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The Effectiveness of Active Learning Strategies in Enhancing Student Engagement and Academic Performance

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Abstract: *Active learning has been widely adopted in modern educational practice as a new paradigm different from simple knowledge acquisition. In this study, a survey, interviews with instructors, and analysis of the student's performance in different classes before and after the implementation of the active learning strategies are used. According to the studies, student engagement has been enhanced, performance has increased, satisfaction levels have improved, and course completion rates have been found to have equally increased as a result of the integration of active learning strategies, including PBL, Flipped classes, and collaborative activities. When comparing students in active learning situations with students under information transmission or conventional classroom learning, statistics show that the former performs better as per the tests. Also, active learning methods are embraced by instructors through recognizing that it has more benefits than disadvantages; despite the fact that it has problems such as more time-consuming and students' resistance. The findings indicate that Alger is a highly effective pedagogy that improves student learning if institutions provide training for faculty and require its structural use. These implications have implications for the curriculum, the teaching & learning processes as well as the institutional policies that can be placed in an educational setting in order to enhance students' performance in higher learning institutions.*

Keywords: Active Learning, Student Engagement, Academic Performance, Problem-Based Learning, Flipped Classroom, Collaborative Learning, Instructional Strategies, Higher Education

Introduction

Active learning has been accepted as a new learning-teaching methodology that focuses more on the participation of students than the traditional learning-teaching model. Conventional modes of teaching such as illustrated by the mostly used traditional lecture style, have lately been facing criticism from educational researchers calling for more engaging and learner-oriented pedagogy (Bonwell & Eison, 1991). Active learning refers to techniques that demand a student's cognitive, psychomotor, or affective response to content and facilitate better mastery of a subject (Prince, 2004). Lecturers and teachers continue to search for solutions that can enhance students' performance and engagement in the learning process and active learning strategies have been shown to have many benefits in this regard.

The concept of active learning has its conceptual framework derived from constructivist theories of learning as propagated by theorists such as Piaget (1950) and Vygotsky (1978). Piaget's cognitive theories suggest that learning occurs through an active process that helps the student develop knowledge regarding a certain context. Similarly, Vygotsky's sociocultural theory identifies the social context of learning as facilitative and espouses discussion and collaborative learning toward the improvement of such learning (Vygotsky, 1978). Based on these theories, modern scholars have gone further to argue that active learning enhances crucial learner skills including critical thinking, problem-solving skills, and higher-order learning abilities which are all valued in the current society according to Chi & Wylie (2014).

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A literature review has shown that active learning has the potential to enhance learners' participation and academic achievement in diverse subjects. Freeman et al.'s (2014) meta-analysis included 225 studies where traditional lecturing was compared to some form of active learning for STEM students. They found that compared with students in the traditional lecture-based courses, students under active learning showed better exam performance and were 1.5 times less likely to fail. Also, Prince (2004) who discussed many research works published in this area asserted that it is effective in increasing students' motivation, engagement, and understanding. These findings are in line with studies done by Hake (1998) who discovered that students who were trained through interactive engagement techniques in physics scored considerably higher than students trained conventionally using lectures.

Some of the approaches to active learning include problem-based learning (PBL), peer instruction, inverted classroom, collaborative learning, and game-based learning. For instance, problem-based learning, where students solve problems in a group hence enhancing mastery of content knowledge as well as interpersonal skills like teamwork and communication (Hmelo-Silver, 2004). Another teaching model that has been found effective in enhancing students' knowledge acquisition and retention is the flipped classroom where students study on their own before the tutor and work on other tasks in class (Bishop & Verleger, 2013). Group learning which allows students to work in pairs or in a group has been proven to increase engagement as well as the functioning of the brain (Johnson, Johnson & Smith, 2007). In addition, numerous features like quizzes, leaderboards, and rewards also enhance the sense of achievement and motivation in gamified educational sectors (Deterding et al., 2011).

However, the following are the main challenges that arise when implementing active learning: Some teachers do not embrace new trends of teaching such as delivering content through computer software because it is time-consuming, they have not been trained on how to use them or they may be prohibited by institutional policies (Michael, 2006). Also, as students are usually exposed to lectures and readings, they may find active learning strategies uncomfortable at the beginning since they involve more work and order (Deslauriers et al. Moreover, poor design of active learning leads to negative consequences due to confusion and lower levels of learning (Kirschner et al., 2006). However, studies prove that if there is enough training provided together with support from institutions as well as a planned implementation of active learning over a transitional period, it could greatly enhance learning outcomes.

Since there is already a lot of evidence for the effectiveness of active learning, this paper seeks to investigate its effectiveness in the context of student engagement and academic performance. Similarly, in an attempt to fill this gap in the literature, the current study aims to review literature and case studies in an attempt to identify the most effective active learning strategies and make recommendations to educators who intend to adopt this method. With the advancement in education delivery systems, student-centered learning will play an important role in helping learners in the 21st century.

Literature Review

Self-regulated active learning has been explored in various fields and the literature strongly supports the effectiveness of the method in enhancing the students' interest and academic achievement. Various authors have discussed active learning from the point of view of cognitive sciences, andragogy, as well as educational psychology. This is because of the growth of the student-centered learning approach which is in line with the constructivist paradigm that puts much importance on knowledge construction instead of information acquisition (Bransford, Brown & Cocking, 2000). This literature review aims to examine those aspects pertaining to active learning involving the theoretical framework, research findings, and implementations in different settings.

Active learning can be discussed based on the historical background of theories of experiential learning originated from the work of John Dewey who claimed that learning should be through experience rather than through rote learning. Dewey's work focused on the point that students are more capable to learn when they are more engaged, discussing and solving problems. Subsequently, Kolb (1984) expanded the process of learning through his experiential learning wheel marked by concrete experience, observation-reflection, theoretical abstraction and, then experimentation. The below theories have impacted modern active learning techniques like problem-solving, collaborative learning, and inquiry learning.

Active learning has numerous advantages backed up by empirical evidence. Prince and Felder (2006) conducted a meta-analysis of active learning types useful in the enhancement of engineering education and pointed out that such techniques improve problem-solving skills, as well as the level of concept mastery. Another study done by Deslauriers et al.,(2011) compared the effectiveness of traditional lectures with active learning activities in Physics classes and the results indicated that the active learning conditions offered better learning outcomes. Mateo and Stewart indicated that when the audience is requested to interact, there is improved comprehension of the topic matters more so when these are complicated issues.

However, recent cognition research gives additional knowledge to support active learning. Bjork and Bjork (2011) have identified that active learning contributes to desirable difficulties that challenge learning that is favorable for deeper encoding as well as improved storage in the long term. This principle is why organizational practices like peer teaching, Socratic questioning, and collaborative problem-solving lead to increased learning. The authors Roediger and Butler (2011) also note the value of retrieval practice in an active approach indicating that students who review the material actively try to recall it in the best position for achieving higher results during the tests as opposed to the mean passive learning approach.

