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Effect Of Formative Assessment Techniques On Students' Learning Styles At University Level

Dr. Fahd Naveed Kausar[1], Anosha Haroon[2], Sara Abid[3], Dr. Ijaz Ahmad Tatlah[4]

[1]Assistant professor School of Education, Minhaj University Lahore Email: fahdnaveed1@hotmail.com (Corresponding Author)
[2]M.phil Scholar, School of Education, Minhaj University Lahore Email: anoshaharoon464@gmail.com
[3]Ph.D. Scholar, School of Education, Minhaj University Lahore Email: sara.abid306@gmail.com
[4]Associate professor Division of Education, University of Education, College Road Township, Lahore Email: tatlah@ue.edu.pk

Abstract

The aim of the study was to find the effect of formative assessment techniques on students' learning styles and find out how students from the public and private sectors perceive the impact at the university level. The study's methodology included quantitative, descriptive, and survey approach. All universities in the Lahore district, including public and private, were the focus of the current research study. It employed a multi-stage sampling approach. The total sample was comprised of 600 students. The questionnaire was created by the researcher. The validity of the instrument was determined through experts' opinions and the reliability of the questionnaire was found through pilot-testing. Cronbach's Alfa was calculated to be 0.923. It was concluded that there was strong effect of formative assessment techniques on students' learning styles. It was noted that there was highly significant difference among private and public sector students' perceptions concerning the effect of formative assessment techniques on students' learning styles at university level.

Keywords: Formative assessment techniques, Students' learning styles, University level

Introduction

Assessment is a wide term refers to all actions that student and teachers engage in to collect information that can be used to identify and get better learning and teaching. Teacher observation, group discussions and student work judgment as well as tests and homework are all included in this definition of assessment. When information from assessments is utilized to alter learning and teaching to fit the needs of students, assessment becomes formative assessment. This information can be used by teachers to make necessary educational adjustments, trying alternate instructional approach or provided that more chances for perform, when teacher recognize how their students are moving ahead and wherever they are having complexity. These behaviors have the potential to boost students' attainment (Black and Wiliam, 1998b).

López-Pastor (2009) stated that assessment was not previously regarded as an element of the process of learning. It had been the system for determining how much pupil has learned without devoting to the procedure through which learners acquire abilities, knowledge and competences. Brown, (2015) stated that however, in recent years, a tendency in higher education has evolved that separates assessment from the idea of grading and as an alternative integrates it into the learning process of students (Huisman 2018). López-Pastor (2009) suggested that formative assessment is a part of learning/instruction process that involves collecting data on a regular basis in order to provide feedback to students. Students can use feedback to change, decide and improve their learning experience. On the other hand, formative evaluation has an indirect influence on learners

(Tosuncuoglu 2018). In addition, it informs teachers about the effectiveness of their tactics. Teaching tactics should be geared to promote autonomous learning or ensuring that students have some influence more than their learning which foster pupil self-sufficiency (Pla-Campas, Arumí-Prat, Senye-Mir, & Ramírez, 2016).

The technique of identifying and responding to students' learning in order to improve that learning throughout the learning process is known as formative assessment (Liu, 2013). Formative evaluation is one of the crucial components of the teaching and learning process, according to Harris, Irving, and Peterson (2008). It allows teachers to use information to enhance students' learning and teaching. Improve student performance through formative evaluation. Formative assessment results are correlated with students' timely feedback and their increased performance (Hameed & Akhter, 2020). Greenstein (2010) stated that teachers can assist students in this quest by using formative assessment techniques. It's a means of determining what students know against what they don't. Students and teachers have traditionally been informed of the learning that has occurred in a variety of ways, a test given at the closing stages of a chapter or unit to assess how well students have understood and applied what they have learned (Kaya-Capocci, O'Leary, & Costello, 2022). Academic awards are typically given to pupils based on their performance on these assessments and then students and teachers both go on to the next portion of the curriculum. Formative assessment is distinct in that it "provides teachers with information they can use to update their teaching and increase students' learning while the race is still ongoing and the result can still be impacted" (Huisman, Saab, van den Broek, & van Driel, 2019).

Stiggins, (2007) and Bennett (2011) stated that the primary goal of formative assessment is to fix students' learning challenges in order to motivate them to study and enhance their academic accomplishment; consequently, it is not solely concerned with improving students' grades or achievement (Muho, & Leka, 2022). Improved student achievement and learning are linked to a number of factors. It is necessary to perform research on the aspects that influence learning of students and their improvement. According to Harris, Irving and Peterson (2008) formative assessment is one of the major important aspects of the instruction and learning process. It allows teachers to use information in order to improve students' knowledge and instruction (Gotwals, & Cisterna, 2022). Previous research has looked into formative assessment seeing that a way of improving students' achievement. Formative evaluation generates timely input from students which is linked to improved their academic achievement (Babinčáková, Ganajová, Sotáková, & Bernard, 2020).

Techniques for formative assessment are quick formative exercises that provide teachers with feedback on the lesson while also providing a brief overview and comments on students' learning. Teacher uses different techniques in classroom to enhance students learning and academic achievement. Formative assessment techniques also called classroom assessment techniques used by teacher. Techniques for formative assessment can have a significant impact on student learning and academic accomplishment (Nawaz, & Akbar,2022). Teachers can utilize a variety of techniques to collect crucial information about students' comprehension, provide feedback and help students to define and achieve meaningful learning goals. Each technique has the potential to improve student learning and achievement (Cauley, & McMillan, 2010).

There are a variety of formative assessment approaches that may be utilized in the classroom on a daily basis to help teachers to understand their students' development and abilities in a simple and effective manner (Asamoah, Shahrill, & Latif, 2022). There are a variety of formative assessment techniques that may be utilized in the classroom on a daily basis to help teachers to understand their students' development and abilities in a simple and efficient manner. Teacher Asks Questions, Asks Students

for Discussion, Sharing of Personal Experiences, Use One-Minute Paper, asking about portfolio, encourage positive behavior, appraises good values, Feedback to students, Story Telling, Multiple Choice Questions and Think Pair & share are some formative assessment techniques (Bashir, Karim, & Akram, 2020).

