
Causes of High Attrition among Physics PPC Students of Dilla University

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Abstract: The summary of the data collected from questionnaire as well as the analysis of the documentary evidence indicated that Preparatory Programme Combined (PPC) students have very poor academic background. The analysis of this study showed that almost all PPC students were assigned to physics department without their preference, i.e. with their third or fourth choice. These students, most of whom were female, were dismissed from the college. The correlation coefficient between the preparatory result of students and their first year cumulative grade point average was (CGPA) calculated to be 0.90. This shows that there is a high degree of relationship between the two results.

Introduction

Many countries have described a decline in the number of students studying science and technology (Osborne et al., 2003). The declining enrollment of students in natural science courses, especially, in the least developed countries to which Ethiopia belongs is more significant, UNESCO (1998). A study conducted by Dejene (1996) as cited in Mekib (1999) shows that, in Ethiopia, student's interest in basic sciences is declining. This is significantly observed in Physics as compared with Chemistry and Biology. Therefore, it will be difficult to get qualified Physics teachers in the profession. This may result in a less qualified number of Physics teachers in Ethiopian schools.

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Despite the fact that science and technology have become more and more important for the society, a large number of students seem to keep them away from studying these disciplines (Sjoberg, 2000). Physics is one of the advancing sciences that contributed much to today's technological development. Scientists in Physics are the by products of Physics teachers and Physics teaching. The dominant public perception of Physics is that it is tedious, abstract and fundamentally irrelevant. The challenge facing Physics teachers is to convince the students that learning Physics is rewarding, fun, useful, and most of all, a worthwhile endeavor.

According to Mekbib (1999), the lack of popularity of Physics is the decline of students' interest towards the subject. It is very important to pay attention to the problems of Physics because it is the heart of basic sciences and the foundation of applied sciences.

Several studies (Crawley and Black 1992; Harvard 1996) have identified students' perception of science as a difficult subject. The most important variable affecting students' attitude towards science education was the kind of science teaching they experienced (Osborne et al., 2003). Tobias (1990), cited in Osborne et al. (2003), had undertaken an investigation of why many college students turn away from science in the course of their studies. These research findings provided strong confirmatory evidence about the influence of teachers on students' attitudes to school science and on their eventual choice of a field of study. According to Harvard (1996), a problem lies in physics and over 50% of his sample study indicated that they did not enjoy learning physics at all.

Girma (2004) concluded that concepts offered in each subject in the preparatory schools are challenging. It becomes beyond the students' scope of understanding to be possessed and analyzed. Students' preparation was also not up to standard; it is difficult to say the preparatory school program could substitute the freshman courses.

The academic performance of preparatory origin students is below the freshman program. That means the preparation they have made was not adequate for professional studies in university.

Temesgen (2004) found out that one of the problems in Ethiopian secondary schools is that there is little or no way for students to supplement the theory with practical works. In line with this, the result of the study conducted by ICDR (1995), cited in Girma (2004), indicated the inadequacy of lab equipments and the inability of giving practical lesson. The problem is more serious in preparatory schools even though it requires more practical works to prepare students for university.

In the old curriculum, in Dilla University context, students used to be assigned to departments after staying one year in the college, and this used to give a chance to students to test their ability and identify their interest in choosing departments. While teaching physics at secondary schools is important, a greater importance is attached to the introductory physics courses taken by students in their first year of college. These introductory courses are the ones in which the student gets his or her first taste of the subject and decides whether or not to pursue studying physics. The basic understanding achieved in these courses is the foundation for all subsequent studies in physics.

Most of the old curriculum physics students were assigned to the department on their own interest. However, the new curriculum students had no chance to test their ability and identify their interest. As a result, they showed hardly any interest to pursue their study in physics. Furthermore, most of the 2003 entry PPC students assigned to Physics Department were female students. These students were dismissed from the university.

This research is, therefore, to investigate the reason why the 2003 entry Physics students attrition rate is exceptionally high which is unseen to this extent in the previous years.

