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Effect of Frayer Model, Choral Response and Muddiest-Point on Students' Academic Achievement

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Abstract

The paper addresses the effect of Frayer Model, Choral Response and Muddiest Point on the academic achievement of undergraduate students in this study. This study employed quasi-experimental design. The sample was 87 undergraduates who were already divided into two groups that were later named as experimental group and control group by using fishbowl method. Before starting the experiment, pretest of both the groups was taken to check either both groups are at same level or not. After pretest, treatment was applied in different timeframes for the period of sixteen weeks and then they were post tested. Pretest and posttest of both the groups were same that were developed by observing basic rules and guidelines of test development. The tests were validated by five experts in the field of assessment and curriculum development. The reliability was ensured by psychometric analysis after administering these on 200 undergraduate students. Paired sample t-test was applied to investigate the effect of assessment methods on students' achievement. Independent sample t-test was applied in order to compare two groups, one that was given the treatment and the other was not given any treatment. The results of the study explored that the mean achievement scores of Muddiest Point was greater than the other two methods of assessment i.e. Frayer Model and Choral Response.

***Key Words**: Frayer Model, Choral Response, Muddiest-Point, Academic Achievement*

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Introduction

The field of "Educational Assessment" encompasses the set of methods, processes and techniques for designing, collecting, scoring, analysing, and interpreting the evidences about students' learning. These methods are eventually supportive in making decisions during teaching (material needs to be taught again or differently), learning (material a student need to revise?), administration (students ready for promotion to the next grade), policymaking (areas of the curriculum need teacher development), and accountability(students be given the supreme scholarship prize). The process depends on expert judgment and statistical analysis of the quality of the assessment methods, their relationship to intended objective or outcomes, and the validity of consequences (Brown, 2018).

Assessment is important at all levels as it is an essential tool for improving understanding of the students when it is considered against realistic standards and thoughtful expectations (Stake, Contreras, & ArbesúIt, 2018). It is both qualitative and quantitative in nature and requires strong, theoretically well-grounded knowledge of learning materials and sequences (curriculum), instructional actions (teaching), and what it means for students to 'know' something (learning) (Lombardi, 2018).

In our educational structure, assessment is basically an ongoing process to assemble, evaluate and reflect on the facts that are involved in improving students' learning. It always provides value judgment based on the results desirability (Brookhart & Nitko, 2015). Good assessment begins with a curriculum, which clearly mentions the expectation of learning, understanding and making sure the progress of students (Furco & Moely, 2012). It has its roots strongly embedded in the curriculum. The first principle of assessment is actually its alignment with the curriculum. Teachers have to set clear criteria and standards in order to design appropriate assessments of students. In the ebb and flow of classroom activities, the teacher may rely on an intuitive sense of what quality and progress look like; this is sometimes called 'assessment as learning'. However, the more explicit these criteria and standards are, the more effective the teaching will be and the more credible assessment decisions will be. Knowledge about criteria and progressions is part of teachers' content knowledge—the teacher must know what mathematics at Grade X looks like in terms of content and difficulty in order to assess it. This is true for all learning areas at all levels (Brown, 2018).

Figure 1: The Curriculum, Teaching, Learning, and Assessment Cycle (Brown, 2018)

