11.8%	272	100.0%
Gender * Ready to use your resources for research	272	100.0%	0	.0%	272	100.0%
Gender * Ever involved in faculty-led project	272	100.0%	0	.0%	272	100.0%

The number of valid and missing cases is also given for each of the item in the questionnaire.

Table 2. Students' Interests in Research

			You Like Research			
			Disagree	Undecided	Agree	Total
Gender	female	Count	8	8	80	96
		% within Gender	8.3%	8.3%	83.3%	100.0%
	male	Count	8	8	144	160
		% within Gender	5.0%	5.0%	90.0%	100.0%
Total		Count	16	16	224	256
		% within Gender	6.3%	6.3%	87.5%	100.0%

Based on the data from table 2, it was found that both the male and female students expressed their liking for conducting research activities. The percentage of male students was greater as compared to female students. The Pearson Chi-Square value is $\chi^2 = 2.438$, $p > 0.05$, which shows that there is no significant differences in the opinion of male and female students regarding their liking for conducting research activities. This contradicts Ghamdi et al. (2013) who found that gender differences affect students' perception about research. The above finding also contradicts Munir & Bolderston (2009) that the students revealed negative attitude towards conducting research and showed disinterest in research based activities.

Table 3. Student's satisfaction with present state of research in universities

			Satisfied with present state of research			
			Disagree	Undecided	Agree	Total
Gender	female	Count	32	8	56	96
		% within Gender	33.3%	8.3%	58.3%	100.0%
	male	Count	80	48	48	176
		% within Gender	45.5%	27.3%	27.3%	100.0%
Total		Count	112	56	104	272
		% within Gender	41.2%	20.6%	38.2%	100.0%

The data from table 3 reveals that the male students are not satisfied from the present research work in universities while the female agreed with the statement. The female may be taking more optimistic view of the situation and satisfied with present state however; the male students may be more demanding and want more research activities to be held in the universities. A large number of male students were also indecisive about the statement.

The Chi-Square value is $\chi^2 = 28.713$, $p < 0.05$; meaning that there is a significant difference in the views of female and male students expressing satisfaction with the present state of research activities in universities. The proportion of female students was almost double than that of male students expressing satisfaction with research. The reason for this difference of opinion would be cleared after getting the responses on the other items at the end.

Table 4. Student's willingness to travel out of city for research activities

			Ready to travel out of city for research			
			Disagree	Undecided	Agree	Total
Gender	female	Count	8	16	64	88
		% within Gender	9.1%	18.1%	72.7%	100.0%
	male	Count	8	48	96	152
		% within Gender	5.3%	31.6%	63.2%	100.0%
Total		Count	8	72	160	240
		% within Gender	6.7%	26.6%	66.7%	100.0%

Table 4 shows how the majority of students were willing to travel even out of city for the purpose of research. It reveals their strong liking and support for research activities. The value of Chi-Square is $\chi^2 = 5.742$, $p > 0.05$; which shows that there is no significant differences in the views of both the groups on travelling out of city for research purposes. Another interesting result here is the large majority of female students expressing their desire to travel out of city although that the socio-cultural norms are a bit stricter for female students to travel out of city without their family members.

Table 5. Student's willingness to use their financial resources for research

			Ready to use your resources for research			
			Disagree	Undecided	Agree	Total
Gender	female	Count	16	24	56	96
		% within Gender	16.7%	25.0%	58.3%	100.0%
	male	Count	48	48	80	176
		% within Gender	27.3%	27.3%	45.5%	100.0%
Total		Count	64	72	136	272
		% within Gender	23.5%	26.5%	50.0%	100.0%

Table 5 reveals very interesting result that more female students are willing to use their own resources for research than the male students. May be the male students want more assistance from the university or other funding agency to assist them in research. The value of Chi-Square is $\chi^2 = 5.152$, $p > 0.05$, revealing that there is no significant differences in the views of both the groups on using their resources for research activities. This is a high level of motivation of the Pakistani students towards research. They are ready to travel and use their resources for research tasks. However, Munir & Bolderston (2009) found a low level of motivation in students. The reason may be the lower sample size that Munir & Bolderston took in their research study.