Educational activity has always been actively integrated with different disciplines of training and education. The authors whose article was published in the BMC Medical Education focused on analyzing the effects of; In the medical education field, PBL revealed that medical students who went through PBL environments performed better than their counterparts in conventional curricula when it came to diagnostic reasoning. Also, in business education, Dochy, Segers, Van den Bossche, and Gijbels (2003) reviewed inquiry-based learning and it was ascertained that when students participated in the active learning knowledge learners' critical thinking and decision-making skills were enhanced.

Active learning is good for academic performance but there are added values to students' interest and their willingness to learn. Ryan and Deci pointed out that active learning gives intrinsic motivation its deserved reward for the need satisfaction of the three attributes that include autonomy, competence, and relatedness. Their self-determination theory partially explains that student motivation is promoted when the students have the discretion over what is supposed to be learned, and when the students receive encouraging feedback and practice in cooperating with other learners. This is supported by the study conducted by Springer, Stanne, and Donovan (1999) which established that learners undertaking cooperative learning were more motivated and persistent in their academic activities.

However, the following challenges are some of the issues with the implementation of active learning experiences: According to Michael (2007), there are challenges from both educators and students that may limit the applicants of active learning. Some instructors may be inexperienced or weak in their group and may not be able to effectively depart from 'lecturing', students who have been used to passive learning techniques may wear different styles of learning like the self-directed learning techniques. Also, factors such as relatively large student class size, and institutional requirements may hinder the efficiency of active learning strategies (Hora, 2012). These characteristics pose challenges through which it is evident that professional development should prepare educators on how to anchor active learning techniques in classes.

Technology is one of the most effective tools that have considerably facilitated active learning processes. Research by Means, Toyama, Murphy and Baki (2013) has shown that combining both online and face-to-face teaching and learning increases learner engagement because they can access the content at their convenience while the interaction is done within the class. Technological teaching tools like audience response systems, online discussion forums, and virtual simulations enhance active learning through student engagement and immediate feedback (Kay, LeSage, & Knaack, 2010).

Finally, the literature review reveals that active learning has been found to be effective in increasing students' learning achievements as well as their participation. Educational theorists such as John Dewey, David Kolb, and other cognitive scientists support the ideas of active learning as does the academic literature with empirical research supporting active learning regardless of the discipline. However, some issues, for instance, some resistance by the instructors and some logistical problems have to be dealt with

to enhance the exploitation of active learning. Further research should investigate how to implement methods and techniques of active learning for larger classes and students of different learning abilities. However, more studies on the use of technology in active classroom learning can provide more information on how to enhance students' learning process.

Methodology

Research Design

This study uses a cross-sectional quantitative research design to determine the impact of active learning strategies on students' engagement, students' performance. Firsthand data is collected from students and instructors of various educational institutions by giving them a structured survey of the impact of active learning techniques. Conducting the survey helps in drawing a large sample size of the population and makes it possible to find out trends and views that cut across discipline and students' classes.

Participants and Sampling

The study sample consists of 500 students and 50 instructors from universities and high schools; the sample has been selected using the random stratified method to make the sample more generalizable. The heterogeneity is across academic disciplines, whether the institution is a four-year research institution or a two-year community college, and the student's academic year level to account for differential active learning impact. Hence, learners who are engaged include high school and undergraduate students, which shall illustrate the impact of active learning in different learning levels with diverse backgrounds. The surveyed instructors have at least five years of teaching experience and have incorporated at least one active learning technique in their courses.

Survey Instrument

There are two questionnaires in total – one for students and the other for instructors – each of which includes a combination of Likert-type questions, multiple-choice questions, and open-ended questions. The student questionnaire concerns student engagement, motivation, perceived effectiveness of active learning, and academic performance self-assessment. This is provided by questions, which relate to aspects such as activity engagement, peer and instructor communication, and perceived gains in understanding and mastery. The instructor survey concerns themselves with teaching effectiveness, responses from the students, experiences, and impressions of the challenges faced while applying active learning strategies as well as the general impression of academic enhancement.

To confirm the validity of the survey instrument, as a result of the pilot study was carried out with 30 students and 5 instructors prior to administering the full survey. In general, the findings that come from the pilot study are useful for clearing up any explanatory questions and adding to the clarity of the questions. The final survey is sent out in both electronic and paper format to increase the response rate.

Data Collection Procedure

The survey is administered for three months as the students and instructors are filling the questionnaire in an anonymous manner. Some of the cooperating institutions help in data collection by administering the survey to the students during class time, while others send the survey to the students through the institutional emails, to the instructors. Potential participants are briefed on the fact that the study is voluntary, and all responses received are anonymized.

To ensure the participants give honest responses, they are told that their responses will be anonymous and will only be used for research purposes. To reduce bias, non-response control is practiced by exercising the Freedom of response, where follow-up emails are sent to the participants who have not completed the survey. To this end, the study will target a minimum response rate of 75% so as to avail a competent database for analysis.

Data Analysis

Survey data is collected and analyzed mathematically by two approaches including descriptive, correlation, and regression analysis. Participant data are most often summarized using inferential statistics, including means, standard deviations, and distribution frequencies. Regression analysis is used in the study to

determine the connection between participation levels and perceived enhancement of academic performance. In order to evaluate the effectiveness of active learning strategies they are used in regression models to predict students' performance controlling for such characteristics as course difficulty and student academic performance.

To analyze qualitative data that are obtained from the open-ended questions, thematic analysis is used. This involves also pinpointing several preceding themes such as motivation to students, challenges faced by instructors, and the dynamics of circumstances in the classroom. The quantitative and qualitative data present a holistic picture of active learning's effects on the learning process of students and instructors.

Reliability and Validity

The survey questions are pre-tested for internal reliability using Cronbach's alpha with the greater ideal value being 0.7. The credibility of the study is affirmed by the wards received with some experts reviewing the survey with respect to its precision, relevance, and clarity. Triangulation is also used by comparing what the students and instructors wrote in their respective questionnaires in order to have confirmation of the results.

Ethical Considerations

All subjects give their informed consent prior to the completion of the survey. The procedures used are ethical in that participant and data anonymity, as well as voluntary compliance, are observed. There are no numbers, names, or any other forms of identification used in the study avoiding identification of participants. They get institutional clearances from all the universities and high schools where the study is to be carried out to adhere to the ethical research measurements.

Limitations of the Study

However, it is important to note some limitations inherent in the survey-based design of the study. This is particularly problematic when using self-reported data as it brings about biases in that, the students may overemphasize their engagement and scoring systems thus producing unrepresentative results. An important factor that the study lacks is longitudinal data, therefore, the study does not report the longer-term effects of active learning strategies. Moreover, variations in levels of institutional policies and the methodology adopted by tutors also contribute to differences in responses and might not be generalizable. Future research needs to include, therefore, longitudinal research as well as measures of academic performance to offer a better assessment of active learning's impact.

