Relationship between Student Involvement and Achievement: An Experimental Research Study

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Abstract

The relation of student involvement and subject achievement in teaching and learning of University of Computer Studies (Taungoo) was studied in this paper. The study analyzed the teaching styles of the subject and the student assessment data of 85 students attending fifth year between 2019-2020 academic years. The research data were evaluated and monitored by using two indicators: student involvement indicators and subject achievement indicators. Qualitative data was thematically coded and quantized then entered in statistical package for social science (SPSS) alongside the quantitative data then was analyzed descriptively and inferentially and presented using statistical tables. Result of the research indicates that student involvement has a positive impact to academic achievement.

Keywords: Student involvement, Achievement, Relationship, SPSS.

1. Introduction

Student involvement pedagogy is used in University of Computer Studies (Taungoo) based on the teachers, subjects and learners.

1.1. Research Motivation

The author has been teaching computer science subject including both theory and practices. But the achievement of the students on each chapter of these subjects is different based on their involvement. Therefore, the significant differences between the effectiveness of student involvement on students' subject achievement was analyzed in this research.

1.2. Research Objective

The aim of this study is to enhance the student's subject achievement in the subject, Information Assurance and Security, of UCS (Taungoo).

It analyzes the assessment on nine chapters of this subject. Each chapter includes theory, chapter review questions, case study and hands on activity.

Firstly, finding of the current study shows that even the subject taught by only one teacher has an impact based on student involvement pedagogy.

In the context of education, good explanation in teaching is essential for unlocking the students' understanding of the subject. From a learning perspective, explanation holds a special place as one of the core critical thinking skills. Secondly, the current study examines that even good explanation has an impact based on student involvement and methodology.

Finally, the study indicates that student centered pedagogy such as involvement in teaching and learning has an effectiveness on students' academic achievement.

2. Related Works

In Teacher-Centered Approach to Learning, Teachers are the main authority figure in this model. Students are viewed as "empty vessels" whose primary role is to passively receive information (via lectures and direct instruction) with an end goal of testing and assessment. It is the primary role of teachers to pass knowledge and information onto their students. In this model, teaching and assessment are viewed as two separate entities. Student learning is measured through objectively scored tests and assessments [4].

In Student-Centered Approach to Learning, while teachers are the authority figure in this model, teachers and students play an equally active role in the learning process. The teacher's primary role is to coach and facilitate student learning and overall comprehension of material [6]. Student learning is measured through both formal and informal forms of assessment, including group projects, student portfolios, and class participation. Teaching and assessments are connected; student learning is continuously measured during teacher instruction. Commonly used teaching methods may include class participation, demonstration, recitation, memorization, or combinations of these [4].

Teacher-Student Interactive Method applies the strategies used by both teacher-centered and student-centered approaches. The subject information produced by the learners is remembered better than the same information presented to the learners by the lecturer. The method encourages the students to search for relevant knowledge rather than the lecturer monopolizing the transmission of information to the learners. As such, research evidence on teaching approaches maintains that this teaching method is effective in improving students' academic performance [4].

Pedagogy is often confused with curriculum. The latter defines what is being taught, while pedagogy actually refers to the method in how we teach the theory and practice of educating. Pedagogy is the relationship between learning techniques and culture, and is determined based on an educator's beliefs about how learning should, and does, take place. Pedagogy requires meaningful classroom interactions and respect between

educators and learners. The goal is to help students build on prior learning and develop skills and attitudes and for educators to devise and present curriculum in a way that is relevant to students, aligning with their needs and cultures [2].

SPSS is short for Statistical Package for the Social Sciences, and it's used by various kinds of researchers for complex statistical data analysis. SPSS is used by market researchers, health researchers, survey companies, government entities, education researchers, marketing organizations, data miners, and many more for the processing and analyzing of survey data [3].

There are a handful of statistical methods that can be leveraged in SPSS, including:

- Descriptive statistics, including methodologies such as frequencies, cross tabulation, and descriptive ratio statistics.
- Bivariate statistics, including methodologies such as analysis of variance (ANOVA), means, correlation, and nonparametric tests.
- Numeral outcome prediction such as linear regression.

Prediction for identifying groups, including methodologies such as cluster analysis and factor analysis.

In "Student Engagement and Quality Pedagogy" a combination of observation schedules and self-report questionnaires have been trialed and the results of the trials yielded valuable insights into how the measures may be improved on fifteen sites in urban and rural South Australia's students between years 7 and 13 [2].

There is a significant but moderate relationship between lecturers' teaching style with the students' academic engagement on a total of 226 lecturers and students of University Utara Malaysia [1]. It was studied on the relationship between student engagement and their academic achievement on 350 undergraduates from two universities in Sri Lanka by using SPSS [5].

"A Comparison of Teacher-Centered and Student-Centered Approaches in Educational Settings" analyzed that teacher has the ultimate authority and is in charge of learning for that reason students do not have adequate opportunities to develop their critical thinking and problem solving skills [4].

"The Relationship between Student Engagement and Their Academic Achievement" comprised of 3,268 15-year-old students from 121 U.S. schools. Multilevel analysis was run on SAS 9.2. This study suggested that educators, policy makers, and the research community need to pay more attention to student engagement and ways to enhance it [7].