Table 6. Student's involvement in faculty led research project

			involved in faculty-led project			
			Disagree	Undecided	Agree	Total
Gender	female	Count	64	8	24	96
		% within Gender	66.7%	8.3%	25.0%	100.0%
	male	Count	104	64	8	176
		% within Gender	59.1%	36.4%	4.5%	100.0%
Total		Count	168	72	32	272
		% within Gender	61.8%	26.5%	11.8%	100.0%

The data from table 6 reveals that majority of female and male students were not involved by faculty members in their research projects. The point of concern is that there existed a considerable number of male students who could not decide whether they were involved by the faculty or not. One reason may be that they may have been given some task by their teacher about which they could not decide whether it was a faculty project or some learning activity.

The value of Chi-Square is $\chi^2 = 41.106$, $p < 0.05$; showing that there is a significant difference in the views of female and male students on participation in faculty led projects. As comparing the gender wise involvement in faculty-led projects, it is observed that female students are involved more in the faculty-led projects as compared to male students. The reason may be the lack of confidence on the male students with respect to the quality and degree of involvement in the research tasks. According to a recent data, 63.3 per cent seats for professional medical colleges in Pakistan were taken by female students on open merit (Choudary, 2012). Thus, the girls are taking more active part in higher education as compared to male students. Moreover, as the female students are more involved by faculty in their projects so the response on item 2 was also influenced by the same factor. That was the reason that the female students were more satisfied with

the present state of research in universities as compared to male students (see table 3).

The data from the open ended question is shown in figure 1 with the frequency count for each point suggested by the UG students.

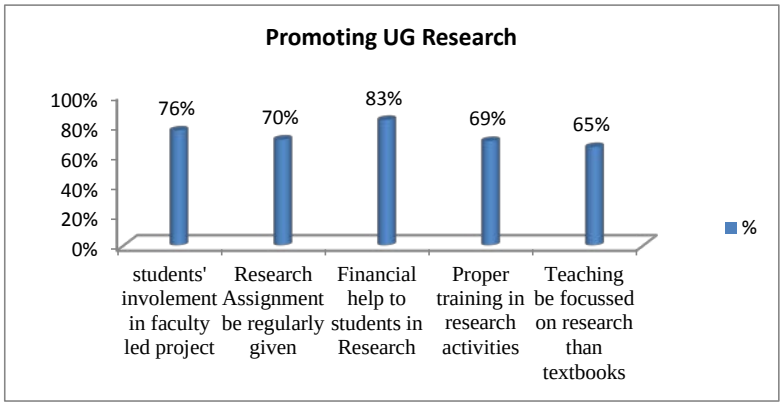

Figure 1. Students' views on promoting UG research in Pakistani Universities

The students viewed that providing financial help has a major role in the promotion of UG research in Pakistan. Further, they suggested that the faculty should involve the students in their projects, the faculty should give research based assignments and projects to students, however, proper training is also necessary to successfully carry out research assignments. Lastly, the faculty should change their existing methodology from textbook teaching to a more practical form of activity based learning.

Conclusion

Based on the above data, we observed that the UG students like to be involved in research-based projects and are willing to use their own resources for such activities. Even, they are ready to travel out of city for performing research-based tasks. However, they are not satisfied with the present state of research in universities. Despite having a positive and favorable attitude towards research, they are hardly involved in research based projects by the faculty pointing to the theoretical nature of teaching at UG level. The need is of introducing a rigorous research program through speedy research grants and incentives to the faculty members. The study revealed that the UG students are highly motivated towards research. They are fully prepared and expressed their willingness to be involved in research-based tasks. They need proper initiatives from the faculty, the university and the funding agencies to engage them in such a way that they also become a

part of knowledge creation and knowledge generation. The preliminary study is thus encouraging to the researchers to go ahead with the next phase for promoting UG research in Pakistani universities.

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