Main Theme : **Strategic Approach for Multidisciplinary Education**

Sub-theme : **Quality Process education at different levels**

Title of Empirical Article:

THE IMPACT OF PROJECT BASED LEARNING ON TEACHER TRAINEES' ACADEMIC ACHIEVEMENT (IN PURSUIT OF ANDROGOGIC EFFECTIVENESS)

First Author:
Dr.T.M.Prashanth Kumar
Assistant Professor,
Department of Studies in Education
Vijayanagar Sri Krishna Devaraya University, Ballari

Second Author:
Prof.T.M.Rajashekara,
Principal,
T.M.A.E. Society College of Education,
Harapanahalli -583132, Vijayanagara Dist.

Abstract:

The purpose of this study is to find out the impact of using multimedia on students' academic achievement in the Colleges of Education affiliated to V.S.K.D. University. To this end, an experiment of two equivalent groups was designed, one of the groups is experimental & the other is control; each of them consists of 80 Teacher trainees. The lecture was given to the first group using Project Based Learning program treated as an experimental group, while the second group was given the same lecture using the traditional method which uses the dialog & discussion technique treated as a control group. Both groups were subjected to pre & post-tests in the subject tackled by the lecture. The analysis result of the pre-test showed no statistically-significant differences, which in turn proves the equivalence of the two groups. Meanwhile, the analysis result of the post test showed that there are statistically-significant differences between the experimental group and the control group at a significance level of 0.05 for the interest of the experimental group.

Key word: Project based learning, Academic achievement, Impact

1. Introduction:

Project based learning is viewed by Cook (2006, p. 3) as a departure from approaches that typically view teachers' roles as transmitting information to children to be remembered and thus are preoccupied with instructing through sequencing content, drilling, correcting, and testing. These approaches are based on behaviorist theories that, support traditional direct instruction as opposed to Piaget's social-constructivist theory, which suggests shift of the teacher's preoccupation from that of 'instruction' to

the child's 'construction'. It is clear, therefore, that project-based learning is grounded on constructivism that regards learners as actively constructing "frameworks of understanding… by using both the knowledge they already possess, and new information presented to them". Constructivism is further regarded as a move from teacher-centred approaches based on behaviorist principles, to a much more learner-centred view, where learners are actively involved in creating their own individual learning environment.

2. Concept of Project based learning:

Project Based Learning, is an instructional approach built upon learning activities and real tasks that have brought challenges for students to solve. These activities generally reflect the types of learning and work people do in the everyday world outside the classroom.

Project Based Learning is generally done by groups of students working together toward a common goal Project Based Learning teaches students not just content, but also important skills in ways students have to be able to function like adults in our society. These skills include communication and presentation skills, organization and time management skills, research and inquiry skills, self-assessment and reflection skills, group participation and leadership skills, and critical thinking. Performance is assessed on an individual basis, and takes into account the quality of the product produced, the depth of content understanding demonstrated, and the contributions made to the ongoing process of project realization.

Project Based Learning allows students to reflect upon their own ideas and opinions, and make decisions that affect project outcomes and the learning process in general. The final product results in high quality, authentic products and presentations.

3. Project

Ntombela (2010, p. 600) reports that Project was designed as a reaction from Industrial Interaction Group (IIG) which criticized new graduates who were found wanting in soft skills. As a result, Project was crafted with an aim of achieving learning outcomes such as team work, meeting deadlines, critical thinking, and research skills (Foundation 1 Module Descriptor, 2009, p. 3). In fact, as Blake (2009) reports, students are engaged in three projects throughout the duration of the course. These projects are (i) Staff portrait gallery in which students collate information about college staff members that they have interviewed; (ii) Pamphlet which is meant to communicate survey results that students have undertaken around a college theme, for instance Road

Safety; and (iii) Class magazine that presents information collected through an interview and a survey about college issues that should be presented in an informative and entertaining manner. Most importantly, Project relies heavily on the six-step approach that underpins the mode of delivery and learning (Ntombela, 2010, p. 600), which necessitates that we look at this approach closely.

4. Six-Step of Project Based Learning Approach:

This approach which is also known as Blank Page Method (BPM) (literally consists of six sequential steps (think, research, plan, write, edit, present) that students must apply when undertaking their projects; needless to say that behind each step is a rationale discussed below.

