

Innovative Teaching Strategies and their Impact on Learning Outcomes in Higher Education

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Abstract: The use of new instructional tactics has changed the face of higher education through fostering student centred learning, better interaction and better performance. The present paper examines the impact of newer teaching and learning strategies on learning outcomes of higher education education, and the research question is what type of instructional strategies (i.e., active learning, blended learning, flipped learning, collaborative learning, project-based learning, gamification, technology enhanced instruction, etc.) can influence learning outcomes. A positivist philosophy and deductive quantitative research methodology was used. The data collected included 200 undergraduate and postgraduate students in institutions of higher learning, using structured questionnaires to aid in the data collection. Descriptive statistics, Pearson correlation analysis and multiple regression analysis were used to analyse data obtained using SPSS. The findings revealed that the students were positive about the innovative teaching strategies, technology enhanced learning and collaborative learning were rated highest. The statistical results had indicated that there were significant positive relationships between innovative teaching strategies and learning outcomes that comprised: student engagement, academic performance, knowledge retention, critical and communication abilities and problem-solving skills. Another finding of the regression analysis was the fact that technology enhanced learning had been the most effective predictor of improved learning outcomes. The study concludes that the effective application of the innovative teaching practices increase the quality of the acquired education and help to attain the needed graduate competencies. It also presupposes an additional investment in digital technologies, the training of faculty and learner-focused pedagogies to improve the quality of teaching and academic outcomes of post-secondary education.

Keywords: Innovative Teaching Strategies, Higher Education, Learning Outcomes, Student Engagement, Technology-Enhanced Learning

I. Introduction

Technological development, shifting workforce demands and shifting once again learning habits among students have changed the institutions of higher learning at an unbelievable rate. The traditional teaching techniques of lectures are being complemented or otherwise replaced by newly developed sorts of teaching techniques that provide involvement of students, critical thinking, encouragement of group work and pragmatism in learning [1]. These are the strategies that are destined to build student based learning processes where students are not supposed to be consumers of knowledge, rather they are supposed to give contributions towards the learning process. The issue of innovativeness in teaching has emerged as a strategic concern because of the demand by universities to increase the quality of education provided and provide the graduates with skills that will enable them survive in the competitive global world economy [2]. Indeed, the innovative teaching strategies are quite wide-ranged, using all the packages of instruction that include flipped classroom, problem-based learning, project-based learning, blended learning, collaborative learning, gamification and technology-enhanced instruction. The strategies are engaging to students in interactive, problem-based learning, and online, as they are stimulated to engage more in course materials. Creative instructional strategies may equally boost academic results and develop transferable abilities required in spheres of communication, teamwork and inventiveness, and critical thinking through their encouragement of more interaction and autonomous learning [3]. Despite this growing trend of adopting such teaching strategies, research on their effectiveness in improving the learning outcomes is still in the process of being funded. The effectiveness of the new teaching practice could be influenced by the institutional resources, experience of instructors, technology, student preparedness, as well as curriculum decisions. Furthermore, the issues related to implementation, assessment and pedagogical change resistance are also problematic to teachers most of the time. The interpretation of the impacts of such strategies on student learning is thus critical in making informed learning decisions. This study will visualize the effect that innovative methods of teaching can have on the learning outcome in higher education. It analyzes the association between the modern instructional practices

and student interaction, educational performance, retention of knowledge and development of skills. These results are likely to have a substantial benefit to staff members, administrators, and policymakers who want to increase the effectiveness of teaching and elevate the quality of higher education by incorporating evidence-based teaching techniques.