Statement of the Problem

Students placed in Physics Department, of course, are those who have backgrounds of science stream. The prevailing problem is the performance of PPC students assigned to the Department in 2003 is very low and hence the attrition rate is very high.

The aim of this study was to pinpoint the cause(s) of high attrition rate of the 2003 entry PPC students assigned to Physics Department. To achieve this aim, the study attempted to answer the following questions: (1) Is there any relationship between preparatory result of PPC students and their first year CGPA? (2) Are PPC students placed in Physics Department on their own choice? (3) Do PPC students have pre-requisite knowledge for university level? (4) Did something special treatment is given to PPC students?

Objectives of the Study

To find answers to questions stated above, the study has the following main objectives: calculating the measure of the degree of relationship (correlation coefficient) between the preparatory result of PPC students and their first year CGPA, investigating the CGPA result of PPC students and academic status with their choice or preference, identifying the possible causes of high attrition rate, and recommend remedial solutions.

Significance of the Study

The results of this study and the recommendations or solutions to the problems will help the concerned body to take corrective measures so

that teaching-learning practices in Physics Department of Dilla University will sustain.

Research Method

Subject of the Study: The target group of this study were new curriculum students of the 2003 entry assigned to Physics Department. Forty-four PPC origin students were used as the subjects of the study. Twenty-three of them were female students.

Instruments of Data Collection: Questionnaire and documentary evidence were used to collect data. The researcher used some open-ended questions to give room for a greater depth of responses and for the freedom of the respondents so that they could clearly reveal their opinion. The questionnaire was distributed to eight physics instructors who offered courses to the target group. Examination result of the students was also obtained from the Registrar's Office and used as additional source of data used in the study.

Procedures

The following procedure was used to answer the basic questions raised in the study: calculating the correlation coefficient between the preparatory result of PPC students and their first year CGPA; investigating the CGPA result of PPC students and their academic status with their choice or preference; comparing the results of FPC and PPC students; identifying the possible causes of high attrition rate, and looking for remedial solutions.

Data Analysis

The data obtained were qualitatively and quantitatively analyzed. The responses of the respondents to the questionnaire were collected and summarized. The preparatory results and CGPA of PPC students

were collected and tabulated. MICROSOFT EXCEL is used for plotting graphs.

Data Analysis and Discussion of the Results

In this research, the researcher was interested to see the degree of relationship between the preparatory results of PPC students in Physics Department against their first year CGPA. Pearson's product moment correlation coefficient method was used to calculate the correlation coefficient.

The correlation coefficient between the preparatory results of PPC students assigned to Physics Department and their first year two semesters CGPA was calculated using the Pearson's product moment correlation coefficient formula. The correlation coefficient was found to be 0.90. This shows that there is a strong degree of relationship between the two results, i.e., the two results are highly correlated. This suggests that their poor background, i.e, low performance in high school and preparatory school, might contribute to the high attrition rate of the students. The results of the students were very low. A low preparatory level result indicated also a low result of CGPA. This indicates that the students lack good academic background.

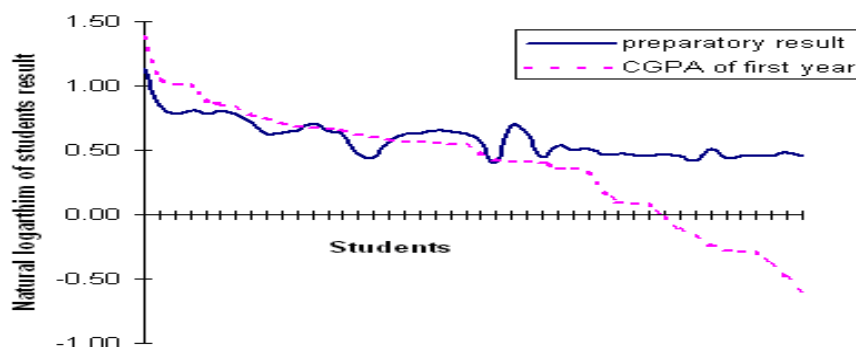


Figure 1: Comparisons of the Preparatory Result of PPC Students Placed in Physics Department with their First Year CGPA.