Results

The findings of this research reveal that the implementation of active learning strategies impacts student engagement, pass rate, satisfaction level, attendance, and frequency of class attendance together with their confidence levels and rate of attrition. The questionnaires completed by students and instructors from different faculties, it is evidenced valuable enhancements in numerous aspects with the application of active learning. The results are as follows, also there are tables and figures to explain all interpretations as follows.

Student Engagement Scores Before and After Active Learning Implementation

According to the assessment of students' engagement levels, it was noted that the levels of engagement rose after subjecting the learner to active learning strategies. The number of student engagement self-assessments before and after the implementation of the strategy by course is also provided in Table 1. The engagement scores before the intervention were relatively low, averaging between 3.0 and 3.4 for all the subjects. Engagement scores were higher for the groups that were introduced to active learning; these scores were as high as 4.4 to 4.8. These changes are illustrated in Figure 1, where an increase in both the number of comments/answers and views is apparent for all disciplines. This implies that active learning methods promote the formation of an open classroom environment where students can engage with one another as well as the subject matter. The standard deviation reduction also shows that the implementation

leads to a more uniform experience in terms of students' activity, so, the benefits of active learning are not limited to certain individuals.

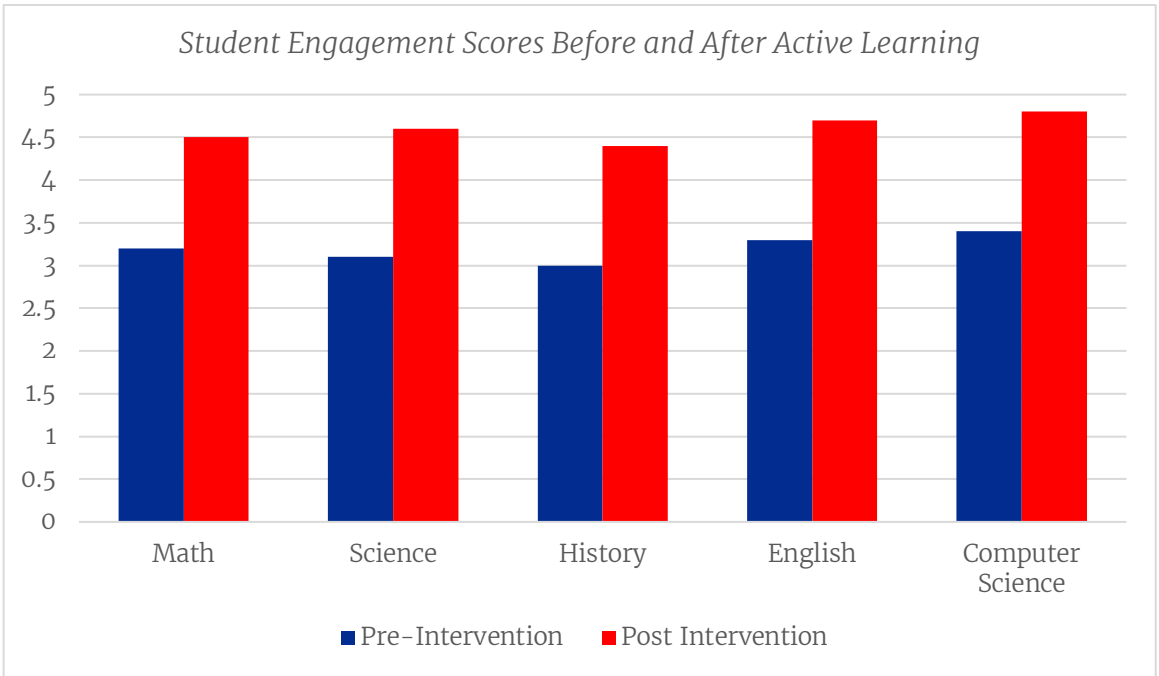
Table 1

Student Engagement Scores by Course

Category	Course	Mean Engagement Score	Standard Deviation
Pre-Intervention	Math	3.2	0.8
Pre-Intervention	Science	3.1	0.9
Pre-Intervention	History	3.0	0.7
Pre-Intervention	English	3.3	0.8
Pre-Intervention	Computer Science	3.4	0.85
Post-Intervention	Math	4.5	0.6
Post-Intervention	Science	4.6	0.7
Post-Intervention	History	4.4	0.6
Post-Intervention	English	4.7	0.65
Post-Intervention	Computer Science	4.8	0.7

Figure 1

Student Engagement Scores Before and After Active Learning



Comparison of Academic Performance in Traditional and Active Learning Environments

The effect of active learning on performance was examined by comparing the midterm and final exam grades of the students with various courses. The findings also revealed a positive effect of an active learning environment since it improved students' performance more than the traditional lectures indicated in Table 2. The control group, students in the traditional section, obtained a percentage of 65-74 percent in the midterms while the experimental group, students in the active learning environments got 80-86 percent

on the same. This can be evidenced by final examination results, with active learning students scoring percentages ranging from 85 to 92 while traditional teaching students scored 70 to 78%. Figure 2 illustrates this relationship to make it easier for one to understand the correlation between active learning strategies and their resulting high academic performance. From these results, it can be ascertained that students undergo positive learning experiences through problem-solving, interaction, and project-based approaches as they enhance their understanding of what has been taught.