II. Related Works

The research in education has focused on creative pedagogical practices where institutions of higher education attempt to improve student learning, engagement and competencies that can graduate students. Strategies involved entail the following pedagogies namely learner centrism, digital technology, group works and experiential learning in order to enhance learning efficacies. Recent studies have indicated that adoption of new teaching strategies can significantly result in the improvement of performance levels and the levels of higher order thinking among the educational institution students. Gianluca et al. [15] compared structural and non-structural learning environment merger and found out that the combination of the formal classroom learning with the experience-sharing learning positively contributes to student motivation, engagement and remembrance of information. Their mixed approach study emphasized that mixed teaching techniques facilitate active learning, and conceptual learning compared with conventional teaching techniques that rely on lecture. Increasing adoptions of lower education in the area of higher education has further revolutionized teaching. Gimpel et al. [16] gave the recommendations in practice by instructors who have integrated premeditated artificial intelligence in the classrooms of the universities. In their study, they have pointed out that AI-based teaching will be more personalized in learning, automated in teaching and provide better feedback to students. Similarly, the research by Luo et al. [25] conducted a systematic review of AI-based learning systems and discovered that AI assists in providing adaptive learning experiences, promoting learner engagement, and providing personalized and tailored learning experiences.

Another important factor influencing effective adoption of innovative teaching strategies is professional development. Hijjatul and Hercz [17] proved that continuous professional development programmes can be of great assistance in improving the pedagogical knowledge of the instructors, their technological competence and even confidence of using the modern instructional methods. The findings of their report show that the institutional investment associated with faculty training directly influences the improvement in the quality of teaching and student learning. A number of studies have also been done to determine the effectiveness of multimodal and integrated instruction strategies in health education. Huang et al. [18] reported that multimodal educational interventions consisting of lectures, simulations and collaborative learning, as part of the neurology resident training, proved highly effective in enhancing clinical competence and performance in testing. Still in the same breath, Huang et al. [19] confirmed the application of a combination of instructional techniques which did bring tangible improvements on the practice and critical thinking of students and use of knowledge. In nursing education, Ismail et al. [20] found out that high-fidelity simulation and curriculum integration resulted in highly enhancing competence, confidence and general satisfaction among learners. Even medical education has been revolutionized thanks to artificial intelligence in the shape of an intelligent tutoring system, adaptive assessment and individualized learning support. Khakpaki [21] emphasized the fact that AI technologies enhance the efficiency in education, support competency-based learning and the design of instruction based on data. The innovation of the technology can aid every educator in giving more individual and responsive education. The use of technology-based blended learning has been given a lot of consideration over the past few years. Lee et al. [22] factored in using ChatGPT into the blended learning environment and discovered that students exhibited high levels of self-controlled learning, higher-order thinking skills, and knowledge building. On the same note, Lin et al. [24] also determined that problem-based learning plus teaching in multidisciplinary and the Flipped Classroom instructional strategies assisted undergraduate medical students to reach improved academic success and clinical rationale aptitude to a considerable level.

Besides higher education, Lemmer [23] has emphasized the importance of new pedagogical practices in maintaining sustainability in the quality of education particularly in a scenario where there is limitation of resources. The review concluded that an effective type of instructional innovation involved a systematic evaluation, institutionalization and adaptable teachings arrangements. Lyu [26] also looked at the application of the new English language teaching pedagogies in university and discovered that technology-assisted instruction, interaction learning activities, and student-centre pedagogies were important in facilitating the degree of language proficiency, in addition, classroom interaction. Overall, the literature review demonstrates that the use of innovative pedagogy techniques positively influence student engagement, academic, critical thinking, collaboration, and learning satisfaction. Nevertheless, the differences in institutional environments, readiness in technology and teacher capacity continue to affect the implication of success. The results suggest that it would be essential to conduct future research that will emphasize the impact of different innovative instructional methods on the learning outcomes within different higher learning settings.

III. Methodology

3.1 Research Philosophy

The research philosophy used in this study is the positivist as they seek to test the measurable between creative teaching and learning in colleges. Positivism assumes that reality is objective and measurable in terms of observable facts and statistical analysis. Because the research question contains positively measurable variables such as student engagement, academic performance, critical thinking, and student satisfaction, the positivist philosophy is quite sufficient to collect empirical data and draw the objective conclusions [4]. The philosophy assists the researcher to limit his/her bias, and also ensures that his/her findings are based on measurable data gathered with the respondents.

3.2 Research Approach

The deductive research methodology is applied by the researcher. The deductive approach will use as the starting point existing known theories, as well as existing literature on innovative teaching methods and student learning. Based on such theoretical suppositions, assumptions are drawn and confirmed or denied using quantitative data collected among higher education students [5]. This method is suitable as it enables the researcher to know whether innovative teaching strategies have a significant influence on the learning outcome as well as confirming the availability of existing education theories in a higher education setting.