Learning is a process that happens in unclear circumstances with shifting fundamentals and is not entirely under the control of the student. Learning, which is defined as "meaningful information," focuses on connecting specialised information sets, and the connections that aid in our learning go beyond what we already know. Learning is not limited to individuals. The effect of experience on behavior is known as learning (De Houwer, Barnes-Holmes, & Moors, 2013). According to Watkins (2001) cited in Rodriguez & Cano (2007) when a student is presented with a learning environment, their intentions are referred to as their learning strategy as well as the manner in which they complete their assignments as evaluated by questionnaires (Hasnor, Ahmad & Nordin, 2013). Martin and Saljo (1976) refer surface, strategic and deep approaches to learning. Role-playing and the material being learned fall under the category of surface learning. The ideal learning strategy for students, particularly those in higher education, is deep learning, which pertains to substantive learning and understanding the context and significance of the material. Deep motivation and deep strategy are proposed as the components of deep learning by Biggs (1987) and Biggs and Leung (2001). Deep motivation is the desire to study or improve one's capacity to learn. A deep approach is one that seeks to understand by reading broadly and connecting new information to what is already known or experienced. Strategic learning identifies the ideal environment and resources for learning and efficiently manages time and effort (Chotitham, Wongwanich & Wiratchai, 2014).

When the formative assessment practices in Pakistan and in different parts of the world are analyzed, techniques for formative evaluation could be considered one of the most crucial elements in students' learning. Instead of assessing students for course grades, formative assessment aims to give students feedback. Formative assessment, which focuses on enhancing this activity, is an evaluation that is now being conducted but is not the entire process of an educational activity (Inozemtseva, & Morozova, 2022). In a nutshell, formative evaluation is analytical, stressing teacher and pupil feedback, and intricately interfering with the teaching process. In order to implement new or remediable measures as soon as possible, formative evaluation might assist in identifying the issues with instruction (Liu, 2013).

Problem Statement

Previous studies have shown that formative evaluation has the academic potential to improve students' learning. There have been numerous models of formative assessment established and much has been written about them. However, there are few quantitative studies on formative assessment in the literature and there are only a few relevant to this area. This scarcity becomes much more apparent in university classes. Therefore, realistic examples are necessary to explore the effect of formative assessment techniques on student’s learning and academic achievement at university level and also for the guidance of the teachers to implement it in the university level classrooms.

Formative assessment techniques and students’ learning had some definite effect and the researcher tried to find it. This research explores the effect of formative assessment techniques on students’ learning styles. Through this research it was observed and understood that how much formative assessment techniques effects on students’ learning and academic achievement (Thaçi, & Sopi, 2022). Overall, this study aims at provide confirmation whether formative assessment techniques have an effect on the students’ learning styles at university level. Additionally, it aims at explore whether formative assessment has same effect on understanding of the public and the private students and on the students of different cognitive ability

Significance of the study

This study suggests that teachers keep track of student progress on a regular basis to maintain learning goals in mind, so that teachers may help students resolve misconceptions before they deviate from the intended course of action and so that they have a clear goal to work toward. It also assists teachers and students in making decisions regarding students' learning and achievement by providing information. This research could be especially useful in guiding some policies aimed at closing the gap between students' learning and their expectations (the gap what learners know and what they require to learn). Policymakers develop policies based on the needs and interests of students to identify the gap. Teachers may have the chance to consider how they might support students in enhancing their academic performance and learning through this study.

Objectives of the study

The objectives of the study were to find out:

1- Effect of formative assessment techniques on students' learning styles at university level.

2- Difference between public and private sector regarding the effect of formative assessment techniques on students' learning styles at university level.

Hypotheses of the study

$H_0$1: There is no significant effect of formative assessment techniques on students' learning styles at university level.

$H_0$2: There is no significant difference between public and private sector regarding the effect of formative assessment techniques on students' learning styles at university level.

Research Methodology

The nature of the research was descriptive and quantitative data collection procedures were used to conduct it. Quantitative research is based on a positivistic philosophical framework/paradigm. All of the public and private universities in the Lahore district were represented in the population. There are a total of 37 universities in Lahore, 16 of which are public and 21 privates. A considerable sample of teachers and students should be included in the study. Sample was selected from the desired population in different steps. Sample was chosen using a multistage sampling method. Initially, the researcher identified two strata (public/private) using the stratified sampling technique. The entire population was then split into three areas (or clusters) based on location using the cluster sampling technique. From each cluster two private and one public university was selected by using simple random sampling. A Sample of 600 students (100 from each public university and 50 from each private university) and 60 teachers (10 from each public university and 5 from each private university) was selected through simple random sampling techniques.

Instrumentation

In this study, a questionnaire was employed to collect data. The five-point Likert scale structure of the questionnaire was deemed to be effective for data collecting. Options of the scale consisted of strongly disagree to strongly agree. There were two main parts of the questionnaires: Part one consisted of demographic information like gender, university type, GPA, Part two consisted of statements relevant to the research objectives of the study like formative assessment techniques and learning. Options of the respondent were demanded on the five-point Likert Scale. The tool was validated using both professional judgement and pilot testing. Questionnaires were given to three specialists about the instrument's interpretation, appropriateness, and organization. After revising instrument in the light of expert opinion, students' instrument was distributed to 30 participants for pilot testing. During the pilot testing, the researcher handed out the questionnaires to the participants. The respondents were asked about the statement's difficulty level and intelligibility. These respondents were not included in the study's final sample. In order to assess the reliability of the instrument, Cronbach's Alpha was determined. The overall score of the student's instrument was

0.923, while the minimum reliability requirement for Cronbach's Alpha is 0.75. This demonstrated the instrument's reliability.