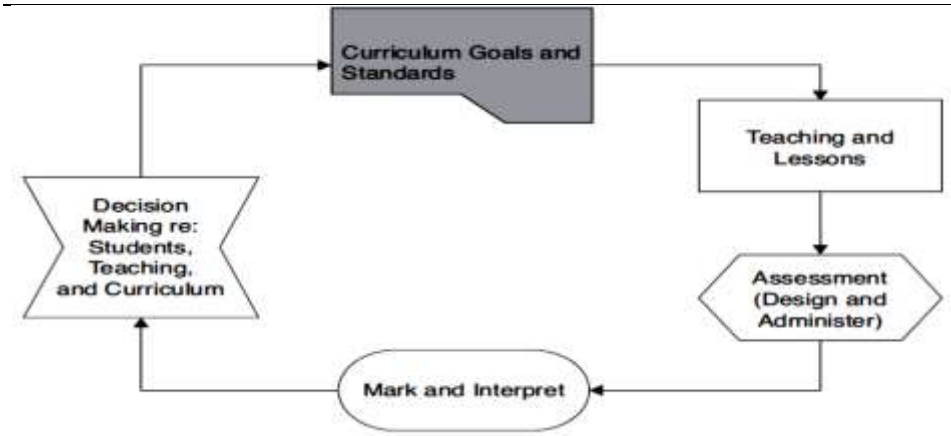


Figure 1 shows an ideal assessment cycle: the content that we want to teach is decided, teaching is implemented, assessments are designed, and interpretations about progress and needs are made. With these in hand, instructors and learners begin to plan what they should do next; teachers think about what they need to do with the curriculum and students, while students are expected to consider what changes they might make. Having made these updated plans, teachers begin a new round of curriculum planning and teaching of the valued content.

The assessment of student learning outcomes is often presented as a variation, regardless of level. on the same standard cycle of: (a) identifying and articulating student-learning outcomes; (b) gathering and analyzing information about the students' achievement of these outcomes; and (c) using the information that was gathered to improve student learning (McConnell & Doolittle, 2018). They further argue that less successful course-embedded assessment initiatives suffer from a critical problem within the assessment cycle - a failure of alignment. Whereas faculty may have learned that the measures they employ to assess student learning must correspond to the learning outcomes they have articulated.

Thompson and Wiliam (2008) were two eminent researchers in the field of educational assessment who presented alternative assessment methods contrasting to traditional assessment methods. These alternative assessment methods attracted the educators and they were of the view that use of various kinds of assessment methods in teaching helps to improve students' learning. There are various kinds of assessment based on the course content and material for classroom instead of traditional objective or final essay exams. That might be at the start, middle or end of the instruction. Some may be in the form of summaries, oral explanations, extended abstracts in clear, concise statements of the essential idea of topic, lecture, and play etc. (Doolittle, 2014). It may be video logs, or "vlogs" in which student reflect upon what she had learned related to a specific lesson/aspect of a course (Parkes & Kajder, 2010). From a number of assessment

methods listed; Frayer Model, Choral Response and Muddiest Point were used as assessment methods in this study due to their nature of implementation along different intervals of time.

Frayer Model is an assessment method that was used in this study along with other two methods. Frayer Model was developed in 1969 by Dorothy Frayer and her fellows at the University of Wisconsin, USA. They design this method to reinforce students in understand different concepts as well as to improve their learning. Generally, Frayer model is staple and popular in many classrooms. It is basically a graphic and visual oriented model, which might be helpful for students in selecting, and organizing information related to a key concept. It is helpful in identifying the misconceptions of students during learning (Buehl, 2014). It may be used in the start of lecture to check the previous knowledge of the students. Buehl (2003) and Frayer, Fredrick and Klausmeier (1969) discovered that the main purpose of this model is to give opportunities to the students to cover different aspects of a topic by defining its familiar and unfamiliar concepts. It is basically a grid design that is split into four portions i.e. essential characteristics, non-essential characteristics, examples and non-examples. The material to be written in the boxes should be developed by the students instead of coping it from the book. In doing assessment through Frayer Model, structure and thinking process developed among students and it ultimately improves their learning. It also provides opportunities to the students to get an insight of the topic and develops the analyzing and synthesizing skills among them (Estacio & Martinez, 2017). Moreover, it can be supportive for the teachers to check the prior understanding and knowledge of the students related to a concept and build ideas to move forward.

Choral Responding as assessment method is also used in this study that capitalizes on rapid instructional process in order to increase response rate of students towards instruction. Usually, a teacher uses choral responding when they want to increase response rate of students and minimize the challenging behavior in contrast of traditional question-answering method such as raising hands etc. (Haydon , Marsicano & Scott, 2013). In this, teachers demand the short responses from the students either to check the understanding about any concept or to improve the students' involvement in the classroom (Heward, 1994; Tincani, 2011). Recently, a number of soft-wares were also identified by Twyman and Heward (2016) to help students in active responding. It may be used at any point during instruction but in the middle of the instruction it is used when a short and consistent answer is required in order to save time of the class for other activities (Blackwell & Mclaughlin, 2015).