4.1.Think:

Thinking, which rests on the notion that it is the first logical step to take when approaching any task, occurs when students initially brainstorm through a spider diagram. Walker (2009a, pp. 4-6) notably emphasizes that brainstorming using a spider diagram is the most effective and practical way as it helps students record their ideas in whatever order they deem necessary, without having to worry about, say order of importance that potentially hampers the flow of ideas. Furthermore, she (ibid, pp. 18-19) asserts that ideas represented by the 'legs' of the spider make it conducive for students to add as many ideas without having to worry about space, which is often the case with a list format. Like most of the steps, as we shall see, thinking works best when done in teams as opposed to individually (Ntombela, 2010, p. 600).

4.2. Research:

During this step students find information through interviews, surveys, internet, library, etc. Ntombela (2010, p. 601) contends that since thinking stage opens a myriad of ideas for students, researching helps narrow the scope so that their focus is more on the topic or subject of investigation. It is expected that each team, after assigning roles to all members, appoints a leader whose duty is to ascertain that the remit is addressed accordingly. For instance, in the first project where students gather information through interviews, the leader secures an appointment with the interviewee and assigns two members to carry out the interview, whilst the rest of the members contribute questions.

4.3. Plan:

Although the amount of information gathered during the researching stage has a better shape than during the thinking stage, it still needs categorization that must ensure that only the required information is recorded appropriately. This takes place

during planning stage where students also decide how the information will be presented as required in the remit. For example, students might decide that, say in the magazine project, their names as contributors would be in the front or back page.

4.4. Write:

Students should now find it easier to execute their plan. During writing stage, the team spirit is still enforced in a way that each student must contribute a potion, say introduction, conclusion, or a paragraph in the body, etc. This measure is meant to discourage strong students from depriving weak ones of giving their best.

4.5. Edit:

It is imperative that students constantly refer to the remit as they progress with the project. This is even more so during the editing stage as students consider whether their writing has responded to the remit, or whether they have not left any crucial information. They also address errors and correct mistakes; first on their own, then by the teacher.

4.6. Present:

Students' project culminates with the showcasing of their effort that occurs during presenting stage. At this stage they attend to the final product making sure it meets the expectations of the recipient. Walker (2009b, p. 10, 12) emphasizes that the importance of students paying close attention to the presentation of their project lies on the understanding that "if beauty is in the eye of the beholder we better make sure that we capture the attention of that eye." More than being a course delivery mechanism, BPM is student-driven: it is the strategy students employ when attacking any academic task (Caledonian College of Engineering (CCE), 2010, p. 12). This strategy is enforced through projects, which also ensures student-centredness. Therefore, it calls for a shift on the traditional role of the teacher from being the centre of the learning process to that of students taking responsibility for their own learning. This is in line with what PBL entails, as discussed above. This also seems to imply more learner independence which Knowles (op cit.) associated with adult learners.

5. Study problem:

The study problem is focused in finding out the influence of using Project Based Learning programme in teaching Inclusive education on the Teacher trainees' academic achievement, especially the Teacher trainees of the Colleges of Education affiliated to V.S.K.D. University, Ballari in comparison with their colleagues who benefit from this curriculum through traditional education.

6. **Study objectives:**

The study aims to find out the impact of using Project Based Learning programme on the Teacher trainees' academic achievement in the ''Inclusive Education'' curriculum through knowing the difference of academic achievement between the teacher students who were given the lecture by using Project Based Learning program (the experimental group) & those who were taught by using traditional methods – teacher, discussion & dialog (the control group). We find out answers for 4 questions after analysing the experiment.

7. **Study significance:**

The importance of the subject study is a result of the following issues:

a. It allows reaching a simplified strategy which leads to easy understanding on the part of the teacher students.

b. It raises the Teacher trainees' academic achievement in Inclusive Education subjects.

c. It develops the teacher trainees' abilities of using Project Based Learning in teaching Inclusive Education subject.

d. It encourages the use of Project Based Learning in the University environment of the colleges of theoretical bases.

8. **Study questions:**

This question can be subdivided into the following questions:

1. Are there any statistically-significant differences between the average marks of the female students of the experimental and control groups in the pre academic achievement test in the ''Inclusive education'' curriculum?

2. Are there any statistically significant differences between the average grade of the experimental and control groups in the post academic achievement test to female students in the curriculum of ''Inclusive education''?

3. Are there any statistically significant differences between the average grades of the experimental and control groups in the pre and post academic achievement tests in the curriculum of ''Inclusive education''?

4. What is the impact of using Project Based Learning on the teacher trainees' academic achievement in the curriculum of ''Inclusive education'?