Data Analysis and Findings

To find out the effect of formative assessment techniques on students' learning, simple linear regression analysis was used and to find the difference between public and private sector regarding the effect, independent sample t-test was used.

Table 1 Effect of formative assessment techniques on students' learning styles (N=600)

Factors	M	St. d
Teacher asks questions	3.6506	.80379
Multiple choice questions	3.7293	.65858
Think pair share	3.7394	.59150
Asks students for discussion	3.7139	.65833
Encourage positive behavior	3.7779	.66265
Feedback	3.7644	.62609
Sharing of personal experience	3.7683	.80703
Use one minute paper	3.7689	.81235
Portfolio	3.8550	.68476
Appraise good values	3.8306	.81513
Story telling	3.9022	.76832

The above table illustrate that with respect to eleven factors (teacher asks questions, multiple choice questions, think pair share, asks students for discussion, encourage positive behavior, feedback, sharing of personal experience, use one-minute paper, portfolio, appraise good values, storytelling) the mean score (M = 3.76; SD=0.711) of students' perception about the effect of formative assessment techniques on students learning styles was reflected toward high level of agreement. The mean score ranges from M=3.65 (Teacher asks questions) to M=3.90 (story telling). In context of the students' views, the factors of teacher asks questions (M=3.65; SD=0.80) were at low level of agreement, while multiple choice questions (M=3.72; SD=0.65), think pair share(M=3.73; SD=0.59), asks students for discussion(M=3.71; SD=0.65),encourage positive behavior (M = 3.77; SD = 0.66), feedback(M=3.76; SD=0.62), sharing of personal experience (M=3.76; SD=0.80), use one-minute paper (M = 3.76; SD = 0.81), portfolio(M=3.85; SD = 0.68), appraise good values(M=3.83; SD=0.81), storytelling(M=3.90; SD=0.76) were at higher level of agreement. Overall, effect of formative assessment techniques on students' learning styles were at moderate level.

Table 2 Effect of formative assessment techniques on students' learning styles

	B	Std. Error	Beta	t	Sig.
	.692	.253	.767	2.732	.007
Formative assessment techniques	.740	.062		11.841	.000

a. Dependent Variable: learning styles

The above table illustrates that effect of formative assessment techniques on students' learning styles. The formative assessment techniques have encouraging influence on students learning styles at university level. Significant differences existed between the groups, t (598) = 11.84, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.767); null hypothesis was rejected. Therefore, there was statistically significant effect of formative assessment techniques on students' learning styles at university level.

Table 3 Effect of Teacher ask questions on students' deep learning

	B	Std. Error	Beta	t	Sig.
	1.405	.273	.620	5.139	.000
Teacher asks questions	.541	.069		7.829	.000

a. Dependent Variable: deep learning

The above table illustrates that effect of teacher asks questions technique on students' deep learning. Significant differences existed between the groups, t (598) = 7.829, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.620); the null hypothesis was disproven. Therefore, there was statistically significant effect of teacher asks questions technique on students' deep learning at university level.

Table 4 Effect of Teacher ask questions on students' Surface learning

	B	Std. Error	Beta	t	Sig.
	1.978	.341	.466	5.806	.000
Teacher asks questions	.449	.086		5.210	.000

a. Dependent Variable: Surface learning

The above table illustrates that effect of teacher asks questions technique on students' surface learning. Significant differences existed between the groups, t (598) = 5.210, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.466); the null hypothesis was disproven. Therefore, there was statistically significant effect of teacher asks questions technique on students' surface learning at university level.

Table 5 Effect of Teacher ask questions on students' strategic learning

	B	Std. Error	Beta	t	Sig.
	1.561	.341	.550	4.582	.000
Teacher asks questions	.562	.086		6.516	.000

a. Dependent Variable: strategic learning

The above table illustrates that effect of teacher asks questions technique on students' strategic learning. Significant differences existed between the groups, t (598) = 6.516, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.550); the null hypothesis was disproven. Therefore, there was statistically significant effect of teacher asks questions technique on students' strategic learning at university level.

Table 6 Effect of multiple-choice questions on students' deep learning

	B	Std. Error	Beta	t	Sig.
	1.856	.257	.553	7.211	.000
Multiple choice questions	.420	.064		6.566	.000

a. Dependent Variable: deep learning

The above table illustrates that effect of multiple-choice questions technique on students' deep learning. Significant differences existed between the groups, t (598) = 6.566, p = 0.00, at

alpha level 0.05 (Standardized Coefficients=0.553); the null hypothesis was disproven. Therefore, there was statistically significant effect of multiple-choice questions technique on students' deep learning at university level.

Table 7 Effect of multiple-choice questions on students' surface learning

	B	Std. Error	Beta	t	Sig.
	1.882	.283	.559	6.651	.000
Multiple choice questions	.469	.070		6.669	.000

a. Dependent Variable: Surface learning

The above table illustrates that effect of multiple-choice questions technique on students' surface learning. Significant differences existed between the groups, t (598) = 6.669, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.559); the null hypothesis was disproven. Therefore, there was statistically significant effect of multiple-choice questions technique on students' surface learning at university level.

Table 8 Effect of multiple-choice questions on students' strategic learning

	B	Std. Error	Beta	T	Sig.
	1.825	.302	.549	6.039	.000
Multiple choice questions	.488	.075		6.500	.000

a. Dependent Variable: strategic learning

The above table illustrates that effect of multiple-choice questions technique on students' strategic learning. Significant differences existed between the groups, t (598) = 6.500, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.553); the null hypothesis was disproven. Therefore, there was statistically significant effect of multiple-choice questions technique on students' strategic learning at university level.