Muddiest Point is third method of assessment that is used in this study. Mostly this method is used at the time of concluding the instruction to find out the muddy point (point in which students feel difficulty). Although, this method can also be used during instruction when a teacher likely to have an idea about the understanding of the students

related to a certain topic. A teacher can get feedback about the content matter they are being taught as well as about their teaching after applying this method (Beck, 2011). Through this technique, students are asked to write down a quick response of a question. It is quite resourceful and efficient because it can provide an instant information in low investment of time and energy (Ornaghi, Pepe, & Grazzani, 2016).

Significance of the Study

The present research will help teachers, students, and stakeholders at higher education in regards of improving students' achievement. It will encourage teachers to use different assessment methods in their instruction instead of using the traditional one. It will also motivate them to use the assessment methods effectively with in the duration of the class. The study will also help the students in a way to help them learn and to be assessed in new ways. It will help them to diagnose the learning difficulties in various ways and to learn on the grounds. It may help the policy makers and curriculum developers in a way to include different assessment methods at university level curriculum instead of just mid and final term assessments.

Objectives of the Study

Following were the research objectives for this study.

1. Investigate the effect of Frayer Model, Choral Response and Muddiest Point on students' academic achievement.
2. Compare the students' academic achievement with and without using assessment methods.
3. Identify the best method of assessment from Frayer Model, Choral Response and Muddiest-Point in the context of improving students' academic achievement.

Hypotheses

While considering the research objectives, following null hypotheses were framed.

H_o1: There is no effect of assessment methods on the academic achievement of control and experimental group.

H_o2: There is no effect of Frayer Model on the academic achievement of control and experimental group.

H_o3: There is no effect of Choral Response on the academic achievement of control and experimental group.

H_o4: There is no effect of Muddiest Point on the academic achievement of control and experimental group.

H_o5: There is no difference in students' academic achievement with and without using assessment methods.

Research Question

1. What is the most appropriate and effective method of assessment among Frayer Model, Choral Response and Muddiest Point in regard to promoting students' achievement?

Methodology

The study was experimental in nature and the research design was pretest posttest quasi experimental. This section further discusses the participants, instrumentation, procedure of experiment, data collection and results.

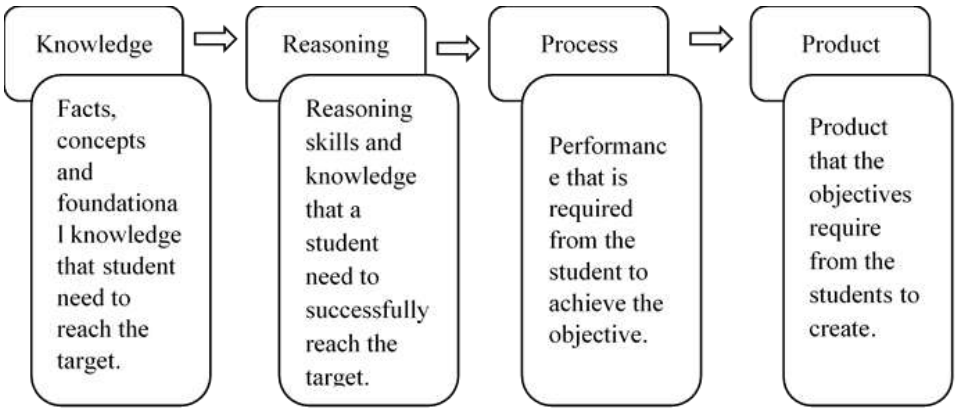
Population and Sample

During the session of 2017, there were about 2500 students enrolled in IER (Institute of Education and Research), University of the Punjab. The sample selected for the study was 87 students who were already in two groups having age group 20-22 years studying the course of curriculum development enrolled in BS (Hons.) Science Education in 5th semester.

Instrumentation

Lesson plans, worksheets and achievement test were used as research instruments in conducting this research. The instruments were developed by keeping in mind the student learning outcomes and methods of assessment. The lesson plans were formulated by considering the learning objectives on four domains: knowledge, reasoning, process and product. A brief description of each of these is given in the figure.