9. **Study terminology:**

   1. **Project Based Learning:** Project-based instruction is innovative by its emphasis on cooperative learning. Additionally, students create tangible results to represent what they have learned.

   2. **Student's academic achievement:** It is the result of what the students learn after the learning process.

   3. **The ''Inclusive education'' curriculum:** Inclusive education is an approach to schooling in which students with many different kinds of disabilities and learning needs are educated in classes with non-disabled and typically developing students. In an inclusive arrangement, students who need additional supports and services spend most of their time with their non-disabled peers rather than in separate classrooms or schools. This article begins with a brief consideration of the ways inclusive education has been defined and an exploration of inclusion's roots in broader movements for civil rights in democratic societies. This is followed by a discussion of the challenges of managing an inclusive classroom, along with several strategies that can help teachers address these challenges through the creation of a "culture of inclusion."

10. **Methodology of the study:**

   The researcher used the experimental method in studying the impact of an independent variable (Project Based Learning Programme) on dependent variable (academic achievement), a comparison was made between the experimental group who studied by using a Project Based Learning program which uses Project Based Learning along with a teacher, and the other group is a control one who studied by using the traditional way of discussion and dialog, along with a teacher. The variables were controlled, which mean that both groups are equivalent in terms of specialty, academic level, teacher and teaching location and the two groups have undergone a pre and post academic achievement tests.

11. **The study population and its sample:**

   The study population was the teacher students in the fourth semester for the academic year 2020-21 and they were 400 Teacher trainees. The sample was randomly taken from the study community, where two branches were selected from the curriculum of the fourth semester teacher trainees, the two divisions. The researchers divided them into control group (40 teacher trainees) and experimental group (40

teacher trainees). The experimental group was given a lecture on ''Inclusive education'' through a Project Based Learning program, where the other group was given the same lecture through using the traditional ways of teaching (teacher, lecture, discussion).

12. The study tools:

The researchers designed a presentation program which uses Project Based Learning to present Inclusive Education and the presentation included sound, images and video clips, it is worth mentioning that the researchers are experienced in teaching that curriculum. The researchers conducted a pre and post academic achievement test, with the help of the curriculum professors, which covers all aspects of the topic to measure the different levels of academic achievement not memorizing. The test included 25 questions divided into two kinds of questions viz True or False (six questions) and Multiple-choice (seven questions), each one included four answers and the student choose the right one.

The test was made in an objective way and it was submitted to a group of arbitrators to judge it scientifically and pedagogically, in terms of the scientific material, its suitability to students and the clarity of its form (the arbitrators were teachers of the curriculum). After knowing their views and suggestions, few questions were modified then the test came out in its final form.

13. The study application process:

- The section of ''Inclusive education'' was selected from the Teacher Education syllabus and its uses in teaching as an experiment.
- A Teacher Educator from the department was selected to instruct both groups (control and experimental) and to refute the impact of changing the teacher on the study, putting into consideration that teaching by Project Based Learning will not affect the traditional way of teaching because this may result in wrong interpretation for the study on the two groups.
- Using the same teacher for the two groups (control and experimental) to contradict the impact of the location variable on the study.
- Ensuring the teacher trainees' academic achievement of the given lecture in both groups (control and experimental) (ensuring quality).
- A pre-test was conducted to the control and experimental groups before conducting the study and its duration was 45 min. A post test was conducted to the control and experimental groups after the first week of the study and its duration was 45 min.

- The equivalence of the two groups was verified through measuring the difference between the two groups' ranges and calculating the standard deviation and the (t) value of the identified variables: the faculty, the female students of the two groups are from the same faculty (College of Education), all of them are on the same year, i.e. fourth semester in addition to groups' equivalence in terms of the absence of differences of statistical significance in the pre academic achievement test or their academic achievement, and any of the previous information about ''Inclusive education'', the subject which will be taught in the study.

14. Statistical processing:

The researchers in the following statistical processing used the Statistical Package (SPSS) for analyzing all processes:

- Calculating the mean.
- Calculating the standard deviation.
- T-test to examine the difference between the performance of control and experimental groups.