3.3 Research Design

This study embraces descriptive cross-sectional research design. The descriptive design is the one, providing the researcher with the opportunity to describe the current practices implemented in teaching and to evaluate the influence of the current teaching upon the student learning without controlling anything. Cross sectional design will enable the researcher to get data of the respondents at one time giving a picture of what they think about the innovative pedagogical practices and their experiences in school [6]. This design is both economical and time saving and appropriate in testing the relationship between variables in education research.

3.4 Research Strategy

The study is a quantitative survey design. Questionnaires administered to students of the institutions of higher learning are designed to make sure that they provide standardized answers related to methodology used in teaching and outcomes of learning [7]. The survey approach helps to gather the data of a sufficiently large sample providing greater representativeness of the results, as well as enabling statistical investigation of correlations between variables.

3.5 Target Population

The society in question will be the undergraduate and postgraduates of the universities and the educational tertiary institutions. Such students have personal experience on a variety of teaching methodologies both conventional and innovative teaching methods and hence they would form the appropriate type of respondent in evaluating the effectiveness of teaching [8]. Learners of different academic background and academic level are accommodated so as to have a diverse range of opinions.

3.6 Sampling Technique and Sample Size

To lessen the effects of selection bias, a simple random sampling technique is used which allows all students to have equal chances to be part of the study. The sample will be enthusiastic because random sampling will enhance sample representativeness and generalizability of the results.

This study will be done among 200 students of the selected institutions of higher learning. The size of this sample is deemed to be sufficient to run the descriptive and inferential statistical tests and maintain the acceptable level of confidence and minimize the sampling error [9].

Table 1. Sampling Framework

Component	Description
Target population	Undergraduate and postgraduate students in higher education institutions
Sampling technique	Simple random sampling
Sample size	200 respondents

Unit analysis	of Individual student
Data collection method	Structured questionnaire
Research approach	Quantitative

3.7 Data Collection Method

The structured questionnaire which consists of closed-ended questions taken on a five-point Likert scale is what is used to gather primary data, where 1 = strongly disagree and 5 = strongly agree. The questionnaire will be further divided into demographic information and items on the innovative teaching strategies and learning outcomes.

The measure is composed of the statements that will measure the experience of the students in relation to flipped classes, blended learning, collaborative learning, project-based learning, technology assisted learning, and gamification. Other questions evaluate learning outcomes like academic performance, classroom interaction, knowledge retention, communication competence, critical thinking, ability to solve problems as well as general satisfaction regarding the learning process [10]. The instruments of the survey are administered via the Web, as they are easier to send the questionnaires and the interviewees remain anonymous and confidential.

3.8 Research Variables

There is 1 independent and 1 dependent variable in the study.

The independent variable is innovative teaching strategies and will consist of active learning, Flipped classroom, blended learning, project-based learning, collaborative learning, gamification and technology enhanced instruction.

Learning outcomes is one of the dependent variables that are gauged by the degrees of student involvement, academic achievement, acquisition of knowledge, the use of critical thinking skills, communication, collaboration skills, problem-solving ability and satisfaction with learning [11].

Table 2. Research Variables and Measurement

Variable	Dimensions	Measurement Scale
Independent Variable	Flipped classroom, blended learning, collaborative learning, project-based learning, active learning, gamification, technology-enhanced learning	Five-point Likert Scale
Dependent Variable	Student engagement, academic achievement, knowledge retention, critical thinking, communication skills, collaboration, problem-solving skills, learning satisfaction	Five-point Likert Scale

3.9 Data Analysis

The information on data is coded and entered into the Statistical Package of the Social Sciences (SPSS) to be analysed. To start with, first, frequency, percentages, means and standard deviations utilized in the context of descriptive statistics assist in describing the demography of the respondents and their attitude towards the innovative teaching strategies. Inferential statistics should be used to analyze the results and discuss variable relationships. The Pearson correlation analysis determines the level of the relationship and directs the innovative teaching strategies and outcomes of learning relationships [12]. The multiple regression analysis will ascertain the level at which the new teaching techniques depict a change in learning outcomes in an affirmative way. The

statistical significance level is tested based on the 5% level of significance ($p < 0.05$). The reliability test will be done by Crunching Cronbach's Alpha and the test value above 0.70 will indicate that the items in the questionnaire are highly internally consistent.

