

POST-COVID TRANSITIONING TO 'NEW NORMAL': GAMIFICATION AS A OUT-CLASS STRATEGY

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Abstract:

Covid-19 pandemic brought into our notice that technology in education can be a way to foster learning. Students find it difficult to measure and construct the various types of angles. Many times rote learning is observed. It shows the need for practice. In this study we investigated the effect of using gamification as an out-class strategy in learning geometry, specifically types of angles and their construction while transitioning the teaching learning process to a Post-Covid 'New Normal' situation. Two gamification tools were used as Math Playground.com and Quizizz.com. The study used a single group experimental design having a sample of 42 students. To collect data on students' achievements pre and post tests were conducted and Wilcoxon signed Rank Test was used for analyzing the data. Analysis of data revealed Math Playground as an effective practice which promotes fun learning. And Quizizz tool, engages students, and can be used as a formative assessment tool. These Gamification tools make learning fun and challenging and increase the performance of the students and can be used as an out-class strategy.

Key words: Post-Covid New Normal, Quizizz, Math Playground, Types of angles, Gamification as out-class strategy, Geometry, Formative assessment

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Introduction:

Covid-19 pandemic brought us into notice that technology in education can be a way for engaging learners if it is used in an efficient way. In India the educational community was having resistance to the use of technology. But the pandemic paved its way and realized the importance of using and essentialness of being prepared for the future. Importance of technology is also mentioned by NEP(2020). The unpreparedness during pandemic realizes that the teacher should update themselves to deliver the content in a manner that digital natives can be engaged and learn in the way they want to learn. Prensky (2001) suggested technology can be used to render difficult topics more engaging and interesting.

Post-Covid reopening of the school will require a strategy which will engage the students. Many studies reported gamification as a strategy to engage the learner in a fun way. There are many online gamification tools and apps. Some teachers and learners have already started benefiting from these apps and websites and they have become very popular all over the world Bal (2018).

As the concept of angles is considered as the basic in learning Geometry, misconceptions related to them may

hinder future success. Teachers should try to find and eliminate the implemented for giving the practice. Hence, the study aims to analyze the effect of using gamification as an out-class activity for practicing the concept of types of angles and its construction and studies the effect of it on students' achievement during post-Covid.

Research question and hypothesis was framed as follows-

RQ 1. Is there any significant difference using gamification as an out-class activity in the mean scores of pre and post Achievement test?

H₀1: 'There is no significant difference in mean scores of pre and post Achievement tests using gamification as an out-class activity.'

Literature Review:

Types of angles and its construction:

Various studies reported the difficulties and misconceptions of the students related to angles and its construction. The below section discusses a few of them.

Biber et. al (2013) stated angle and its construction are the basic concepts of geometry. Almost every subject of geometry requires a good knowledge of angles. Any student who has not adequately comprehended basic geometric concepts will not understand and succeed in the subsequent subjects of geometry .

Following are the misconceptions that the students have as reported in the study conducted by Bütüner & Filiz, (2016):

- Angles are only static figures that are represented by the intersection of two lines or rays.
- Angle measurement depends upon the side lengths of the angles, size of the arc or the amount of space between the sides of the angle. Hence, could not recognize the 180°angle.
- Many students had difficulty in distinguishing right angles whose arms are not parallel to the paper's margins.

Unal & Urun (2021) concluded that the students have knowledge gaps and misconceptions about the definition of an angle, its drawing and representation with symbols, specifying its vertex and edges, its measure, types, and drawing perpendicular to a line. Many students find it difficult to place the protractor for drawing or measuring the angle. It is supported in the study investigated by Silva & Santos (2019) it states that the students find difficulty to place the point of reference of the protractor at the point that will be the vertex of the angle and 0° in the extension of the side of the angle.

Gamification:

Gamification can play a big role when we incorporate it into the learning process by enhancing student's engagement and learning which results in increase in student's motivation (Sahin & Namli, 2016). Licorish (2017) stated gamification helps in improving the quality of teaching and learning. Gamified intervention fosters students' performance (Craig *et al.*, 2020) According to Metwally et. al (2021) gamifying homework aims to increase motivation and engagement. NEP (2020) and NEP (2019) suggested incorporation of the Games in the curriculum.

Gamification Tools used in the study:

Any software or tool that applies game mechanics to non-game environments in order to enhance engagement and overall success is known as a gamification platform (Zainuddin et. al., 2020). Two gamification platforms were used in the study - 1. Quizizz.com and 2. Math Playground which is discussed in the section below.

Quizizz.com:

Quizizz.com is a free online gamification tool. Teachers can use it as an formative test, for giving practice to the student in live mode in the classroom or as homework for revising the concept. Thus it can be used for in-class or out-class

activity. Teachers can create assignments and share the link with students and can see students' progress in her reports. Students can engage anytime and from anyplace. Leaderboards motivate them to practice and to collect maximum points to acquire upper position on it. It helps them to increase their speed and accuracy.

Math Playground.com:

Math Playground, an online free gamification tool was created in 2002. It promotes a fun way to practice math facts. It includes a variety of math topics, from problem solving and mathematical art to real world math and thinking games.

Methods:

A. Methodology

The study investigated the differences in learners' performance of the same group before and after the intervention using Single group experimental design to determine the impact of gamification tool Math Playground and Quizizz on achievement of students in learning geometry, specifically in relation to types of angles and their construction.