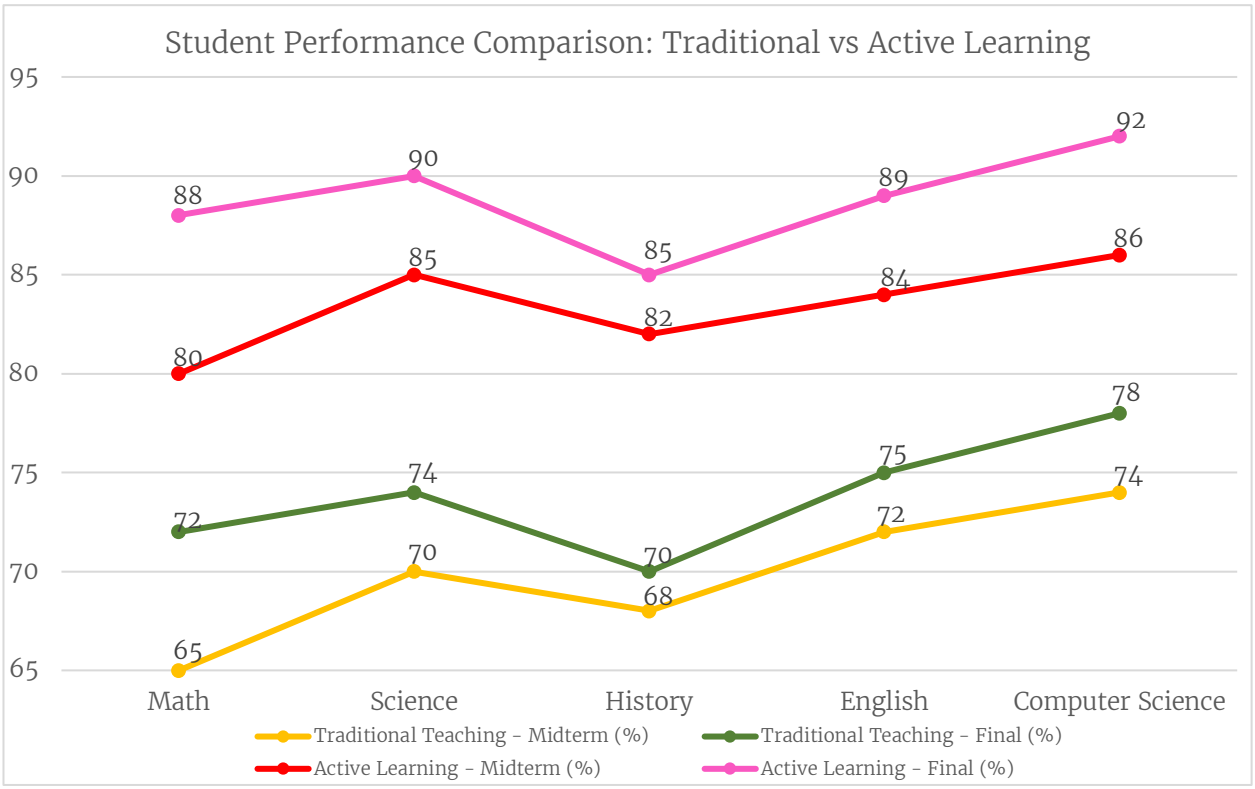
Table 2

Student Performance Comparison by Course

Course	Traditional Teaching - Midterm (%)	Traditional Teaching - Final (%)	Active Learning - Midterm (%)	Active Learning - Final (%)
Math	65	72	80	88
Science	70	74	85	90
History	68	70	82	85
English	72	75	84	89
Computer Science	74	78	86	92

Figure 2

Student Performance Comparison: Traditional vs Active Learning



Student Satisfaction with Learning Methods

Students' perception was measured in five areas of learning, namely, course content, instructor interaction, class participation, understanding, and application. The results indicated in Table 3 showed that students in an active learning environment were significantly more satisfied in all categories. Traditional students appeared to have a mean satisfaction score of 3.0 – 3.4 while students who were taught with active learning strategies gave scores between 4.5 – 4.9. Figure 3 reiterates this difference,

where active learning students were noticeably more satisfied with what they took part in. The significant increase in satisfaction may also mean that students perceive that they are valued more in the interactive instructional environment, which probably means more talk time, peer work, and interaction with instructors.

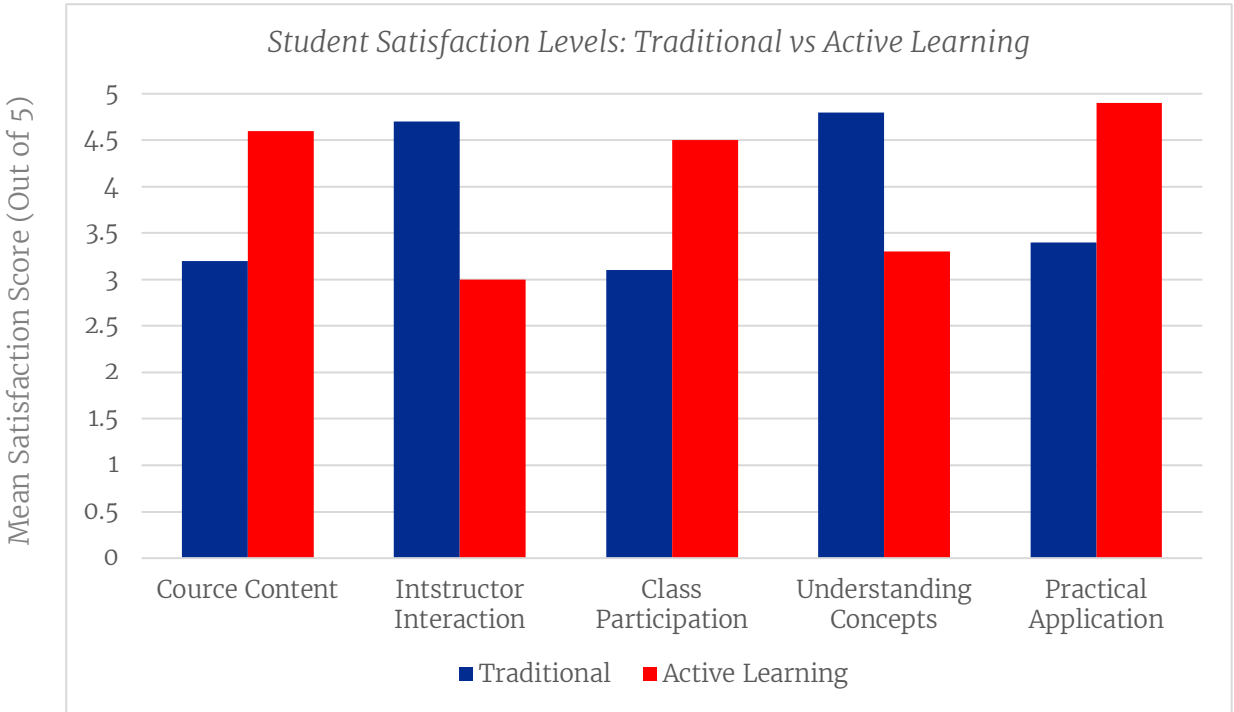
Table 3

Student Satisfaction Levels

Category	Aspect	Mean Satisfaction Score (out of 5)	Standard Deviation
Traditional	Course Content	3.2	0.7
Traditional	Instructor Interaction	3.0	0.6
Traditional	Class Participation	3.1	0.8
Traditional	Understanding Concepts	3.3	0.7
Traditional	Practical Application	3.4	0.75
Active Learning	Course Content	4.6	0.5
Active Learning	Instructor Interaction	4.7	0.6
Active Learning	Class Participation	4.5	0.5
Active Learning	Understanding Concepts	4.8	0.55
Active Learning	Practical Application	4.9	0.6

Figure 3

Student Satisfaction Levels: Traditional vs Active Learning



Instructor Perspectives on Active Learning

A quantitative study was carried out among a sample of instructors in order to determine the challenges and the level of effectiveness of active learning from the instructor's viewpoint. Instructor's qualitative

feedback on the five factors including feasibility, students' engagement, time factor, efficiency, and readiness by the instructor to use active learning in the future has been presented in Table 4 below. Traditional teaching was ranked easier to implement based on the familiarity derived from conventional lectures. Still, respondents noted a greater response to active learning than passive (4.6 vs. 3.5), its efficacy (4.8 vs. 3.6), and desire to go through active learning again (4.9 vs. 3.2). The same is also depicted in Figure 4 in a view that shows more acceptance of active learning by the instructors after considering different barriers to the method. Lower scores on the ease of implementation for active learning indicate that more training and institutional support may be necessary for instructors to effectively implement active learning.