Figure 2. Domains of Lesson Plans (Source: Authors)



The achievement test (pre-test and post-test) was formed by considering Bloom's Taxonomy of Educational Objectives. For this, a two-way specification table was formed. Since achievement test was developed at undergraduate level, therefore, the test item will contain items of all the cognitive levels of Bloom's taxonomy i.e. knowledge, comprehension, application, analysis, synthesis, and evaluation. Students learning outcomes (SLOs) were assessed through various item formats e.g. MCQs and short answers and essay questions. The final test was consisted of 30 MCQs, one essay type question and 2 short questions.

Piloting of Instruments

The instruments i.e. lesson plans and achievement test of the study were validated by five experts in the field of education and curriculum and finalized by considering the suggestions they pose. In achievement test, some items were reviewed and then those questions were selected that were related and linked with the principles and learning objectives of the course taught to them. Two hundred students were selected for piloting to check the reliability of the achievement test and items were revised after doing the item analysis of the collected data. The item analysis of the achievement test was carried out by using ITEMAN software. The reliability of the final test was 0.86 and the items were selected by considering its item difficulty and discrimination range i.e.

"Difficulty index = 0.2 --- 0.8"

"Discrimination Range = 0.2 - 0.6"

"Point Bi-serial less than 0.8" (State Board of Education, 2014)

The test-items that lie under the above range were selected in the final achievement test. The final test after piloting was administered to the students before conducting the experiment. After pre-test, treatment was applied for the period of sixteen weeks and then post-test of these students was conducted.

Intervention Procedure

The intervention was carried out for 16 weeks to the participants who were divided already (pre-existed) into control group and experimental group. Traditional method of assessment was used to assess the students of control group while experimental group was assessed through Frayer Model, Choral Response and Muddiest Point. Both the groups were assessed side by side. Beside this, groups were pre-tested before the experiment to check their baseline performance. The difference in the mean scores of both groups was 0.59 that is not a big difference in social sciences. After pre-test, both groups were randomly assigned to treatment groups by fishbowl sampling. Both the groups were taught by the same person and the content taught to the students were the same as well. Further Table 1 describes the application of prescribed assessment methods to the students in experimental group.

Table 1

Implementation of Assessment Methods

Methods	*When to use*	*How to implement*	*Apply on*
Choral Response	During instruction when a short, consistent answer is expected.	Pose a question, and hold up your hand as a signal to "think, don't blurt." After a few seconds, lower your hand and use a verbal cue for all students to answer at once.	Whole class
Frayer Model	Beginning of a lesson to assess students' prior knowledge about a concept or topic and to identify potential misconceptions.	Students use a template to provide an operational definition, describe characteristics or properties, and list examples and non -examples from their own prior knowledge of an important concept or topic.	Group mode
Muddiest Point	At any time during instruction. Provides feedback to the teacher that can be used to modify teaching strategies	Using half sheets of paper or index cards, ask students to describe the "muddiest point" of the lesson so far. Collect the responses and use them to inform the rest of the lesson or the next lesson. Useful at any point; could also be used as an exit ticket.	Group mode

Results

According to the nature of research hypotheses, appropriate statistical techniques were used to analyze the data. The analysis for the present study is given below;

Table 2 *Paired Sample t-test on Pretest and Posttest scores of Experimental Group*

Scores	*N*	*Mean*	*SD*	*df*	*t-value*	*Sig. (2-tailed)*
Pre-Test	36	5.53	2.360	35	35.565	.000
Post-Test	36	23.97	2.311			

The table clarifies the pretest and posttest scores of students of treatment group. For comparing the mean achievement scores of the students in pretest and posttest, paired sample t-test was applied (Pretest Mean= 5.53, SD= 2.360; Posttest Mean= 23.97, SD= 2.311). The t value was 35.565 with df (85) that is higher than the table value of t (1.290). In the same way, the p-value is 0.000, which is less than 0.05 which reflected that experimental group students scored better after intervention.

Table 3

Independent Sample t-test of Control and Experimental Group after using Frayer Model

Groups	n	Mean	*SD*	*df*	*t-value*	*Sig. (2-tailed)*
Control	51	2.550	.987	85	14.759	.000
Experimental	36	5.346	.666			

Above table shows the difference in achievement scores of control and experimental group. Independent sample t-test was applied (Control M= 2.550, SD= .987; Experimental M= 5.346, SD= .666) at 0.05 level of significance in order to compare the mean achievement scores of the students in both groups. The value of t was 14.759 with df 85 which is greater than the table value of t i.e. 1.290. In the same way, the p-value is 0.000 that is less than 0.05 which reflected that experimental group students scored better when they were assessed by Frayer Model than control group.