Table 9 Effect of think pair share technique on students' deep learning

	B	Std. Error	Beta	t	Sig.
	1.714	.223	.641	7.685	.000
Think pair share	.478	.058		8.267	.000

a. Dependent Variable: deep learning

The table above illustrates the effect of the think-pair-share technique on learners' deep learning. Since there were substantial differences among the groups, t(598) = 8.267, p = 0.00, at alpha level 0.05, the null hypothesis was disregarded (Standardized Coefficients=0.641). Therefore, the think pair share technique had a statistically significant impact on students' deep learning at the university level.

Table 10 Effect of think pair share technique on students' surface learning

	B	Std. Error	Beta	t	Sig.
	2.335	.287	.449	8.137	.000
Think pair share	.370	.074		4.970	.000

a. Dependent Variable: Surface learning

The table above illustrates how the think-pair-share technique affected students' surface learning. The difference between the groups was significant (t(598) = 4.970, p = 0.00, alpha level 0.05), rejecting the null hypothesis (Standardized Coefficients=0.449). Therefore, the think pair share technique had a statistically significant impact on students' surface learning at the university level.

Table 11 Effect of think pair share technique on students' strategic learning

	B	Std. Error	Beta	t	Sig.
	1.893	.281	.565	6.743	.000
Think pair share	.493	.073		6.777	.000

a. Dependent Variable: strategic learning

The table above illustrates the effect of the think-pair-share technique on students' strategic learning. Since there were substantial differences among the groups, the null hypothesis was disregarded (t(598) = 6.777, p = 0.00, at alpha level 0.05) (Standardized Coefficients=0.565). Therefore, the think pair share technique had a statistically significant impact on students' strategic learning at the university level.

Table 12 Effect of ask students for discussion technique on students' deep learning

	B	Std. Error	Beta	t	Sig.
	1.868	.218	.617	8.584	.000
Ask student for discussion	.494	.064		7.767	.000

a. Dependent Variable: deep learning

The above table illustrates that effect of ask students for discussion technique on students' deep learning. Significant differences existed between the groups, t (598) = 7.767, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.617); the null hypothesis was disproven. Therefore, there was statistically significant effect of ask students for discussion technique on students' deep learning at university level.

Table 13 Effect of ask students for discussion technique on students' surface learning

	B	Std. Error	Beta	t	Sig.
	2.465	.276	.428	8.924	.000
Ask student for discussion	.378	.081		4.693	.000

a. Dependent Variable: Surface learning

The above table illustrates that effect of ask students for discussion technique on students' surface learning. Significant differences existed between the groups, t (598) = 4.693, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.428); null hypothesis was excluded. Therefore, there was statistically significant effect of ask students for discussion technique on students' surface learning at university level.

Table 14 Effect of ask students for discussion technique on students' strategic learning

	B	Std. Error	Beta	T	Sig.
	2.800	.309	.301	9.067	.000
Ask student for discussion	.282	.090		3.125	.002

a. Dependent Variable: strategic learning

The above table illustrates that effect of ask students for discussion technique on students' strategic learning. Significant differences existed between the groups, t (598) = 3.125, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.301); null hypothesis was excluded. Therefore, there was statistically significant effect of ask students for discussion technique on students' strategic learning at university level.

Table 15 Effect of encourage positive behavior technique on students' deep learning

	B	Std. Error	Beta	t	Sig.
	1.564	.298	.557	5.252	.000
Encourage positive behavior	.536	.081		6.631	.000

a. Dependent Variable: deep learning

The above table illustrates that effect of encourage positive behavior technique on students' deep learning. Significant differences existed between the groups, t (598) = 6.631, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.557); null hypothesis was excluded. Therefore, there was statistically significant effect of encourage positive behavior technique on students' deep learning at university level.

Table 16 Effect of encourage positive behavior technique on students' surface learning

	B	Std. Error	Beta	t	Sig.
	2.412	.373	.339	6.476	.000
Encourage positive behavior	.361	.101		3.566	.001

a. Dependent Variable: Surface learning

The above table illustrates that effect of encourage positive behavior technique on students' surface learning. Significant differences existed between the groups, t (598) = 3.566, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.339); null hypothesis was excluded. Therefore, there was statistically significant effect of encourage positive behavior technique on students' surface learning at university level.

Table 17 Effect of encourage positive behavior technique on students' deep learning

	B	Std. Error	Beta	t	Sig.
	2.036	.381	.417	5.339	.000
Encourage positive behavior	.471	.104		4.542	.000

a. Dependent Variable: strategic learning

The above table illustrates that effect of encourage positive behavior technique on students' strategic learning. Significant differences existed between the groups, t (598) = 4.542, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.417); null hypothesis was excluded. Therefore, there was statistically significant effect of encourage positive behavior technique on students' strategic learning at university level.

Table 18 Effect of feedback technique on students' deep learning

	B	Std. Error	Beta	t	Sig.
	1.869	.263	.541	7.100	.000
Feedback	.214	.034		6.364	.000

a. Dependent Variable: deep learning

The above table illustrates that effect of feedback on students' deep learning. Significant differences existed between the groups, t (598) = 6.364, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.541); null hypothesis was excluded. Therefore, there was statistically significant effect of feedback on students' deep learning at university level.

Table 19 Effect of feedback technique on students' surface learning

	B	Std. Error	Beta	t	Sig.
	2.503	.322	.364	7.774	.000
Feedback	.159	.041		3.866	.000

a. Dependent Variable: Surface learning

The impact of feedback on students' surface learning is depicted in the above table. There were differences between the groups that were statistically significant (t(598) = 3.866, p = 0.00, Standardized Coefficients=0.364); the null hypothesis was rejected. Consequently, feedback had a statistically significant impact on students' surface learning at the university level.