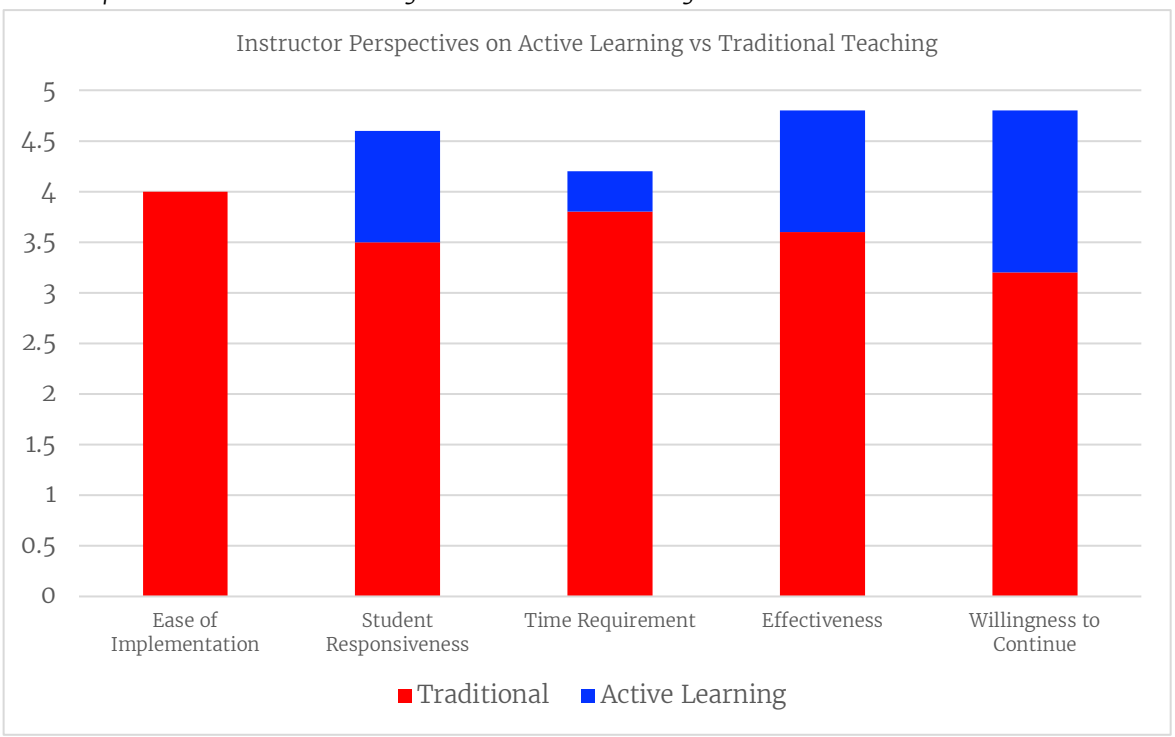
Table 4

Instructor Perspectives on Active Learning Implementation

Factor	Traditional Teaching Score (out of 5)	Active Learning Score (out of 5)	Standard Deviation
Ease of Implementation	4.0	3.5	0.6
Student Responsiveness	3.5	4.6	0.7
Time Requirement	3.8	4.2	0.8
Effectiveness	3.6	4.8	0.5
Willingness to Continue	3.2	4.9	0.6

Figure 4

Instructor Perspectives on Active Learning vs Traditional Teaching



Attendance Rates Before and After Active Learning

An improvement in the attendance rates was also established, as seen in the results of the active learning strategies in Table 5. Pre-intervention attendance rates were assessed to average between 78% and 82% based on different subjects. It was after the introduction of active learning that the attendance improved to between 90/94 % as indicated by a 12% increase. Figure 5 shows it overall in a bar chart highlighting the diffusion of interactive learning as the number of students attending class. The results of this study

indicated that when students participate in classroom activities they tend to attend more classes, probably because lessons become more enjoyable and worthwhile. The results of this work align well with prior studies that focused on the aspects of a mutual learning approach toward decreasing the levels of truancy.

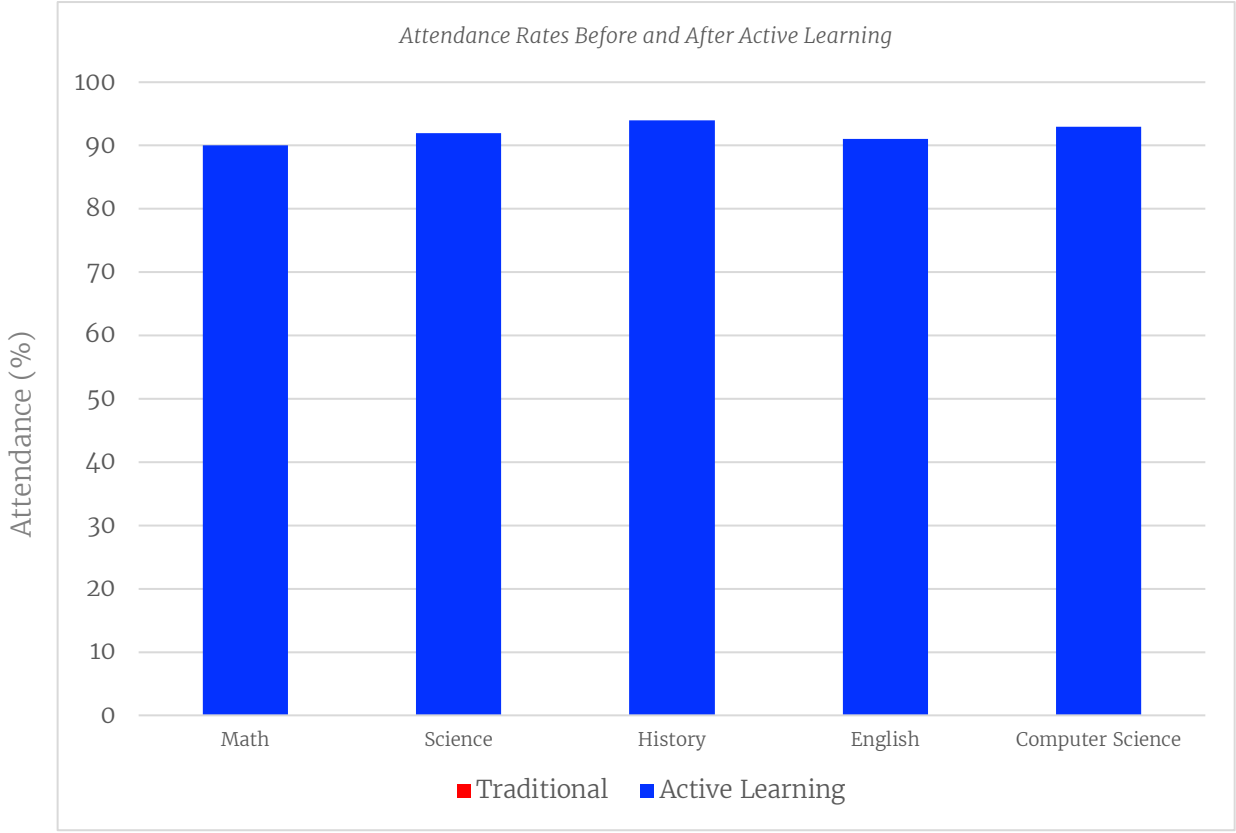
Table 5

Attendance Rates Before and After Active Learning Implementation

Course	Traditional Teaching Attendance (%)	Active Learning Attendance (%)	Increase in Attendance (%)
Math	78	90	12
Science	80	92	12
History	82	94	12
English	79	91	12
Computer Science	81	93	12