15. The study results and its discussion:

After applying the experiment, the researcher conducted a post academic achievement test then she analysed the study outcomes to figure out the impact of using Project Based Learning on teacher trainees' academic achievement and the results were as follows:

15.1. Results related to each question:

Question (1): Are there any statistically-significant differences between the average marks of the female students of the experimental and control groups in the pre academic achievement test in the ''Inclusive education'' curriculum?
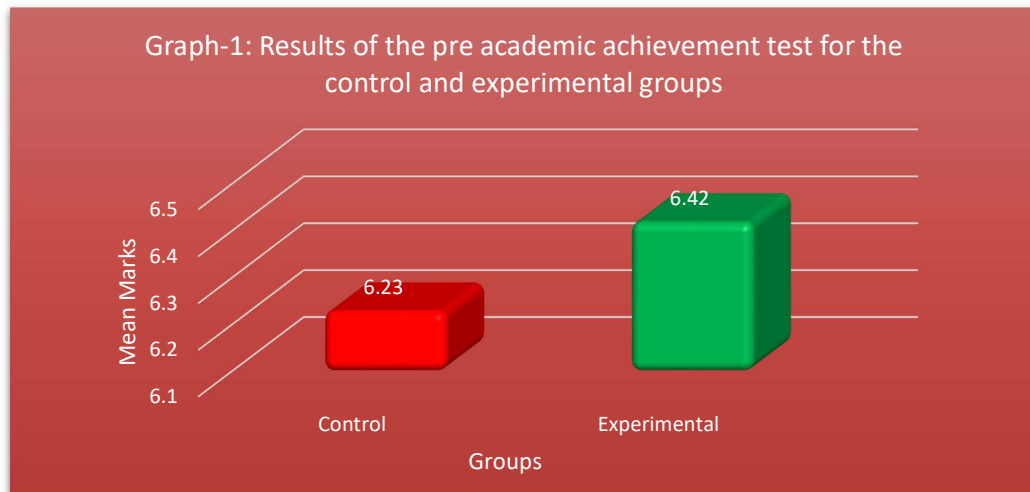
To answer this question the median and the standard deviation of the pre academic achievement test for the experimental and control groups were extracted as shown in Table 1.

Table-1
Results of the pre academic achievement test for the control and experimental groups

Group	Number	Mean	Standard deviation	Student T-value	Significance
Control	40	6.23	1.523	1.102	Not significant
Experimental	40	6.42	1.2.34		

Table value of t at 0.05 significance level and 78 degree of freedom is 2.021

Table-1, reveals that there are no statistically-significant differences between the experimental and control groups at the significance level of 0.05 in the pre-test which indicates the equivalence of the two groups. The data can be effectively shown by the following graph.

Graph-1: Results of the pre academic achievement test for the control and experimental groups

Question (2): Are there any statistically significant differences between the average grade of the experimental and control groups in the post academic achievement test to female students in the curriculum of ''Inclusive education''?
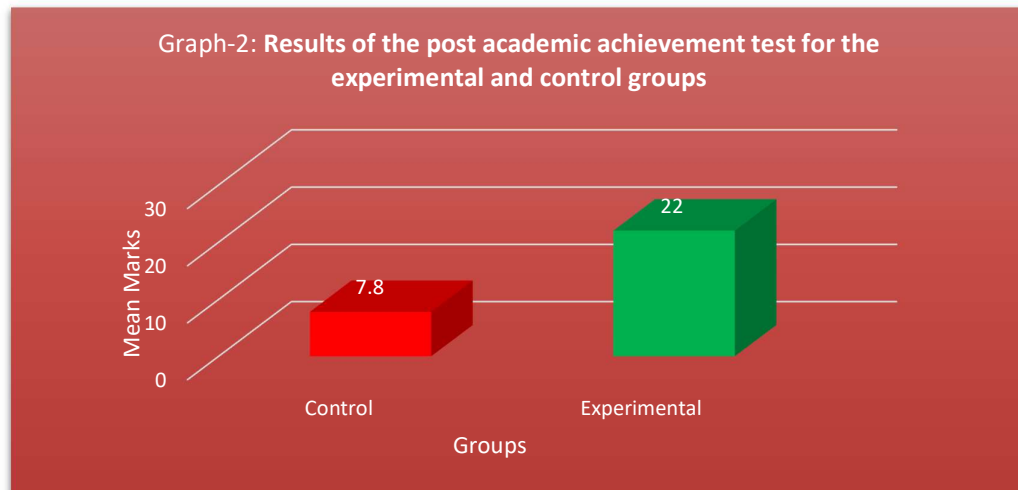
To answer that question, the standard deviation and the median were calculated for both the control and experimental groups in the post academic achievement test as shown in Table-2.