Table 4

Independent Sample t-test of Control and Experimental Group after using Choral Response

Groups	*n*	*Mean*	*SD*	*df*	*t-value*	*Sig. (2-tailed)*
Control	51	2.101	.534	85	25.220	.000
Experimental	36	5.026	.304			

The table describes the difference in achievement scores of control and experimental group. Independent sample t-test was applied (Control M= 2.101, SD= .534; Experimental M= 5.026, SD= .304) at 0.05 level of significance to compare the mean achievement scores of the students in both groups. The t value was 25.220 with df (85), which is higher than the value of table t (1.290). In the same way, the p-value is 0.000 that is less than 0.05 which reflected that experimental group students scored better when they were assessed by Choral Response than control group.

Table 5

Independent Sample t-test of Control and Experimental Group after using Muddiest Point

Groups	*N*	*Mean*	*SD*	*df*	*t-value*	*Sig. (2-tailed)*
Control	51	2.601	.947	85	21.462	.000
Experimental	36	6.981	.254			

The table describes any difference in achievement scores of control and experimental group. Independent sample t-test was applied (Control M= 2.601, SD= .947; Experimental M = 6.981, SD= .254) at 0.05 level of significance in order to compare the mean achievement scores of the students in both groups. The t value was 21.462 with df (85) which is higher than the table value of t (1.290). In the same way, the p-value is 0.000 that is less than 0.05 which reflected that experimental group students scored better when they were assessed by Muddiest Point than control group.

Table 6

Independent Sample t-test on Pretest Scores of Control and Experimental Group

Groups	*N*	*Mean*	*SD*	*df*	*t-value*	*Sig. (2-tailed)*
Control	51	6.12	2.215	85	1.191	0.237
Experimental	36	5.53	2.360			

The table describes the difference in pre achievement scores of control and experimental group. Independent sample t-test was applied (Control M = 6.12, SD= 2.215; Experimental M = 5.53, SD= 2.360) at 0.05 level of significance, in order to compare the mean achievement scores of the students in both groups. The t value was 1.191with df (85) which is lower than the table value of t (1.290). In the same way, the p-value is 0.237 that is higher than 0.05 which reflected that the students in both groups are not significantly different from one another.

Table 7

Independent Sample t-test on Posttest Scores of Control and Experimental Group

Groups	*N*	*Mean*	*SD*	*df*	*t-value*	*Sig. (2-tailed)*
Control	51	14.25	2.869	85	16.82	.000
Experimental	36	23.97	2.311			

The table describes the difference in post achievement scores of control and experimental group. Independent sample t-test was applied (Control M= 14.25, SD= 2.869; Experimental M = 23.97, SD= 2.311) at 0.05 level of significance, in order to compare the mean achievement scores of the students in both groups. The t value was 16.82with df (85) which is higher than the table value of t (1.290). In the same way, the p-value is 0.000 that is less than 0.05 which reflected that experimental group students scored better in post-test when they were assessed by assessment methods than the students of control group.

Table 8

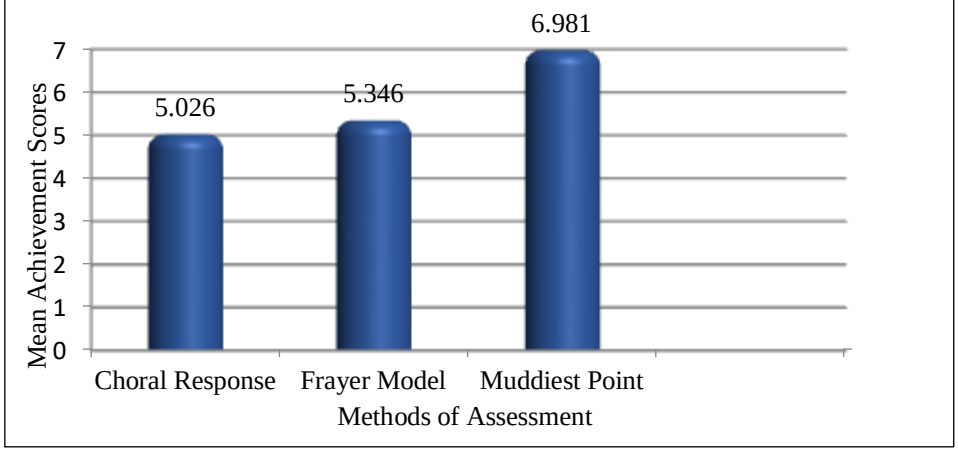
Comparison Regarding Assessment Methods based on Mean Achievement Scores