Table 20 Effect of feedback technique on students' strategic learning

	B	Std. Error	Beta	t	Sig.
	2.516	.344	.345	7.318	.000
Feedback	.160	.044		3.634	.000

a. Dependent Variable: strategic learning

The impact of feedback on students' strategic learning is depicted in the above table. There were differences between the groups that were statistically significant (t(598) = 3.634, p = 0.00, Standardized Coefficients=0.345); the null hypothesis was rejected. Feedback had a statistically significant impact on students' strategic learning at the university level as a result.

Table 21 Effect of sharing personal experience technique on students' deep learning

	B	Std. Error	Beta	t	Sig.
	2.386	.246	.428	9.691	.000
Sharing personal experience	.353	.075		4.683	.000

a. Dependent Variable: deep learning

The above table illustrates that effect of sharing personal experiences technique on students' deep learning. Significant differences existed between the groups, t (598) = 4.683, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.428); null hypothesis was excluded. Therefore, there was statistically significant effect of sharing personal experiences technique on students' deep learning at university level.

Table 22 Effect of sharing personal experience technique on students' surface learning

	B	Std. Error	Beta	t	Sig.
	2.754	.284	.334	9.711	.000
Sharing personal experience	.305	.087		3.512	.001

a. Dependent Variable: Surface learning

The above table illustrates that effect of sharing personal experiences technique on students' surface learning. Significant differences existed between the groups, t (598) = 3.512, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.334); null hypothesis was excluded. Therefore, there was statistically significant effect of sharing personal experiences technique on students' surface learning at university level.

Table 23 Effect of sharing personal experience technique on students' strategic learning

	B	Std. Error	Beta	t	Sig.
	2.600	.296	.372	8.786	.000
Sharing personal experience	.360	.091		3.970	.000

a. Dependent Variable: strategic learning

The above table illustrates that effect of sharing personal experiences technique on students' strategic learning. Significant differences existed between the groups, t (598) = 3.970, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.372); null hypothesis was excluded. Therefore, there was statistically significant effect of sharing personal experiences technique on students' strategic learning at university level.

Table 24 Effect of use of one-minute paper technique on students' deep learning

	B	Std. Error	Beta	t	Sig.
	1.923	.249	.551	7.738	.000
Use one minute paper	.417	.064		6.537	.000

a. Dependent Variable: deep learning

The above table illustrates that effect of use one-minute paper technique on students' deep learning. Significant differences existed between the groups, t (598) = 6.537, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.551); null hypothesis was excluded. Therefore, there was statistically significant effect of use one-minute paper technique on students' deep learning at university level.

Table 25 Effect of use of one-minute paper technique on students' surface learning

	B	Std. Error	Beta	t	Sig.
	2.504	.304	.383	8.239	.000
Use one minute paper	.320	.078		4.109	.000

a. Dependent Variable: Surface learning

The above table illustrates that effect of use one-minute paper technique on students' surface learning. Significant differences existed between the groups, t (598) = 4.109, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.383); null hypothesis was excluded. Therefore, there was statistically significant effect of use one-minute paper technique on students' surface learning at university level.

Table 26 Effect of use of one-minute paper technique on students' strategic learning

	B	Std. Error	Beta	t	Sig.
	1.943	.295	.535	6.598	.000
Use one minute paper	.474	.076		6.271	.000

a. Dependent Variable: strategic learning

The above table illustrates that effect of use one-minute paper technique on students' strategic learning. Significant differences existed between the groups, t (598) = 6.271, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.535); null hypothesis was excluded. Therefore, there was statistically significant effect of use one-minute paper technique on students' strategic learning at university level.

Table 27 Effect of portfolio technique on students' deep learning

	B	Std. Error	Beta	t	Sig.
	1.760	.249	.587	7.068	.000
Portfolio	.466	.065		7.184	.000

a. Dependent Variable: deep learning

The above table illustrates that effect of portfolio technique on students' deep learning. Significant differences existed between the groups, t (598) = 7.184, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.587); null hypothesis was excluded. Therefore, there was statistically significant effect of use portfolio technique on students' deep learning at university level.

Table 28 Effect of portfolio technique on students' surface learning

	B	Std. Error	Beta	t	Sig.
	2.706	.323	.308	8.366	.000
Portfolio	.270	.084		3.207	.002

a. Dependent Variable: Surface learning

The above table illustrates that effect of portfolio technique on students' surface learning. Significant differences existed between the groups, t (598) = 3.207, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.308); null hypothesis was excluded. Therefore, there was statistically significant effect of use portfolio technique on students' surface learning at university level.

Table 29 Effect of portfolio technique on students' strategic learning

	B	Std. Error	Beta	t	Sig.
	2.032	.314	.491	6.477	.000
Portfolio	.456	.082		5.579	.000

a. Dependent Variable: strategic learning

The above table illustrates that effect of portfolio technique on students' strategic learning. Significant differences existed between the groups, t (598) = 5.579, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.491); null hypothesis was excluded. Therefore, there was statistically significant effect of use portfolio technique on students' strategic learning at university level.

Table 30 Effect of appraise good value technique on students' deep learning

	B	Std. Error	Beta	t	Sig.
Appraise good values	1.237	.246	.688	5.023	.000

	.577	.061		9.398	.000

a. Dependent Variable: deep learning

The above table illustrates that effect of appraise good values technique on students' deep learning. Significant differences existed between the groups, t (598) = 9.398, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.688); null hypothesis was excluded. Therefore, there was statistically significant effect of appraise good values technique on students' deep learning at university level.

Table 31 Effect of appraise good value technique on students' surface learning

	B	Std. Error	Beta	t	Sig.
	1.345	.284	.654	4.735	.000
Appraise good values	.606	.071		8.547	.000

a. Dependent Variable: Surface learning

The above table illustrates that effect of appraise good values technique on students' surface learning. Significant differences existed between the groups, t (598) = 8.547, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.654); null hypothesis was excluded. Therefore, there was statistically significant effect of appraise good values technique on students' surface learning at university level.