Table-2
Results of the post academic achievement test for the experimental and control groups

Group	Number	Mean	Standard deviation	Student T-value	Significance
Control	40	7.8	1.452	10.632	Significant
Experimental	40	22	1.411		

Table value of t at 0.05 significance level and 78 degree of freedom is 2.021

Table-2 shows statistically significant differences between the control and experimental groups at the significance level of 0.05 in the post academic achievement test in favour of the experimental group. The data can be effectively shown by the following graph

Graph-2: **Results of the post academic achievement test for the experimental and control groups**

Question (3): Are there any statistically significant differences between the average grades of the experimental and control groups in the pre and post academic achievement tests in the curriculum of ''Inclusive education''?

To answer that question, a comparison was made between the standard deviation and the median for the experimental and control groups in the pre and post academic achievement tests, as shown in Table-3.

Table-3
Comparison between the results of the pre and post achievement tests for the control and experimental groups

Group	Pre achievement test		Post achievement test		Student T-value	Significance
	Mean	Standard deviation	Mean	Standard deviation		
Control	6.23	1.523	7.8	1.452	4.401	Significant
Experimental	6.42	1.2.34	22	1.411	12.451	Significant

Table value of t at 0.05 significance level and 78 degree of freedom is 2.021

There are statistically significant differences between the pre and post achievement test at the significance level of 0.05 for both the control and experimental groups.

It is observed that the development of the academic achievement for the experimental group is greater than that of control group. This stresses the effective use of Project Based Learning in presenting Inclusive education lessons.

Graph-3: Comparison between the results of the pre and post achievement tests for the control and experimental groups
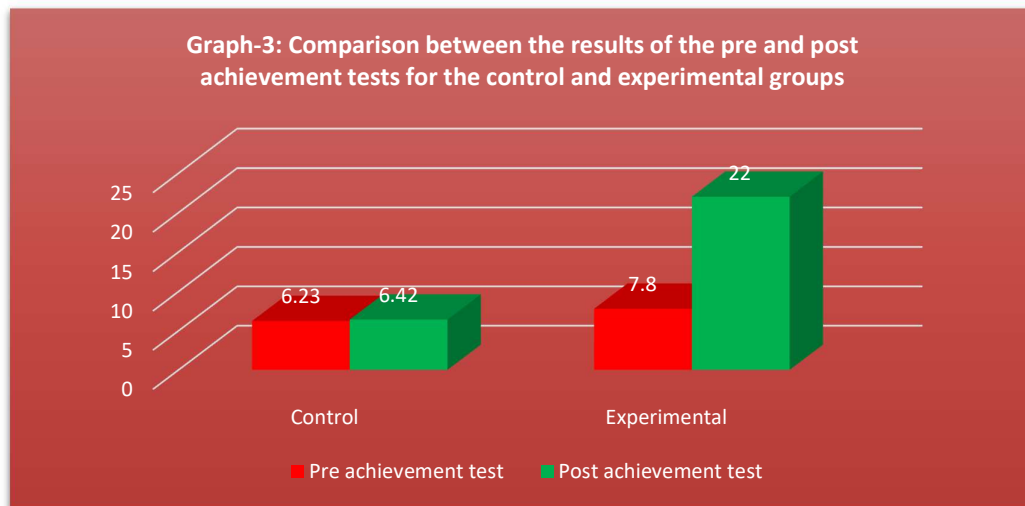
Question (4): What is the impact of using Project Based Learning on the teacher trainees' academic achievement in the curriculum of ''Inclusive education'?

After getting the statistical results of the pre and post academic achievement tests of the control and experimental groups, the positive impact of using Project Based Learning programme was clear on teaching the curriculum of ''Inclusive education'' and on better scientific academic achievement of the experimental group compared to the results of the control group, which proves that using Project Based Learning programme in education is an effective means of reaching a better learning.

Findings:

1) The positive impact of using Project Based Learning programme was clear on teaching the curriculum of ''Inclusive education'' and on better scientific academic achievement of the experimental group compared to the results of the control group, which proves that using Project Based Learning programme in education is an effective means of reaching a better learning.

2) There are no statistically-significant differences between the experimental and control groups at the significance which indicates the equivalence of the two groups.

3) The development of the academic achievement for the experimental group is greater than that of control group. This stresses the effective use of Project Based Learning in presenting Inclusive education lessons

4) The using of Project Based Learning programme in education is an effective means of reaching a better learning.

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