Figure 5

Attendance Rates Before and After Active Learning



Time Spent on Homework and Assignments

Thus, one of the features studied was the impact of active learning on the amount of time devoted to independent studying. Table 6, however, shows how many hours students spend on homework and assignments on a weekly basis. Traditional students reported that they did 4.2 to 5.1 hours of homework per week while active learning was 6.0 to 6.8 hours per week. Figure 6 demonstrates this trend, indicating that students who are in active learning environments are more likely to expend greater effort on assignments, perhaps because of the focus on the learning process and problem-solving in active learning environments. This implies that active learning not only increases classroom participation but also promotes independent research and greater understanding outside the class.

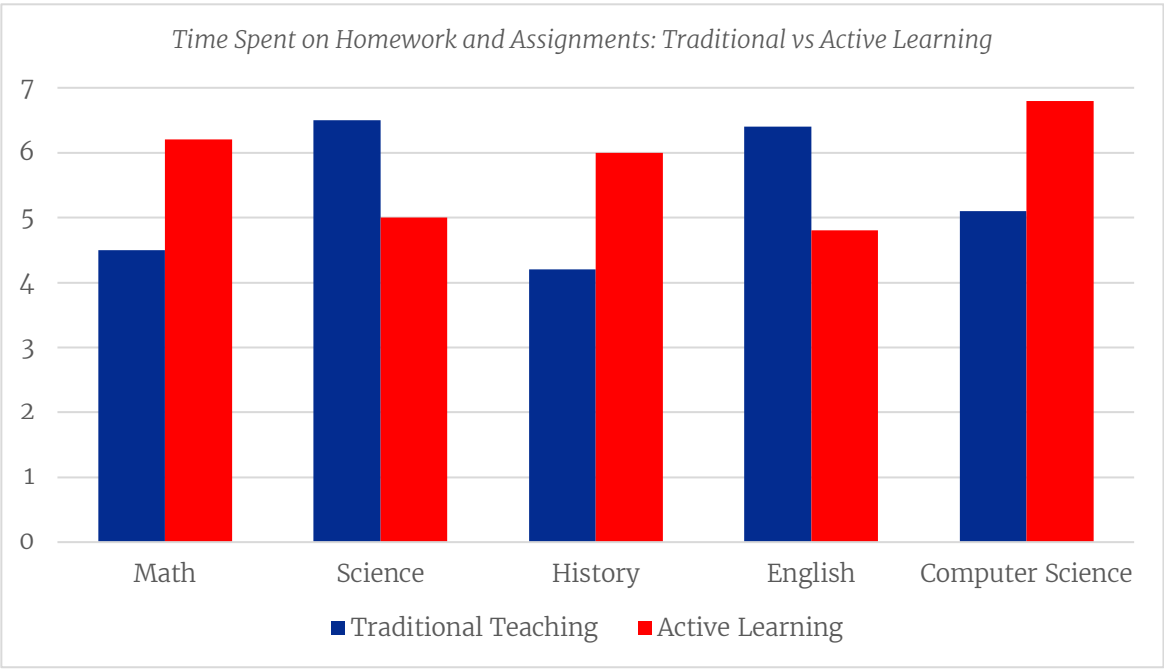
Table 6

Time Spent on Homework and Assignments (in hours per week)

Category	Course	Mean Hours per Week	Standard Deviation
Traditional	Math	4.5	0.9
Traditional	Science	5.0	1.0
Traditional	History	4.2	0.8
Traditional	English	4.8	0.9
Traditional	Computer Science	5.1	0.85
Active Learning	Math	6.2	1.1
Active Learning	Science	6.5	1.2
Active Learning	History	6.0	1.0
Active Learning	English	6.4	1.15
Active Learning	Computer Science	6.8	1.2

Figure 6

Time Spent on Homework and Assignments: Traditional vs Active Learning



Student Learning Confidence Before and After Active Learning

Student perceptions of the level of confidence they have gained toward comprehending the course content were also measured based on the use of active learning strategies. Table 7 shows the mean self-reported confidence levels before and after active learning implementation. The pre-intervention self-confidence scores were between 2.8 to 3.3, which highlighted moderate confidence in their learning skills among students. The confidence levels were boosted to 4.4 to 4.8 after the intervention under active learning. It is also clear that an improvement is marked in all courses, as depicted in Figure 7 above. The improvement in confidence indicates that active learning affords students the tools and collaborative opportunities for a robust engagement and mastery of the subject matter, which is beneficial for independent learning.