Assessment Methods	*Mean*	*SD*
Choral Response	5.026	0.304
Frayer Model	5.346	.666
Muddiest Point	6.981	.254

Here, n=36

The table shows the mean scores of achievements of students in experimental group across each methods of assessment. Descriptive statistics were performed comparing the Methods of Assessment. From the above table, it can be inferred that applied assessment methods have significant effect on students' academic achievement. Muddiest Point is the quite effective method of assessment than other two methods because mean achievement score of muddiest point is 6.981 while the achievement score of choral response was 5.026 and that of Frayer model was 5.346. Choral Response and Frayer Model also contributed in improving students' academic achievement but not as effective as Muddiest Point that can be seen in figure 3.

Figure 3. *Comparison in Methods of Assessment*



Discussion

The study aimed to find out the effect of Frayer Model, Choral Response and Muddiest-Point on the academic achievement of undergraduate students. The results showed that the students of experimental group have better performance than control group; although both groups were of same semester who studied the same content and taught by same teacher by using same teaching method; although assessment methods were different for both the groups. The results of the study are evident that treatment group exhibited better performance as compared to control group which means that assessment methods (Frayer Model, Choral Response and Muddiest Point) put a positive effect on the academic achievement of the students. Before experiment, both groups were at same level of achievement, when pre-test was taken so it was assumed that both groups are same. Therefore, it might be said that the students showed interest in the methods of assessment used. Abejehu (2016) conducted a study in which he explored the effect of assessment methods on students' academic achievement and the results of his study supports the finding of this study that assessment methods increase the performance of the students. Likewise, another study revealed that assessment methods were supportive to promote the students' performance and achievement (James & Folorunso, 2012). The results also aligned with different studies (Gibbs & Simpson, 2004, 2005; Louden et al., 2005; Matters, 2006; Nicol & MacFarlane 2004) conducted on assessment and revealed that they affect the students' achievement in positive ways. While considering Frayer Model, it also improves the students' performance and the results were aligned with the findings of previous studies (Estacio & Martinez, 2017; Roe & Smith, 2012; Wanjiru & O-Connor, 2015) who discovered that it improves performance in positive ways. It is one of the recent formative assessment tool available (Gagnon & Maccini, 2000; Griffin & Tulbert, 2006; Hall & Strangman, 2002; Hawk, 2006; Hill & Flynn, 2006; Howard &

Ellis, 2005; Roe & Smith, 2012; Wanjiru & O-Connor, 2015). Likely, Mahampun and Sibarani (2014) also conducted study that explored that Frayer Model can be used in building vocabulary and concepts of the students by using graphical representation. They further added that Frayer Model can be used to categorize among new and previous knowledge of the students and may also be used as a study aid in educational researches. Similarly, different studies discovered that students responded more to teacher questions when they were required to chorally respond in the classroom instead of using traditional questioning like raising their hand and volunteering to respond individually (Godfrey, Grisham-Brown, Schuster, & Hemmeter, 2003; Haydon et al., 2013; Kamps, Dugan, Leonard, & Daoust, 1994). Results also showed that during choral responding individuals' learning improves and they were motivated to learn (Haydon et al., 2013). Besides, Muddiest Point assessment method was also used in this study and the findings explored that it had positive effect on the academic achievement of students. These findings align with the findings of Carlson (2015) who investigated that muddiest point helped the students to learn and analyze information more effectively. Bullock, Gibson, Howard, Liu, Tatachar and Yuet, (2018) also explored that muddiest point is the most valuable time of the class that help students to learn and prepare for exams. Likewise, Snead (2016) conducted an experimental research to explore the effect of muddiest point assessment method on the performance of the students. The results of this research also showed the positive effect of this method on students' achievement.