As indicated in Fig. 1, the two results were almost comparable. They show that the high attrition rate was most likely attributed to the students' poor background. These students were generally academically weak. The findings of Girma (2004) also strongly support this idea in that new curriculum students' preparation was not up to standard; it was difficult to say the preparatory school program could substitute the freshman program. The academic performance of preparatory origin university students was below the freshman program. That means the preparation they made was not adequate for professional studies in university.

Why weak students are admitted to Physics Department? The answer to this question was found to be students with better preparatory result did not choose to pursue their study in Physics, though it is difficult to generalize in crude sense that all preparatory students' background is poor. That is, most of the weak students were placed to Physics Department, as indicated in the table below.

Table 1: Result and Status of Physics PPC Students of 2003 Entry.

S. No.	B	C	Status	Choice	Sex	S. No.	B	C	Status	Choice	Sex
1	3.11	4.00	DL	1	M	23	1.77	1.80	W	3	F
2	2.34	2.87	P	1	M	24	1.71	1.42	D	3	F
3	2.25	2.71	P	1	M	25	1.67	1.39	D	3	F
4	2.22	2.37	P	1	M	26	1.66	0.79	D	3	F
5	2.19	2.74	P	1	M	27	1.65	1.42	D	3	F
6	2.18	2.42	P	1	M	28	1.63	0.61	D	3	F
7	2.18	2.29	P	1	M	29	1.61	1.87	W	3	F
8	2.05	2.18	P	1	M	30	1.60	1.11	D	3	F
9	2.03	1.97	W	1	M	31	1.59	1.18	D	3	F
10	2.00	1.50	D	1	M	32	1.59	0.74	D	4	F
11	1.93	1.74	D	1	M	33	1.59	0.97	D	4	F
12	1.92	2.00	D	1	M	34	1.59	1.09	D	4	F
13	1.92	1.74	D	2	M	35	1.58	0.75	D	4	F
14	1.92	1.95	W	2	M	36	1.58	0.89	D	4	F
15	1.89	1.50	D	3	M	37	1.58	0.55	D	4	F
16	1.89	2.05	P	1	M	38	1.57	0.68	D	4	F
17	1.88	1.76	W	1	M	39	1.57	1.08	D	3	F
18	1.88	1.71	D	2	M	40	1.56	1.84	W	4	F
19	1.88	2.13	P	2	M	41	1.56	1.50	D	4	F
20	1.88	1.76	W	2	M	42	1.55	0.76	D	4	F
21	1.88	1.95	W	3	M	43	1.52	0.84	D	4	F
22	1.78	1.61	D	3	F	44	1.50	1.53	D	4	F

Source: Dilla University Registrar Office

(Key: D=Deans List; P=Pass; W=Warning; D=Dismissed; B= Preparatory Result;
C=Cumulative GPA of two semesters).

Table 1 depicts that from the preparatory students assigned to Dilla University in 2003, one student who has maximum preparatory result

and placed in Physics Department with his first choice got a CGPA of 4.0 even outweighing the old curriculum students with one year college exposure.

From the analysis of the documentary evidence, it can be grasped that more than 75% of the students joined Physics Department without their choice. The main reason for their failure was also their low preparatory result since placement to departments was made on the basis of students' preparatory result. This has, at large, contributed to the high attrition rate of students. The same technique of assigning students to departments was also applied to students of 2004 entry, and thus a similar high attrition rate can be expected. The solution to this problem, which the University can easily put into action, is using talent distribution. And it is important to investigate and seek solution to problems related to Physics teaching at preparatory level.

Besides these factors, the students' background has contributed to the problem. That is, these two student groups had different background. For example, Freshman Program Combined (FPC) students had one-year college exposure but they were treated equally with PPC students who had no exposure to college life. This might have contributed to the high attrition rate of PPC students. On the other hand, the dominance of FPC over PPC might have been due to the fact that the PPC students had no sufficient pre-requisite knowledge that could help them pursue college study. This in turn could have been due to an ineffective teaching learning process practiced at preparatory level. In fact, this needs a further investigation.