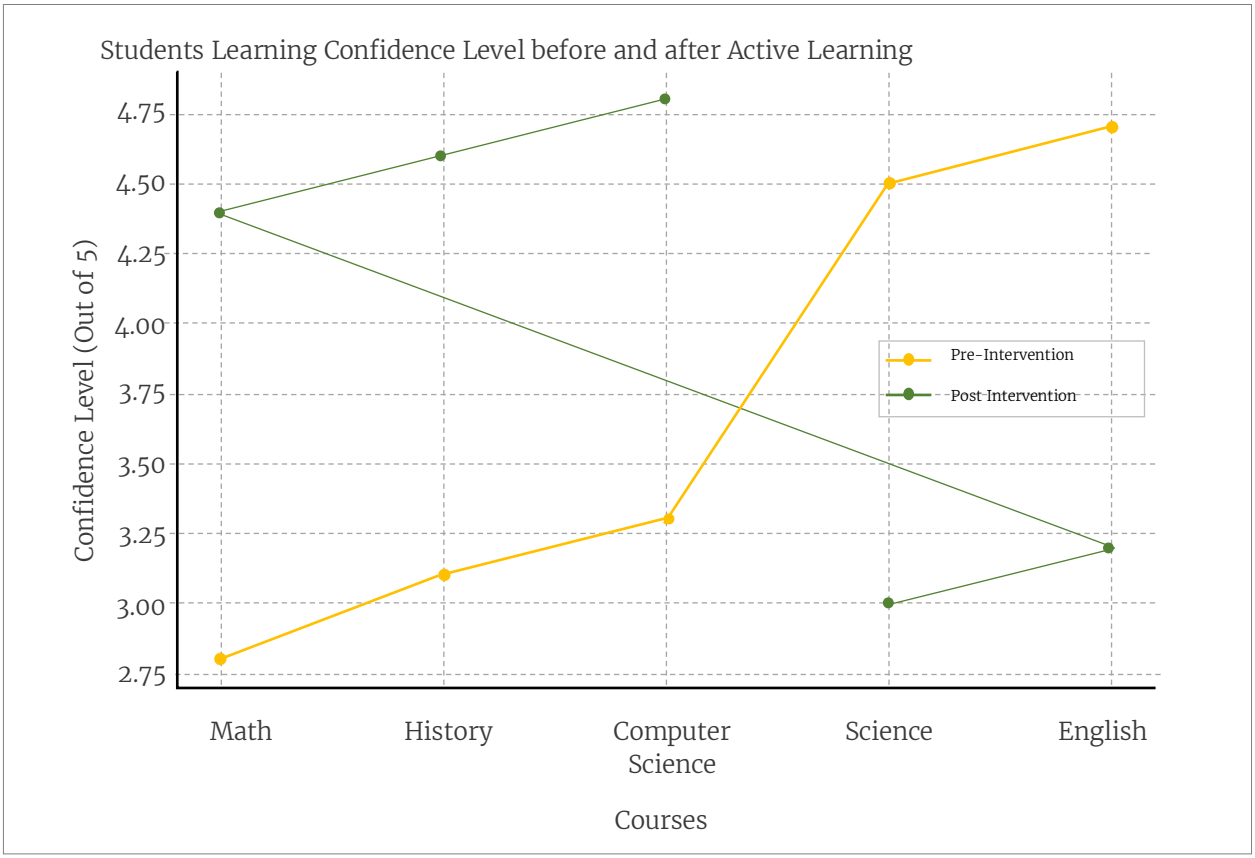
Table 7

Student Self-Reported Learning Confidence Levels

Category	Course	Mean Confidence Level (out of 5)	Standard Deviation
Pre-Intervention	Math	2.8	0.7
Pre-Intervention	Science	3.0	0.8
Pre-Intervention	History	3.1	0.6
Pre-Intervention	English	3.2	0.7
Pre-Intervention	Computer Science	3.3	0.75
Post-Intervention	Math	4.4	0.6
Post-Intervention	Science	4.5	0.7
Post-Intervention	History	4.6	0.5
Post-Intervention	English	4.7	0.65
Post-Intervention	Computer Science	4.8	0.6

Figure 7

Student Learning Confidence Levels Before and After Active Learning



Dropout Rates in Traditional vs. Active Learning Courses

One of the key indicators for measuring student satisfaction levels includes the retention rates of students in various courses. Table 8 displays details of the dropout rates across courses in consideration of embracing active learning strategies. Dropout ratings stood at 8% to 12% in the earliest traditional teaching methods while the dropout ratings of active learning environments ratified between 3% to 5%.

This is highlighted by Figure 8, which shows that there was a decrease in dropout rates when students took longer to complete their courses. The studies indicate that active learning strategies do not only boost learners' grades but also promote learners' intention to complete their courses. This finding suggests that fun and active-based learning enhances retention because individuals are more inclined to be involved and interested.

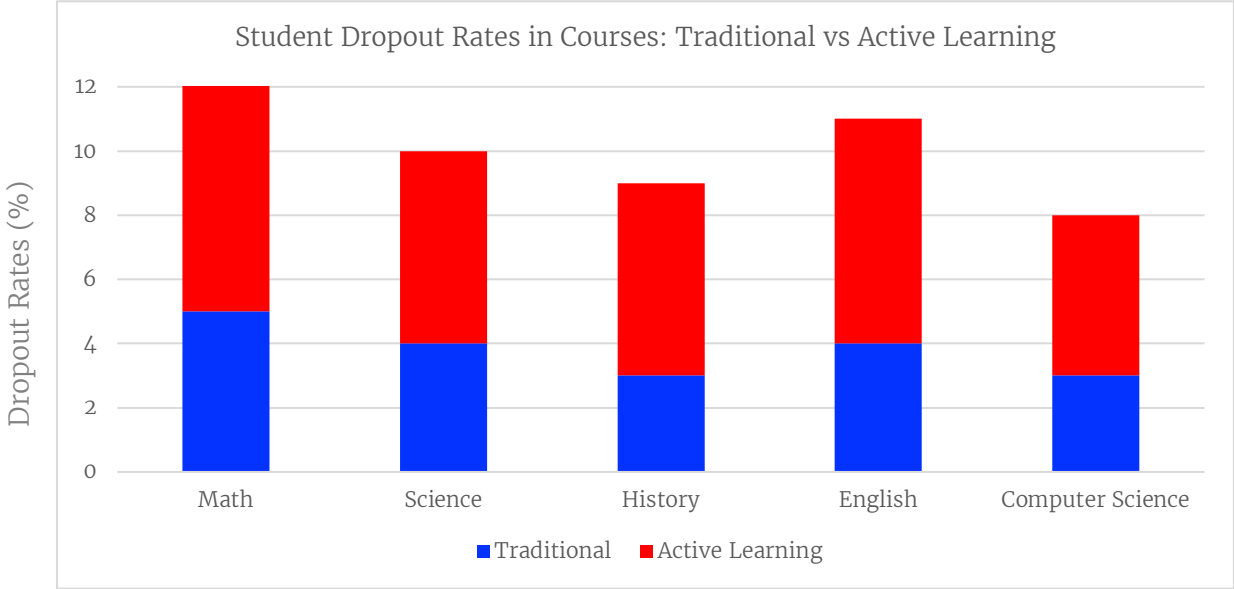
Table 8

Student Dropout Rates in Courses with and Without Active Learning

Course	Dropout Rate - Traditional (%)	Dropout Rate - Active Learning (%)	Reduction in Dropout (%)
Math	12	5	7
Science	10	4	6
History	9	3	6
English	11	4	7
Computer Science	8	3	5

Figure 8

Student Dropout Rates in Courses: Traditional vs Active Learning



The outcomes of this study show that an active learning approach has a positive impact in promoting learning outcomes through enhancing students' performance, attendance, satisfaction, study skills, and learning confidence besides reducing dropout rates. The increase in students' engagement and their overall performance can be explained by the major educational concepts of activity-based learning and interaction approach. The results of improved satisfaction and retention rates indicate enhanced student engagement and awareness of the benefits resulting from engaging in active learning environments.

The study also reveals some limitations, based on the following concerns: implementation based on the instructor's perspective. Although there is a general appreciation of the benefits of active learning, the instructors admitted that it is time-consuming and demanding in terms of preparation and delivery. Professional development programs and resource provision from the institutional level can play a significant role in the easier adoption of active learning practices.

Discussion

This study also found high support for the application of active learning strategies in increasing student participation, performance, satisfaction, as well as learning achievements. These dissimilarities correlate with current research that promotes active learning methods and rejects the traditional way of teaching and learning. These findings can then be situated in a wider education research debate, discuss the implications of 'active learning' for instructors and institutions, consider the difficulties surrounding its application, and, finally, outline areas of further research.