Conclusion

To conclude we can say that methods of assessment (Frayer Model, Choral Response & Muddiest Point) improve the students' academic achievement. All three methods have significant effect on students and can be used in the classrooms at higher education. Although, when it comes to the comparison of these three methods, the students produce significantly high mean scores across Muddiest point then Choral Responding and Frayer Model. It reflects that Muddiest point is the most effective methods of assessment among the three methods, but all are significantly good in regard to promoting students' achievement. It is practicable in the classroom easily at a time and even separately. These methods of assessment may be used with different teaching strategies or other assessment methods in order to improve or get better results. The teachers at other levels may also use these methods to explore them at other levels in intentions to improve students' learning.

References

Abejehu, S.B. (2016). The practice of continuous assessment in primary schools: The case of Chagni, Ethiopia. *Journal of Education and Practice, 7*(13), 24-30

Beck, S. V. (2011). Assessing classroom assessment techniques. *Active Learning in Higher Education, 12*(2). 125–132.

Blackwell, J. A. & McLaughlin, T. F. (2005). Using guided notes, choral responding, and response cards to increase student performance. *The International Journal of Special Education, 20*(2), 35-41.

Brookhart, S. M., & Nitko, A. J. (2015). *Educational assessment of students* (7th ed.). Pearson.

Brown, G. T. L. (2018). *Assessment of Student Achievement.* Routledge.

Buehl, D. (2003). *Wait. Let me think about that*. Retrieved from http://www.weac.org/News_and_Publications/education_news/2002-2003/read.aspx

Buehl, D. (2014). *Classroom strategies for interactive learning*. International Reading Association.

Bullock, K. C., Gibson, C., Howard, M., Liu, J., Tatachar, A., & Yuet, W. C. (2018). Use of the Muddiest Point Technique as an exam review in an integrated pharmacotherapy course. Currents in Pharmacy Teaching and Learning, 10(9), 1295-1302.

Carlson, A. 2015. Classroom assessment technique: Muddiest point. [Online]. [Accessed 10 March 2015]. Available from: http://pandora.cii.wwu.edu/cii/resources/modules/muddiestpoint/

Doolittle, P. E. (2014). Assessment for free: Fully integrating assessment into teaching and learning. Retrieved from www.ResearchNotRhetoric.com.

Estacio, D. R. & Martinez, O. D. (2017). The use of modified Frayer model in developing science vocabulary of senior high school students. *New Trends and Issues Proceedings on Humanities and Social Sciences.*[Online]. 4(1), pp 36-42.

Frayer, L. E., Fredrick, W. C., & Klausmeier, H. J. (1969). A Schema for testing the level of concept mastery, Working paper No. 16, Madison, Wisconsin: Wisconsin research and development center for cognitive learning, University of Wisconsin

Furco, A. & Moely, B. E. (2012). Using learning communities to build faculty support for pedagogical innovation: A multi-campus study. *Journal of Higher Education, 83*(1), 128–153.

Gagnon, J. & Maccini, P. (2000). Best practices for teaching mathematics to secondary students with special needs: *Implications from teacher perceptions and a review of the literature. Focus on Exceptional Children, 32*(5), 1-22.

Gibbs, G. & Simpson, C. (2004; 2005). Conditions under which assessment supports student learning. *Learning and Teaching in Higher Education. 1*, 3-31.

Godfrey, S. A., Grisham-Brown, J., Schuster, J. W., & Hemmeter, M. L. (2003). The effects of three techniques on student participation with preschool children with attending problems. *Education and Treatment of Children, 26*(3), 255–272.

Griffin, C. & Tulbert, B. (2006). The effect of graphic organizers on students' comprehension and recall of expository text: A review of the research and implications for practice. *Reading and Writing Quarterly*, *11*(1), 73-89.

Hall, T. & Strangman, N. (2002). *Graphic organizers*. National Center on Accessing the General Curriculum.

Hawk, P. (2006). Using graphic organizers were significantly beneficial to student achievement. *Science Education, 70*(1), 81-87.

Haydon, T., Marsicano, R., & Scott, T. M. (2013). A comparison of choral and individual responding: A review of the literature. *Preventing School Failure, 57*(4), 181–188.