The summary of the responses to the item "How did you find the 2003 entry PPC students in relation to their: class participation, interest towards your subject, ability to solve problems, performance in the exams in your course?" indicates that the interest of PPC students

towards physics was low. They were also weak in classroom participation, in problem solving ability, and in their performance in exams. The following, for instance, are responses obtained from course instructors:

PPC Students seemed well – drilled in memorizing chunks of the course, but they were less able to understand and apply their knowledge...About 75% of the students are unable to understand the concepts, about 15% of the student are above average, the remaining 10% are good in Physics. ... PPC Students found the subjects/courses beyond their level. ... More than 90% of them joined the Department without their interest. Because of this many failed to understand concepts and solve problems.

This is similar to what Girma (2004) concluded, the academic performance of preparatory origin university students was lower than the freshman program as the preparation they made was not adequate for their studies in university.

As regards the item which asked: “Is there anything special you did to help PPC students in the learning-teaching process compared with the old curriculum students in relation to: course delivery, tutorial, assessments, exam style/nature, advising, grading scale?” The respondents replied that though the course code and credit hours of some courses were changed, the course content was not changed and this gave rise to the reduction in the depth of the course delivery. On the other hand, these students were unable to understand the concepts and hence more tutorials were given. Not only was this, but the difficulty level of exam also reduced. The exam included all types. However, no significant change had been made in the assessment method and the grading scale except that the scale is some how pulled down to pull up students for grade. Despite these efforts to help, PPC students failed to succeed.

According to the responses to the item, “What do you think contributed to the high attrition rate of PPC students, especially females?” “Can you compare them with the old curriculum students?” The high attrition was attributed to:

- poor ability in school mathematics;
- lack of maturity;
- lack of the necessary academic background or lack of required pre-requisite knowledge level to pursue college study;
- dislike and fear of Physics;
- placement of students in the department without their interest and choice; and
- Similar treatment given to two different groups of students with different background.

The following responses can also strengthen these ideas:

In general, the PPC students have very poor background: they came without any thing and they left without anything gain...The old curriculum students were competent, responsible, i.e., they could perform tasks independently; have sufficient pre-requisite knowledge level to pursue college study. Whereas the PPC students are not competent, and they are very passive- i.e., they can not perform tasks independently and they are academically far behind the old curriculum students.

The analysis of the response to the question, “What do you suggest as a remedial solution to problems you mentioned in response to the above item?” shows the following:

- not forcing students to join Physics Department without their interest and choice;
- giving well organized, planned and three-week intensive maths course to all science students on their arrival at the College;

- giving attention to devising tutorial class and ways the students could access teaching material access;
- improving image of physics; and
- investigating the challenges and problems in learning and teaching physics at high school and preparatory school level. And finally revising, re-evaluating and making appropriate change in Physics curriculum.

However, the respondents did not give any direction about how to implement the proposed solutions.

Conclusion

The summary of the data collected from the questionnaire as well as the analysis of the documentary evidence indicated that PPC students had very poor academic background. The analysis also indicated that the results of the FPC students significantly increased after the students joined Physics Department. Furthermore, these students were assigned to physics department without their interest /choice. This supplemented with the similar treatment given to two different groups with different background, contributed to high attention rate of PPC students. The analysis of the documentary evidence showed that almost all PPC students assigned to Physics Department based on their third or fourth choices were dismissed. Most of the dismissed students were female students.

The correlation coefficient between the preparatory result of students and their first year cumulative grade point average (CGPA) was calculated to be 0.90. This shows that their poor background in Physics most likely attributes to the low performances of these students.

Recommendations

The author of this paper recommends the following:

1. The concerned body should use talent distribution of students during placement to departments to maintain even distribution across departments and to sustain the teaching–learning process in Physics Department.
2. Senior staff of Physics Department should give orientations to the students up on their arrival at the College. This minimizes students' ill - perception and image towards Physics.
3. An investigation should be made at preparatory level since Physics courses given at this level are the foundation for the subsequent courses in Physics Department at the College level.
4. Instructors of Physics need to check their teaching and assessment methods.

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