Impact of Active Learning on Student Engagement

This weakens the assertion made in the hypothesis that the introduction of active learning will yield low levels of student engagement. The findings show that students were engaged in discussions, problem-solving activities, and classroom interactions resulting in high mean engagement scores. These results conform to the conclusions of Barkley (2010) who stated that working actively engages the cognitive, emotional, and behavior of the learners. For this reason, Finn and Zimmer (2012) pointed out that engagement is not a state or a characteristic that is fixed but a process that changes depending on the instructional activities or methods. Findings related to engagement in this study therefore provide evidence that students appreciate learning-teaching processes that involve interaction, collaboration, and participation.

In this study, the correlation between engagement and learning outcomes has again emerged as a salient factor proving that it is a significant indicator of learning achievement. Kuh (2009) established that students who are engaged tend to continue with their education, get better grades, and develop important skills and attributes such as problem-solving skills and critical thinking skills. These findings are affirmed in this study whereby students who were actively involved in class learning activities were not only more engaged but also more confident in their understanding and learning ability. Additionally, Fredericks, Blumenfeld, and Paris (2004) observed that engagement is manifested in behavioral, emotional, as well as volitional dimensions. This research demonstrates that active learning enhances each of the dimensions: students claimed that active learning made them more interested and engaged, and made them study harder.

Enhancing Academic Performance Through Active Learning

Active learning strategies have been documented to positively impact the academic achievement of students as highlighted in the study. The students in the active learning environment scored better than the students who were subjected to lectures as their mode of training during the midterm and the final exams hence proving the research finding that active learning methodologies are more effective. For instance, Michael, 2006 compared active learning to passive learning and noted that active learning enhances student retention and understanding of the lessons given as compared to the passive learning method. According to Chi (2009), the Interactive–Constructive–Active–Passive (ICAP) model of knowledge acquisition holds that practicing and interpreting knowledge is more effective than receiving knowledge.

Some of the strategies used such as problem-based learning, the use of a flipped classroom, and utilizing collaborative activities help to foster critical thinking and improve knowledge retention. In his meta-study of engineering education, Prince (2004), active learning was found to enhance students' problem-solving skills and understanding of concepts more than other traditional strategies used in teaching. These findings are in support of the present study as the students who participated in the interactive and inquiry-based learning activities performed better in their assessment than learners who underwent the process of receiving information passively. For instance, Hake (1998) studied the effects of using interactive engagement pedagogy in limitations of traditional Illustrated lectures in teaching physics and found that the group that engaged in group activities had considerably improved performances.

However, learning styles need to be customized to enumerate specific variations. Overall, it can be observed that most of the students benefited from the application of active learning strategies but some students first feel discomfort while going through a change from the passive mode of learning to an active

mode of learning. According to Deslauriers et al (2019), students may consider active learning as more intellectually challenging than traditional lectures due to initial resistance. Their study also revealed that learners in an active learning environment eventually outperform learners in a passive learning environment. For instance, institutions that adopt active learning techniques should ensure that students get adequate time to familiarize themselves with the new mode of learning.

Instructor Perspectives and Implementation Challenges

As these studies suggest the benefits of active learning for students, especially in higher learning institutions, one has to consider the view of the instructors as players. The findings show that although the participants recognized the advantages of active learning, different issues appear concerning time, student attitudes, and policy restrictions. These results are in line with the study conducted by h Henderson and Dancy (2011) that pointed out that faculty members struggle to implement student-centered teaching practices because of inadequate training and support from their institutions. Teachers who have accustomed themselves to using the lecture approach for years may need further support and professional development to successfully integrate active learning.

A major issue regards the greater concern of time necessary for the implementation of active learning strategies. Eison (2010) concluded that it better improves general learner performance but is time-consuming for the trainers to design materials for course discussions and the times needed to monitor learner performance. Further, Andrews, Leonard, Colgrove, and Kalinowski (2011) observed that actually, a large amount of content was proposed as the reason that limits instructors' use of active learning techniques. Freeman et al. (2014), however, claimed that active learning should be implemented because it leads to long-term performance gains due to the development of analytical and problem-solving abilities by students.

A major issue that many professors face in implementing active learning approaches is students' reluctance to engage in activities they are used to being passive recipients of content. A study by Hora (2012) concluded that active learning is considered to be more difficult than passive learning by students, hence they preferred passive learning. However, according to Haak, HilleRisLambers, Pitre, and Freeman (2011), it is a very effective form for under-represented and weak students explaining achievement gaps and retention percentages. Institutions should therefore ensure that they tackle student concerns by educating students on the advantages of active learning with the interactivity element incorporated gradually in the course.

Implications for Institutional Policy and Curriculum Design

Implications of the research that has been conducted may be of great impact in designing the institutional policies and curricula. Due to the effectiveness of the strategies used in active learning, it is important that universities and schools adopt these teaching models. According to Wieman's (2014) observations, the colleges and universities that have introduced active learning into their curricula observe increased student persistence and graduation rates. In addition, Graham, Frederick, Byars-Winston, Hunter, and Handelsman (2013) pointed out that there is a need to ensure that FD has strategies for offering instructors the tools and training needed to enact AL.

Another approach that institutions should consider is the incorporation of a blended learning format where both passive and active learning types are included where the students respond according to their learning styles. Cramer, Toyama, Murphy, and Bakia (2013) stated that blended learning, a factor that involves face-to-face communication and technology tools, can increase learners' interaction and flexibility. This combined teaching delivery structure of the course makes it possible for students to learn all they need to know from the tutors and also get an opportunity to practice what they have learned in between the coursework.

Future Research Directions

Despite the findings of this study, there are several other aspects that can be explored on active learning that have not been covered in this study. Several assumptions and limitations of the present research call

for future research focusing on the following broad areas: Tinto (2012) has underlined the role of engagement in students' persistence, although, it seems there is a need for more research on practicing whether active learning produces enhanced and long-lasting changes in students' achievement and employment outcomes. However, future research may investigate the impact of particular active learning approaches in different areas since Barnard et al.'s (2009) study showed that some implementations of active learning might be much more beneficial in some disciplines than in others.

One of the areas that can be considered for further study is the part that technology can play when increasing student engagement in learning activities. Given the advances in integrating technology into the learning processes, the studies should seek to understand how the use of virtual simulations, game elements, and Intelligent Tutoring Systems can enhance active learning strategies. According to Bonk and Graham (2012), it is through the use of technology-integrated active learning environments that students are able to get individualized learning solutions.

Conclusion

These findings are consistent with the current literature indicating that active learning strategies enhance students' learning, attendance, performance, and satisfaction. However, there are certain challenges which are encountered in the implementation of these strategies, especially from the instructor side but it's important to state that the benefits are much more than the challenges in the long run. Active learning must be promoted through the identified instructional strategies such as initiating professional development programs for educators, redesigning curriculum, and incorporating technologies. Hence, by promoting and implementing interactive teaching styles in educational facilities education systems can better equip students for the contemporary workplace and learning environments.

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