3.10 Validity and Reliability

The content validity will be achieved with the help of a thorough analysis of the existing educational literature and the assistance of academic professionals who would help in the verification of whether questionnaire items are sufficient to convey study constructs. The construct validity is backed by matching the measurement items with the already validated educational research tools. The reliability is established with respect to Cronbach's Alpha coefficient after a pilot testing of the questionnaire on a small group of students [13]. It is then adjusted based on the responses of the participants to make them even more readable, consistent and comprehensible until the larger survey is conducted.

3.11 Ethical Considerations

One is subjected to a high degree of ethical standards in the course of a research. The remaining respondents will also be informed to give their consent before they will participate which will be purely voluntary. The subjects are aware of the purpose of the study, confidentiality measures and their rights to withdraw without penalty at some stage during the study. No identifiers are collected about the participants, thus, anonymity and privacy. The data obtained is kept in a safe place and employed to serve only academic purposes. The researcher embraces honesty, openness, and integrity in gathering data, making analyses, interpreting, and reporting without violating ethical provisions by the institution in conducting research involving human subjects.

IV. Results And Analysis

The chapter brings to the fore the findings that the questionnaire survey conducted targeted on 200 study participants in institutions of higher learning. The discussion identifies the demographic nature of the respondents, their current views of innovative teaching strategies, as well as how these strategies are related to learning outcomes. Statistical Package of the Social Sciences (SPSS) was used to analyse the data [14]. Descriptive statistics, correlation and multiple regression analysis were used to give the findings interpretation.

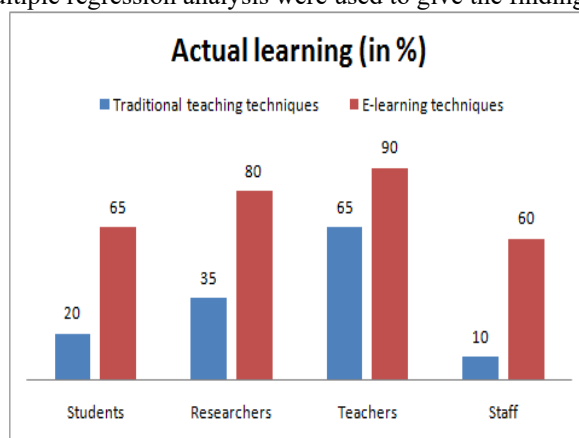


Figure 1: “Graph showing actual learning ability with Elearning techniques”

4.1 Demographic Profile of Respondents

The analysis was carried out with 200 valid questionnaires. The respondents represented the different levels of learning thus providing a broad understanding of innovative instruction in higher learning.

Table 4.1 Demographic Characteristics of Respondents (n = 200)

Variable	Categor y	Freq uenc y	Percent age (%)
Gender	Male	92	46.0
	Female	108	54.0

Age	18–20 years	58	29.0
	21–23 years	86	43.0
	24–26 years	39	19.5
	Above 26 years	17	8.5
Programme	Undergraduate	142	71.0
	Postgraduate	58	29.0
Experience with Innovative Teaching	Less than 1 year	36	18.0
	1–3 years	81	40.5
	More than 3 years	83	41.5

The results of the demographic show that 54 percent of the respondents were female and 46 percent were males. Most (43 per cent) fell in the 21 to 23 years bracket, which is the mean age of students of higher education. They were undergraduate students (71) and postgraduate students (29). In addition to this more than 8 out of 10 respondents indicated that they had at least one year experience with new ways of teaching indicating that the respondents were well exposed to allow them to form judgements regarding contemporary way of delivery [27].

4.2 Students' Perceptions of Innovative Teaching Strategies

Students were requested to assess different innovative teaching practices on a five-point Likert scale with the 1 as Strongly Disagree, and 5 as Strongly Agree.