Heward, W. L. (1994). Three low-tech strategies for increasing the frequency of active student response during group instruction. In R. Gardner, III, D. Sainato, J. O. Cooper, T. Heron, W. L. Heward, J. Eshleman, & T. A. Grossi (Eds.), *Behavior analysis in education: Focus on measurable superior instruction* (pp. 283–320). Brooks/Cole.

Hill, J. & Flynn, K. (2006). *Classroom instruction that works with English language learners*. Association for Supervision and Curriculum Development.

Howard, P. & Ellis, E. (2005). *Summary of major graphic organizer research findings.* Retrieved from http://www.hoover.k12.al.us/hcsnet/rfbms/makessense7.4/donotopenfolder/implmnt/dontopen/msstrats/stuf/GOMatrix.pdf on 1 February 2017.

Institute of Education and Research. (2017). *Information regarding population of the study.* University of the Punjab, Lahore, Pakistan.

James, A. O., & Folorunso, A. M. (2012). Effect of Feedback and Remediation on Students' Achievement in Junior Secondary School Mathematics. *International Education Studies, 5*(5), 153-162.

Kamps, D. M., Dugan, E. P., Leonard, B. R., & Daoust, P. M. (1994). Enhanced small group instruction using choral responding and student interaction for children with autism and developmental disabilities. *American Journal of Mental Retardation, 99(1),* 60-73.

Lombardi, P. (2018). *Instructional methods, strategies and technologies to meet the needs of all learners*. n.d.

Louden, W., Rohl, M., Gore, J., McIntosh, A., Greaves, D., Wright, R. et al. (2005). Prepared to teach: An investigation into the preparation of teachers to teach literacy and numeracy. Canberra: Department of Education, Training and Youth Affairs.

Matters, E. C. (2006). Working together to safeguard children. The Stationery Office.

McConnell, K. D., & Doolittle, P. E. (2018). Course-Embedded Assessment: Aligning Pedagogical Practices to Enhance Student Learning. In C. Secolsky & D. B. Denison (Eds.), *Handbook on measurement, assessment, and evaluation in higher educatio*n (pp. 54-69). Routledge.

Nicol, D. J., & Macfarlane, D. (2004). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice, *Studies in Higher Education. 2*(1), 21-34.

Ornaghi, V., Pepe, A. & Grazzani, I. (2016). False-Belief Understanding and Language Ability Mediate the Relationship between Emotion Comprehension and Prosocial Orientation in Preschoolers. *Front. Psychol.* 7(1), 5-34. doi: 10.3389/fpsyg.2016.01534

Parkes, K. & Kajder, S. (2010). Eliciting and assessing reflective practice: Best practices. *International Journal of Teaching and Learning in Higher Education, 22*(2), 218–228.

Roe, B. D., & Smith, S. H. (2012). *Teaching reading in today's elementary schools.* Houghton Mifflin Company.

Rowe, M. & Goldin-Meadow, S. (2009). Differences in early gesture explain SES disparities in child vocabulary size at school entry. *Science*, 323(5916), 951- 953.

Stake, R. E., Contreras, G., & ArbesúIt, I. (2018). Assessing the quality of a university, particularly its teaching. In C. Secolsky & D. B. Denison (Eds.), *Handbook on measurement, assessment, and evaluation in higher education* (pp. 35-47). Routledge.

Thompson, M. & Wiliam, D. (2008). Tight but loose: a conceptual framework for scaling up School Reforms. In: C. Wylie (ed) *Tight but Loose: Scaling Up Teacher Professional Development in Diverse Contexts*. Princeton, NJ: Educational Testing Service (ETS).

Tincani, M. (2011). *Preventing challenging behavior in your classroom: Positive behavior support and effective classroom management*. Prufrock Press.

Twyman, J. S., & Heward, W. L. (2016). How to improve student learning in every classroom now. *International Journal of Educational Research*. doi:10.1016/j.ijer.2016.05.007

Wanjiru, B. & O-Connor, M. (2015). Effects of mathematical vocabulary instructions on students' achievement in Mathematics in Secondary Schools of Murang'a County, Kenya. *Journal of Education and Practice, 6*(18), 201-107.