Table 32 Effect of appraise good value technique on students' strategic learning

	B	Std. Error	Beta	t	Sig.
	1.135	.293	.676	3.875	.000
Appraise good values	.664	.073		9.083	.000

a. Dependent Variable: strategic learning

The above table illustrates that effect of appraise good values technique on students' strategic learning. Significant differences existed between the groups, t (598) = 9.083, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.676); null hypothesis was excluded. Therefore, there was statistically significant effect of appraise good values technique on students' strategic learning at university level.

Table 33 Effect of storytelling technique on students' deep learning

	B	Std. Error	Beta	t	Sig.
	2.275	.310	.378	7.344	.000
Story telling	.357	.088		4.039	.000

a. Dependent Variable: deep learning

The above table illustrates that effect of storytelling technique on students' deep learning. Significant differences existed between the groups, t (598) = 4.039, p = 0.00, at alpha level 0.05 (Standardized Coefficients=0.378); null hypothesis was excluded. Therefore, there was statistically significant effect of storytelling technique on students' deep learning at university level.

Table 34 Effect of storytelling technique on students' surface learning

Story telling	B	Std. Error	Beta	t	Sig.

	3.098	.364	.172	8.507	.000
	.179	.104		1.728	.087

a. Dependent Variable: Surface learning

The above table illustrates that effect of storytelling technique on students' surface learning. Significant differences existed between the groups, t (598) = 1.728, p = 0.087, at alpha level 0.05 (Standardized Coefficients=0.378); null hypothesis was accepted. Therefore, there was statistically not significant effect of storytelling technique on students' surface learning at university level.

Table 35 Effect of storytelling technique on students' strategic learning

	B	Std. Error	Beta	t	Sig.
	3.508	.391	.058	8.972	.000
Story telling	.064	.111		.577	.565

a. Dependent Variable: strategic learning

The above table illustrates that effect of storytelling technique on students' strategic learning. Significant differences existed between the groups, t (598) = .577, p = 0.565, at alpha level 0.05 (Standardized Coefficients=0.058); null hypothesis was accepted. Therefore, there was statistically not significant effect of storytelling technique on students' strategic learning at university level.

Null hypothesis ($H_0$1)

There is no significant difference between public and private sector regarding the effect of formative assessment techniques on students' learning styles at university level.

Table 36 Difference between Private and Public Sector Students' Perceptions

Variable	**University Sector**	**N**	**Mean**	**Std. Deviation**	**t-Value (df = 598)**	**p ($\propto$ = 0.05)**
Formative assessment technique	Public	300	3.8370	.40229	3.425	0.001
	Private	300	3.7085	.51015		

The above table illustrates that with respect to eleven factors (teacher asks questions, multiple choice questions, think pair share, asks students for discussion, encourage positive behavior, feedback, sharing of personal experience, use one-minute paper, portfolio, appraise good values, storytelling). Public universities students (M = 3.83, S.D. = 0.402) reflected higher level of agreement about formative assessment technique in students learning, Private university students, on the other hand, showed a low level of agreement about the use of formative assessment techniques in students' learning (M = 3.70, S.D. = 0.510). With an alpha level of 0.05, the difference in mean scores between the groups was significant (t(598) = 3.425, p = 0.001). The null hypothesis was discarded since there was a statistically significant distinction among students at public and private universities with regard to the use of formative assessment strategies at the university level.

Table 37 Difference between Private and Public Sector Students' Perceptions

Factor	University Sector	N	Mean	Std. Deviation	t-Value (df = 598)	p ($\propto$ = 0.05)
Teacher asks questions	Public	300	3.5900	.81197	-1.849	0.065
	Private	300	3.7111	.79225		

In terms of how formative assessment procedures affected students' learning styles, the table demonstrates the absence of a statistically substantial difference among the groups. Students at private colleges were more likely to agree with the statement that teachers should ask questions to help students learn, whereas students at public universities were less likely to agree (M = 3.59, S.D. = 0.811). At the 0.05 alpha level, the difference between the groups' mean scores was not statistically significant (t(598) = -1.849, p = 0.065). As a result, when it came to the teacher's questioning during class at the university level, there was statistically no difference between students at public and private universities, therefore the null hypothesis was accepted.

Table 38 Difference between Private and Public Sector Students' Perceptions

Factor	University Sector	N	Mean	Std. Deviation	t-Value (df = 598)	p ($\propto$ = 0.05)
Multiple choice questions	Public	300	3.7360	.68401	.248	0.804
	Private	300	3.7227	.63321		

The table shows that there were no statistically significant differences between the groups when it came to how formative assessment strategies affected students' learning. Students from private colleges (M = 3.72, S.D. = 0.633) and public universities (M = 3.73, S.D. = 0.684) showed higher levels of agreement on multiple-choice questions in their learning. The difference in mean scores among the groups was not significant statistically at alpha level 0.05 (t(598) =.248, p = 0.804). As a result, there was no statistically significant difference in answers to the multiple-choice questions at the university level between students from public and private universities; therefore, the null hypothesis was accepted.

Table 39 Difference between Private and Public Sector Students' Perceptions

Factor	University Sector	N	Mean	Std. Deviation	t-Value (df = 598)	p ($\propto$ = 0.05)
Think pair share	Public	300	3.7752	.54086	1.482	0.139
	Private	300	3.7037	.63704		

The table shows that there were no statistically significant differences between the groups when it came to how formative assessment strategies affected students' learning. Students from private colleges (M = 3.70, S.D. = 0.637) showed low levels of agreement about think-pair-share in students' learning, while students from public universities (M = 3.77, S.D. = 0.540) showed

higher levels of agreement. The difference in mean scores among the groups was not significant statistically at alpha level 0.05 (t (598) = 1.482, p = 0.139). Therefore, there was no statistically significant disparity in the think pair share at the university level between students at public and private universities; therefore, the null hypothesis was accepted.