Table 4.2 Descriptive Statistics of Innovative Teaching Strategies

Teaching Strategy	Mean	Standard Deviation	Interpretation
Active learning activities	4.31	0.62	High
Flipped classroom	4.18	0.69	High
Blended learning	4.27	0.65	High
Collaborative learning	4.36	0.58	High

Project-based learning	4.25	0.66	High
Technology-enhanced instruction	4.42	0.54	Very High
Gamification	4.09	0.72	High
Overall Mean	4.27	0.64	High

The results indicate that the students had very positive attitudes towards innovative teaching methods. The mean score of technology-enhanced instruction was the greatest (4.42), which means that students greatly valued the application of digital platforms, multimedia materials and interactive learning technologies. The rating of group learning (4.36) was high as well and it implies that group work and interaction played a major role in the learning process. The lowest mean is 4.09 in gamification but this is consistently in the high agreement category. This might even be the indicator that even though the students might value the elements of learning game based education is not the same in other courses and institutions [28]. Overall, the mean score of 4.27 ensures that the methods of the innovative teaching receive, in general, positive acceptance and are perceived in a positive manner by the higher education students.

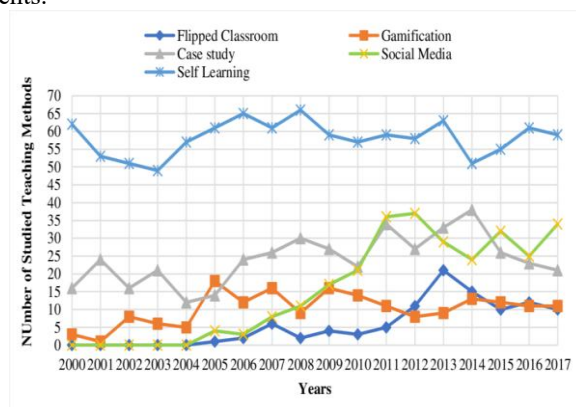


Figure 2: “Trend of new teaching methods over years 2000-2017”

4.3 Learning Outcomes Achieved through Innovative Teaching

The degree to which the innovative teaching strategies contributed to various learning outcomes was also measured by students.

Table 4.3 Descriptive Statistics of Learning Outcomes

Learning Outcome	Mean	Standard Deviation	Interpretation
Student engagement	4.39	0.56	Very High
Academic performance	4.21	0.63	High
Knowledge retention	4.18	0.67	High
Critical thinking	4.33	0.59	Very High

Problem-solving skills	4.35	0.57	Very High
Communication skills	4.29	0.61	High
Collaboration skills	4.37	0.55	Very High
Learning satisfaction	4.30	0.60	Very High
Overall Mean	4.30	0.60	Very High

The innovative teaching strategies, according to the results, have a positive influence on a range of dimensions of learning outcomes. The most significant mean (4.39) was recorded on student engagement implying the effectiveness of interactive teaching methods to maintain the engagement and interest of the students. The collaboration skills (4.37) and problem-solving skills (4.35) were also rated very high, and it suggests that a project-based learning framework and deployment of collaborative classroom activities would be ineffective to fuel applied competencies. The average score of 4.21 and 4.18 was marginally lesser academic performance and knowledge retention respectively but was also in the high category [29]. With a mean of 4.30, it can be concluded that creative instruction practices greatly affect the learning process and study life of students positively.

4.4 Correlation Analysis

Pearson correlation analysis was done to determine the correlation between innovative teaching strategies and learning outcomes.

Table 4.4 Pearson Correlation Analysis

Variables	Pearson Correlation (r)	Significance (p-value)	Interpretation
Innovative Teaching Strategies and Student Engagement	0.782	0.000	Strong Positive
Innovative Teaching Strategies and Academic Performance	0.714	0.000	Strong Positive
Innovative Teaching Strategies and Knowledge Retention	0.695	0.000	Strong Positive
Innovative Teaching Strategies and Critical Thinking	0.756	0.000	Strong Positive

Innovative Teaching Strategies and Problem-Solving Skills	0.773	0.000	Strong Positive
Innovative Teaching Strategies and Overall Learning Outcomes	0.811	0.000	Very Strong Positive

Correlation analysis revealed positively significant positive correlations between innovative teaching strategies and each of the measures of learning outcomes ($p < 0.001$). The NNTB reported the most significant correlation between the innovation in teaching techniques and the results of the entire learning process ($r = 0.811$), meaning that the more the new teaching techniques are utilized, the more the improvement of the learning outcomes of the students.