B. Participants

The research was conducted on a sample of 42 students of age 11-13 yrs from a Maharashtra State Board school.

C. Design and Procedure

The research was conducted to investigate the effects of using Math Playground and Quizizz on achievement. During the course of the research, ten physical classes were conducted. Before data collection, the tool was investigated for its validity and reliability, and based on suggestions the instrument was updated and the final tool was framed. It was implemented for data collection in the beginning as a pretest and at the end as a posttest. The tool consisted of eight MCQ of one mark each and three constructions of four marks each. After the data collection as a pretest score an online session was conducted using video conferencing application Zoom. Students were given hand-on practice on the Math Playground and Quizizz tool and given the understanding about what they are expected to do during the programme. The researcher herself taught the decided syllabus for thirty-five min. per day, for eight days. On a daily basis post the physical classroom teaching, the researcher shared a link of the Quizizz game to students for practicing and revising the concept that was taught. Three quizzes were designed containing questions relevant to understanding the concept of types of angles. It was also used as a formative assessment tool by the researcher. After teaching the students how to construct the desired angles one more link was shared from Math Playground for practicing. It helped students to recognize angles and understand concepts of angle measurement and its construction. After the completion of the desired syllabus the posttest was implemented.

D. Data Collection

To collect data on students' achievements pre and post tests were conducted.

V. Data Analysis

Wilcoxon signed Rank Test was used for analyzing the data; because the assumptions of parametric tests were violated. It is the non parametric test used to compare two sets of scores that come from the same participants. It is used in studies that gather before and after measurements. The two ratings of the data gathered before and after, the initial as pretest and final as post test scores were used. This test is used in an experimental study investigated by Putri et al (2018) to find Students' understanding in modified Flipped classroom approach.

Results of the study:

The tables below show the descriptive and inferential analysis of the study.

Table 1: Pre and post-test -Wise N, M, SD and Variance of Achievement test

Test	N	M	SD	Variance
Pre	42	6.46	1.81	3.27
Post	42	13.27	3.22	10.34

Table 2: Relevant statistics for the Wilcoxon Signed Rank Test on Achievement

N	Mean	SD	Z value	P
42	451.5	79.98	-5.65	<.00001

From the descriptive statistics, it can be observed that the students' mean post Achievement test scores ($M=13.27$, $S=3.22$) are higher than the mean pre test scores ($M= 6.46$, $SD= 1.81$).

From the Wilcoxon Signed Rank Test it can be seen that the $p < 0.05$. It indicates that the mean pre and post Achievement test scores differ significantly. Thus the null hypothesis 'There is no significant difference in mean scores of pre and post Achievement tests using gamification as an out-class activity is rejected.' It may therefore conclude that the improvement in post test scores can be the result of gamification.

Discussion:

Post-Covid transitioning to the New Normal in education should be a blend of the best educational practices of pre Covid-19 and current scenario. Transitioning to 'New Normal' after the pandemic will be a challenge for teachers. Educational strategies should be designed in a way to engage and motivate students to minimize the loss of learning. The study found the gamification tools Math Playground and Quizizz promote engagement and increase performance. Math Playground helps students in practicing the problems in a fun and challenging way. It eliminates rote learning. Students are challenged with new problems. Freedom to fail helps them to try without fear of failure. Similarly using the Quizizz tool the students are motivated to give their best performances. Leaderboards stimulate competition and improve students' engagement, challenging them to collect maximum points. It can be used as a formative assessment tool (Permana & Prematawati, 2020).



Figure 1: Screenshot from Math Playground.com

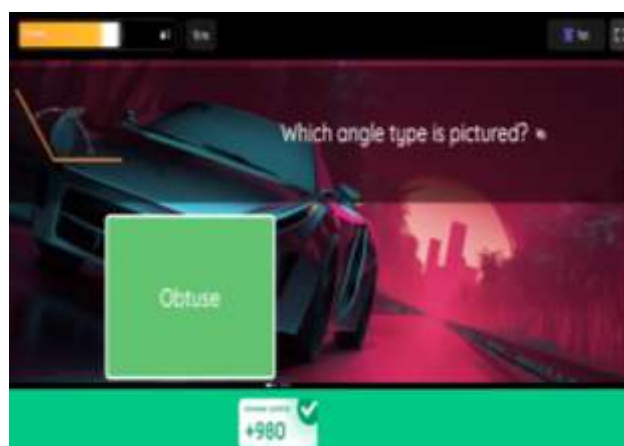


Figure 2: Screenshot from Quizizz.com

Conclusion:

From this study we found that use of gamification tools as Quizizz and Math Playground helps to increase the performance of students. Math playground found to be efficient in providing practice by challenging and giving them the opportunity of freedom to fail. Similar results were obtained in different researches about the effectiveness of using Quizizz (Permana & P Prematawati, 2020, Zainuddin et. al., (2020). Students like the features of the Quizizz tool, especially the leaderboard, which shows the ranking of their performance and motivates them to study (Zhao, 2019). This study shows both the tools help to increase enjoyment which is inline with the study of Sahin & Namli (2016). All in all, gamification tools have the potential of improving the results, making learning fun and challenging. Our study suggests Gamification as an out-class strategy can be useful in transitioning education to the ‘New Normal’.

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