Table 40 Difference between Private and Public Sector Students' Perceptions

Factor	University Sector	N	Mean	Std. Deviation	t-Value (df = 598)	p ($\propto$ = 0.05)
Asks students for discussion	Public	300	3.7856	.63023	2.680	0.008
	Private	300	3.6422	.67879		

The table shows that there were substantial statistical differences between the groups when it came to how formative assessment strategies affected students' learning. Higher levels of agreement on asking students for discussion in their learning were shown by students at public universities (M = 3.78, S.D. = 0.630), but lower levels of agreement were shown by students at private universities (M = 3.64, S.D. = 0.678). The difference in mean scores among the groups was not significant statistically at alpha level 0.05 (t(598) = 2.680, p = 0.008). As a result, when students were asked to participate in a conversation at the university level, there was a statistically significant difference between those attending public and private universities, therefore the null hypothesis was rejected.

Table 41 Difference between Private and Public Sector Students' Perceptions

Factor	University Sector	N	Mean	Std. Deviation	t-Value (df = 598)	p ($\propto$ = 0.05)
Encourage positive behavior	Public	300	3.8676	.56291	3.346	0.001
	Private	300	3.6881	.73936		

The table shows that there were substantial statistical differences between the groups when it came to how formative assessment strategies affected students' learning. Students from private colleges (M = 3.68, S.D. = 0.739) showed low levels of agreement on encouraging positive behaviour in students' learning, whereas students from public universities (M = 3.86, S.D. = 0.562) showed higher levels of agreement. The difference in mean scores among the groups was not significant statistically at alpha level 0.05 (t(598) = 3.346, p = 0.001). As a result, there was a statistically significant distinction among students at public and private colleges in the encouragement of positive behaviour during academic study; therefore, the null hypothesis was rejected.

Table 42 Difference between Private and Public Sector Students' Perceptions

Factor	University Sector	N	Mean	Std. Deviation	t-Value (df = 598)	p ($\propto$ = 0.05)
Feedback	Public	300	3.8708	.52067	4.223	0.000

	Private	300	3.6579	.70103	

The table shows that there were substantial statistical differences between the groups when it came to how formative assessment strategies affected students' learning. Higher levels of agreement on feedback in students' learning were shown by students at public universities (M = 3.87, S.D. = 0.520), compared to private university students (M = 3.65, S.D. = 0.701), who showed lower levels of agreement. The difference in mean scores among the groups was not significant statistically at alpha level 0.05 (t (598) = 4.223, p = 0.000). As a result, there was a statistically significant difference between students at public and private universities in terms of feedback throughout university-level learning; therefore, the null hypothesis was rejected.

Table 43 Difference between Private and Public Sector Students' Perceptions

Factor	**University Sector**	**N**	**Mean**	**Std. Deviation**	**t-Value (df = 598)**	**p ($\propto$ = 0.05)**
Sharing of personal experiences	Public	300	3.8333	.67745	1.978	0.048
	Private	300	3.7033	.91508		

The table shows that there were substantial statistical differences between the groups when it came to how formative assessment strategies affected students' learning. Students from private colleges (M = 3.70, S.D. = 0.915) showed low levels of agreement on sharing personal experiences in students' learning, whereas students from public universities (M = 3.83, S.D. = 0.677) showed higher levels of agreement. The difference in mean scores among the groups was not significant statistically at alpha level 0.05 (t (598) = 1.978, p = 0.048). Because of this, there was a statistically significant difference in the amount of personal experience that students from private and public colleges shared at the university level; therefore, the null hypothesis was rejected.

Table 44 Difference between Private and Public Sector Students' Perceptions

Factor	**University Sector**	**N**	**Mean**	**Std. Deviation**	**t-Value (df = 598)**	**p ($\propto$ = 0.05)**
Use one-minute paper	Public	300	3.8389	.73276	2.117	0.035
	Private	300	3.6989	.88048		

The table shows that there were substantial statistical differences between the groups when it came to how formative assessment strategies affected students' learning. Students from private colleges (M = 3.69, S.D. = 0.880) showed low levels of agreement about the utility of one-minute papers in students' learning, whereas students from public universities (M = 3.83, S.D. = 0.732) showed higher levels of agreement. The difference in mean scores among the groups was not significant statistically at alpha level 0.05 (t(598) = 2.117, p = 0.035). As a result, there was a statistically significant variation in the use of the one-minute paper at the collegiate level between students at private and public universities; therefore, the null hypothesis was rejected.

Table 45 Difference between Private and Public Sector Students' Perceptions

Factor	University Sector	N	Mean	Std. Deviation	t-Value (df = 598)	p (∝ = 0.05)
Portfolio	Public	300	3.9540	.61303	3.576	0.000
	Private	300	3.7560	.73748		

The table shows that there were substantial statistical differences between the groups when it came to how formative assessment strategies affected students' learning. Higher levels of agreement about the use of portfolios in students' learning were shown by students at public universities (M = 3.95, S.D. = 0.613), compared to private university students (M = 3.75, S.D. = 0.737), who showed lower levels of agreement. The difference in mean scores among the groups was not significant statistically at alpha level 0.05 (t(598) = 3.576, p = 0.000). As a result, there was a statistically significant difference in the usage of portfolio by students at private and public universities; therefore, the null hypothesis was rejected.

Table 46 Difference between Private and Public Sector Students' Perceptions

Factor	University Sector	N	Mean	Std. Deviation	t-Value (df = 598)	p (∝ = 0.05)
Appraise good values	Public	300	3.9578	.77570	3.867	0.000
	Private	300	3.7033	.83481		

The table shows that there were substantial statistical differences between the groups when it came to how formative assessment strategies affected students' learning. While private university students (M = 3.70, S.D. = 0.834) showed low levels of agreement regarding evaluating excellent values in students' learning, public university students (M = 3.95, S.D. = 0.775) showed higher levels of agreement. The difference in mean scores among the groups was not significant statistically at alpha level 0.05 (t(598) = 3.867, p = 0.000). As a result, there was a statistically significant difference in student evaluations of excellent values at the university level between students at public and private universities; therefore, the null hypothesis was rejected.