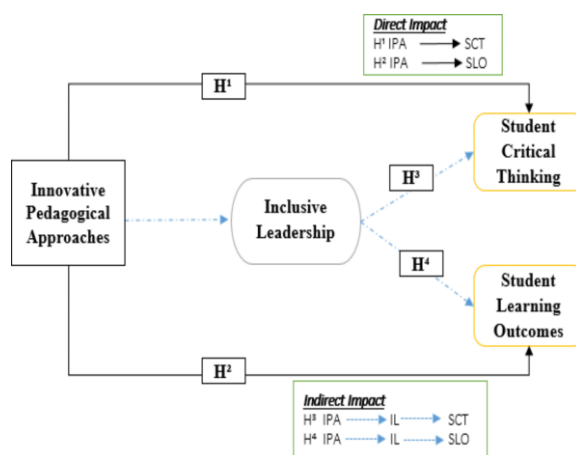


Figure 3: “Enhancing student critical thinking and learning outcomes through innovative pedagogical approaches in higher education”

The student engagement had a positive correlation which is strong ($r = 0.782$) therefore indicating that the active and technology-based teaching activities enhanced classroom engagement. Similarly, there were high correlations between problem solving ($r = 0.773$) and critical thinking ($r = 0.756$) and to innovative teaching practices, which shows the relevance of both experiential and collaborative base of learning. The highest correlation coefficient ($r = 0.695$) was the lowest and although this relationship was significant the relationship was good [30]. All these findings might show that creative instructions can have a good influence upon different variables in student learning.

4.5 Multiple Regression Analysis

Multivariate analysis Multiple regression analysis was used to investigate the innovative teaching strategies and its predictive effects on learning outcomes.

Table 4.5 Multiple Regression Results

Variable	Beta (β)	t-value	p-value	Decision
Active learning	0.258	4.72	0.000	Significant
Blended learning	0.219	3.98	0.000	Significant
Collaborative learning	0.274	5.06	0.000	Significant

Technology-enhanced learning	0.305	5.84	0.000	Significant
Project-based learning	0.194	3.47	0.001	Significant
Gamification	0.147	2.91	0.004	Significant
Model Statistics	R² = 0.68	F = 69.83	0.000	Model Significant

Regression analysis indicates that the learning outcomes in students in higher education are strong predictors of innovative teaching strategies used. It was found that the regression model was highly explanatory with a variance of 68 percent ($R^2 = 0.68$) of the learning outcomes. The most predictive was technology enhanced learning ($b = 0.305$), which means that such factors as online learning, virtual learning environments, multimedia resources and online cooperation tools play an important role in helping students learn better. The second rank was assigned to collaborative learning ($= 0.274$), where interaction with colleagues and collaborative learning activities are important. The active learning ($= 0.258$) was also significant in a positive effect, i.e., the quality of classroom discussions, case studies, and interactive exercises increased the levels of learning. Blended learning ($= -0.219$) and project-based learning ($= -0.194$) played an important part in the enhancement of educational results integrating theoretical and practical knowledge. The beta coefficient of gamification was the lowest (0.147), and yet significant, meaning that gamification elements of learning are positively contributing to the teaching practice, as long as they are integrated properly. The overall regression equation proved to be meaningful ($F = 69.83$, $p < 0.001$) and the results could be observed that the combination of innovative teaching methods is effective in terms of learning outcomes of students.