3. Research Design and Methodology

According to teaching styles and student's academic assessment in UCS (Taungoo), the study collected the data on student involvement percentage on each chapter as student involvement indicators and then corresponding assessments on 85 students attending fifth year between 2019-2020 academic years as academic achievement indicators.

Five teaching involvement indicators are used as following in the subject.

I1. The percentage of explanation by teachers
I2. The percentage of self-study by students
I3. The percentage of student involvement in practical
I4. The percentage of group work discussion
T5. The percentage of student involvement on questioning on each other in their discussion

Using the above questionnaire collects the data for the study of student involvement indicator in nine chapters as shown in table 3.1.

Table 3.1. The percentage of involvement indicators on each chapter

Involvement Indicators	3	7	8	9	10	11	12	13	14
I1	50	60	60	65	10	10	20	40	55
I2	10	20	20	10	30	25	20	20	20
I3	40	20	20	25	30	25	20	20	5
I4	0	0	0	0	15	20	20	15	15
I5	0	0	0	0	15	20	20	5	5

Student achievement according to academic assessment in UCS (Taungoo) is indicated as following.

A1. Assessment on tutorial
A2. Assessment on assignments
A3. Assessment on hands on activities
A4. Assessment on case study
A5. Assessment on critical thinking questions

Table 3.2. Encoded achievement assessment on each chapter

Assessment Indicators	3	7	8	9	10	11	12	13	14
A1	**1**	**1**	**1**	**1**	**3**	**2**	**2**	**2**	**1**
A2	**1**	**0**	**0**	**0**	**2**	**2**	**2**	**1**	**1**
A3	**1**	**1**	**1**	**1**	**2**	**2**	**2**	**1**	**1**
A4	**1**	**0**	**0**	**0**	**2**	**3**	**2**	**1**	**1**
A5	**0**	**0**	**0**	**0**	**2**	**2**	**2**	**0**	**0**
Total %	**26.67**	**13.33**	**13.33**	**13.33**	**73.33**	**73.33**	**66.67**	**33.33**	**26.67**

The achievement data for the study were generated from students' academic assessment test scores after each chapter. These scores were thematically categorized, coded and quantized by four variables: "Bad", "Natural", "Good" and "Better" as "0", "1", "2" and "3" respectively as shown in table 3.2.

4. Research Findings

The study sought to establish the methodologies adopted by teacher in different teaching styles. Descriptive analysis was done to obtain minimum and maximum scores in teaching method indicator ($\mathbf{I_i}$), the means of each $\mathbf{I_i}$ and the standard deviations. Table 4.1 summarizes the descriptive analysis of each **Ii** for nine chapters.

Table 4.1. Descriptive analysis of Student Involvement Indicators (I_i) on Each Chapter

Chapters	N	Min	Max	Mean	Std. Devi of each I_i
3	9	0	50	20	23.4520788
7	9	0	60	20	24.49489743
8	9	0	60	20	24.49489743
9	9	0	65	20	27.15695123
10	9	10	30	20	9.354143467
11	9	10	25	20	6.123724357
12	9	20	20	20	0
13	9	5	40	20	12.74754878
14	9	5	55	20	20.61552813

On above results in tabular form by SPSS analysis, the maximum value in chapter 3, 7, 8 and 9 are the percentage of explanation by teachers. And the standard deviations of these four chapters are the most one. The minimum values in the percentage of group work discussion, I4 and the percentage of student involvement on questioning on each other in their discussion, I5 are the main key point that makes the most standard deviation.

Table 4.2. Pearson correlation analysis of involvement on student's subject achievement results

Involvement Indicators		Achievement Results
I1	Pearson correlation (r)	-0.9906
I2	Pearson correlation (r)	0.6725
I3	Pearson correlation (r)	0.1818.
I4	Pearson correlation (r)	0.8322
I5	Pearson correlation (r)	0.9627

The above tabular form shows Pearson's correlation. The Pearson's correlation coefficient (r) is a measure of the strength of the association between the two variables. Firstly, Students' achievement results have a positive impact of the involvement indicator I2 (self-study) in r = 0.6725, I4 (group) in r =0.8322 and I5 (questioning) in r = 0.9627. These are the factors of student-centered approach. Among them, Secondly, I5, student involvement on questioning on each other in their discussion has the better influence on students' performance, r =0.9627. And then thirdly, r= -0.9906 shows that good explanation has a negative impact on students' achievement cause of no student's involvement.

Finally, the involvement in teaching and learning percentage shows that only the involvement person improves in academic performance. The percentage of teacher involvement in chapter 3, 7, 8, 9 is more than student involvement. Therefore, the understanding of teacher improves than that of students. In the involvement in questionnaires-based chapter, the depth understanding of student's improves than other chapters. This finding shows that involvement not only in teaching and learning but also questioning themselves and each other has a direct relationship on academic achievement.

5. Conclusion

The research data were evaluated and monitored by using two indicators: student involvement indicators and academic achievement indicators and analyzed by SPSS analysis tools. The study established that involvement in questioning styles could cause an improvement on subject achievement. Information Assurance and Security subject without critical thinking about problems and questions, the students emphasize only on the exam marks and they are still lack of use the respective skills in real world problems. It is also an evidence for better impact that questions upon the lecturer during discussion is needed to be prepared by students rather than teachers.

6. Further Extensions

According to these findings, the above effective student involvement styles in other subjects will be used in next years. And then, the comparison of these subjects-based involvement styles will be examined as further extensions.

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