Table 47 Difference between Private and Public Sector Students' Perceptions

Factor	University Sector	N	Mean	Std. Deviation	t-Value (df = 598)	p (∝ = 0.05)
Story telling	Public	300	3.9978	.71715	3.068	0.002
	Private	300	3.8067	.80621		

The table shows that there were substantial statistical differences between the groups when it came to how formative assessment strategies affected students' learning. Public university students (M = 3.99, S.D. = 0.717) showed a higher degree of agreement with the use of stories in the classroom, private university students, on the other hand, demonstrated a lower degree of agreement (M = 3.80, S.D. = 0.806). According to statistics, the difference in mean

scores between the groups was not statistically significant ($t(598) = 3.068$, $p = 0.002$) at alpha level 0.05. Since there was a statistically significant disparity between students at public and private institutions in terms of their story at the university level, the null hypothesis was disregarded.

Discussion and Conclusion

The university students' perceptions about eleven factors (teacher asks questions, multiple choice questions, think pair share, asks students for discussion, encourage positive behavior, feedback, sharing of personal experience, use one-minute paper, portfolio, appraise good values, storytelling) the mean score ($M = 3.76$; $SD=0.71$) of students' perception about the effect of formative assessment technique on students learning styles at university level were reflected at high level of agreement. It is concluded that formative assessment techniques have significant effect on students' learning styles.

Weurlander et al., (2012) stated that students are encouraged to study because formative evaluation makes them extra conscious of students learning procedure in terms of what students already identify and what they also require to be taught (Senye-Mir, Arumí-Prat, Pla-Campas, & Ramírez, 2016). When teacher asks questions during class, students' learning improves, because teacher catches students' attentions. Students are actively involved in learning process. Multiple-choice questions are the foundation of a noteworthy segment of assessment in students' learning. Multiple choice questions have positive impact on students' learning. Think pair share technique mixes communication and thinking. This will enable teachers to identify and immediately correct any errors in their pupils' thinking. The teacher and students have an opportunity to comment on student ideas throughout the class discussion (Cullinane 2011).

It was determined that there is a significantly substantial impact on students' learning styles when teachers ask for discussion. Discussions that are prompted by teachers help students learn better because they give them the opportunity to process information rather than just absorb it. Different skills are required for lecturing and guiding an argument. Teacher encourages positive behavior of students and sharing his personal experience during class to improve students' learning. Teachers share personal experiences with pupils in order to inspire them to share their own tales (Maharani, & Prastikawa, 2022). Teacher gives one-minute paper to students to ask what you found useful in today's class; students are actively involved in learning and ask about their opinion. The focus of the minute paper is on understanding and the instructor gives pupils a limited opportunity to describe the main issues (Purcell, 2014). Learners can reflect on their learning and evaluate themselves through a portfolio review, and gain a more in-depth understanding of what they are studying than a simple explanation.

Teacher appraises good values in students and it helps students to enlarge and guide their behavior, beliefs and attitude. Students should always receive feedback on the average (the learning activity) during formative assessment. Students receive feedback that not only informs them of their outcomes other than it allows students to adjust their learning procedure, make the decisions about it and as a result, have new options for achieving the assessed competencies (Ismail, & Tini, 2020). When teacher tells stories in class, students' self-esteem enhances, students develop critical thinking skills, students teach ethics and students teach cultural sensitivity. It was observed that storytelling techniques have a significantly substantial impact on students' deep learning but have no discernible impact on their surface as well as strategic learning (Joseph, 2022). But overall, formative assessment techniques effect on students' learning styles are very high. It improves students learning at university level.

Difference between private and public sector students' regarding the effect of formative assessment technique on students' learning styles with respect to eleven factors (teacher asks questions, multiple choice questions, think pair

share, asks students for discussion, encourage positive behavior, feedback, sharing of personal experience, use one-minute paper, portfolio, appraise good values, storytelling) are significant. Public universities students (M = 3.83, S.D. = 0.402) reflected higher agreement level about formative assessment technique in students learning, Private university students, on the other hand, showed a low level of agreement about the use of formative assessment techniques in students' learning (M = 3.70, S.D. = 0.510). With an alpha level of 0.05, the difference in mean scores between the groups was significant (t(598) = 3.425, p = 0.001). As a result, there was a statistically significant disparity among a student at public and private universities in terms of how formative assessment techniques affected their university-level learning styles.

The difference between public and private universities' teachers with respect to effect of teachers asks questions, multiple-choice questions and think pair share techniques on students' learning styles at university level were not statistically significant. the differences between professors at private and public universities with respect to effect of Asks students for discussion, encourage positive behavior, Feedback, sharing of personal experiences, use one-minute paper, Portfolio, appraise good values, and Story telling on students' learning styles at university level were highly statistically significant. Majority of students agreed that there is an encouraging effect of formative assessment technique on students learning styles at university level.

In contrast, teachers were dominant as formative assessment performance as effective teacher directed, which closely linked to their perception that formative assessment contingent on the teacher. Formative assessment techniques were used more often considered gaining a specific purpose, or sometimes in their teaching, and delightfully, the teachers were influential as formative assessment performance as individual teacher directed. Additionally, it was noted that teachers working within this paradigm had limited expertise with formative assessment techniques and practical teaching strategies (Shaikh, Shah, & Mirza, 2020).

Overall, it was determined that the use of formative assessment techniques significantly contributes to improving student learning at the university level. Additionally, students in the private sector have a positive outlook on how formative assessment methods affect students' learning preferences. Additionally, it is believed that formative evaluation methods boost students' self-esteem and motivation while simultaneously enhancing their academic achievement. The study discovered how formative assessment methods affected students' learning preferences.

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