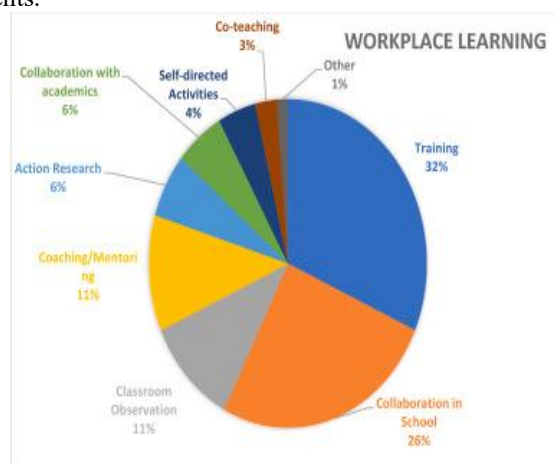


Figure 4: "Teachers' professional learning and its impact on students' learning outcomes"

4.6 Discussion of Findings

These findings confirm that the new approaches to learning are highly effective to enhance the learning process in higher learning institutions. The effectiveness of technology based instruction, collaborative instruction, active and project based instruction found the students to be very consensual. These methods of teaching create more interactive learning classrooms and encourage participation or engagement, critical thinking, and practice of knowledge. The descriptive research revealed that the average of the scores in the innovative teaching strategy and those of learning outcomes is significantly the same and that there exists a child-wide attitude towards the modern teaching strategies satisfaction. Technology-enhanced learning ranked the highest in the evaluation that illustrates the increasing importance of digital platform/learning management systems/multimedia contents/virtual cooperation in contemporary higher learning. Correlation analysis also confirmed that an increased implementation of innovative teaching strategies is correlated with better student engagement, academic success, retention of knowledge, critical thinking and problem solving. This presents the best association with total learning outcomes, as multiple innovative instructional techniques yield more beneficial learning outcomes in comparison to using traditional lectures-based instructional methods. The regression calculation indicated that technology has

been found to increase learning, collaborative learning, and active learning are the best predictors of learning results. These findings imply that colleges and universities need to put more investments on educational technologies, faculty training functions and participant centred pedagogy. Though the predictive power of gamification was the weakest, it was statistically significant, implying that its usefulness lies in a considered approach of applying the technique in course design, as opposed to adopting the technique in isolation. Overall, the research results point to the fact that the study objectives have been met as they demonstrate that the innovation of teaching techniques contributes greatly to educational experiences and performance of students. Those universities that pursue flexible, technology enhanced, collaborative and student-centred, teaching methods are more likely to produce graduates who possess a higher chance of developing critical thinking skills, high-quality communication skills, increased levels of engagement and enhanced readiness to go on to professional practice. These studies provide empirical evidence on the fact that one of the most significant determinants of the quality of education and performance among students in higher education is the teaching innovation.

V. Conclusion

Pedagogical innovations have already become an essential component of modern higher education, with the ability to enable institutions to create challenging, student-centered instructional experiences that could translate to enhanced academic achievement and acquisition of skills. In this study, the impacts of the instructions that were creative on the learning outcomes were reviewed by evaluating student perceptions of such methodologies as: active learning, combining and flipping classes, team learning, project-based learning, game-based learning, and instruction with technology. The results show that the strategies have a positive impact on student engagement, retention of knowledge, critical thinking, problem solving skills, communication skills, and overall learning satisfaction. The statistical significant result has indicated that the innovative methods of teaching are closely associated with learning outcomes and this implies that the methodical approach to instruction in the form of learner-centered approach is indeed a critical element that can lead to the attainment of education. Learning outcomes increased with technology-enriched learning and collaborative learning to become the strongest, which demonstrates the enhanced importance of digital technologies and interactive classroom activities in contemporary learning. Although all the innovative teaching methods discussed in the study had positive results, the success in their applications relies on good technological set ups, teachers ability, organizational support and a student desire to be involved in proactive learning arrangements. The paper concludes that tertiary institutions should invest more and enhance the pedagogical practices and faculty formation programs which favour the quality of teaching and prepare the graduates with the knowledge, skills and competencies required to survive in the modern changing world of professional practice. The combination of collaboration method and use of educational technologies, as well as advantages of experiential learning can contribute greatly to academic experiences of learners and their future academic performance. Future studies can build upon this study by investigating innovative methods of teaching in various academic fields, methodologies and institutional characteristics and cultural backgrounds through longitudinal or mixed research methods to give a clearer picture on their long-term educational effects.

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