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Mathematics Formative Assessment: Right mix of chalk and challenges

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Abstract

Assessment is an important ongoing process and integral part in the educational context. Students must be aware of their progress in order to learn properly. Similarly, in order to be an effective teacher, one must be aware of what the student knows, feels, and can do in order to help him or her improve their abilities, knowledge, and attitudes. As a result, teachers and students require ongoing input on their progress and challenges in order to create suitable learning activities and make revisions to those that have already been prepared. Innovative assessment is described as anything that allows a student to transfer their knowledge, abilities, competences, and dispositions from learning to assessment. Wherever possible, the transition between learning and assessment should be seamless. The assumption behind this technique is to ensure that the learner can see a clear link between what they're learning and how it will be utilised in any or all of the following areas: • the real world • a job setting • when they graduate to a higher level of schooling.

Keywords: Assessment, feedback, learning activities, transition

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Gandhinagar**Introduction**

“Every single person is a genius. But if you assess a fish by its ability to climb a tree, it will believe it is stupid for the rest of its life.” -Albert Einstein This quotation underlines the significance of using the appropriate assessment tools and methodologies to evaluate the learner and the learning outcomes.

“The glossary of education reforms states that in education, the term assessment refers to the wide variety of methods or tools that educators use to evaluate, measure and document the academic readiness, learning progress, skill acquisition, or educational needs of learners.”

The fundamental purpose of assessment is to estimate students’ level of achievement in order to enhance student learning during the learning process. By interpreting students’ performance through formative assessment and sharing the results with them, instructors help students to “understand their strengths and weaknesses and to reflect on how they need to improve over the course of their remaining studies.” (Maki, 2002, pg. 11)

Importance of Assessment:

Students' performance can be linked to specific learning objectives, allowing teachers to assess the effectiveness of their teaching. It aids in the institutionalisation of effective teaching methods and the revision of ineffective ones in pedagogy. It gives teachers and students with brief feedback on the extent to which students are meeting the course goals. It aids critical reflection on one's teaching and aids in the development of reasoning for pedagogical choices in the classroom.

Among the various types of assessments, the focus of this research paper is on the different types of formative assessments that can be used to assess the skills, knowledge and understanding of the learner as well as the effectiveness of the educational program.

Educators use the results of formative evaluations to change and enhance teaching practises during an educational time, hence they are usually referred to as "for learning." Using new

formative assessment procedures in a regular and successful manner eliminates the possibility of receiving unexpected final grades. Students may constantly grow and excel when technology is integrated into teaching and learning on a regular basis. Learning is beneficial and effective because it is based on a continuous cycle of feedback and development.

It is a two-way street when it comes to formative evaluation. Classrooms should be feedback-rich environments that gather information from several sources. Teachers seek and receive timely feedback so that we may better tailor our lesson to our students' needs. Learners look for and use feedback on their progress toward a learning goal.

Method: The sample consisted of 35 students of one section of standard X of a school. To improve teaching techniques and modify the instructional method in teaching of Probability, exit slips were used. To assess students on their understanding of the topic of trigonometry, creative extension project was given.

(i) Exit-tickets:

Exit tickets are a type of formative evaluation that allows teachers to measure how well students comprehend the subject being taught in class. A decent exit ticket can determine whether students just have a rudimentary comprehension of the content. Teachers can then utilise this information the next day to tailor instruction to match the requirements of their students.

Chapter of Probability was taught with the help of powerpoint presentation wherein videos were embedded and assessment was done using kahoot- a game-based learning platform wherein the quiz was customized for the particular topic. As this was the first chapter to be taught at the time of commencement of online classes, it became necessary to collect the feedback of students on the effectiveness of methodology used to teach the topic. Students were required to respond to the questions or prompts in the google form that they had submitted before they leave the class. These cards provided the immediate information that could be utilised to assess students' understanding, monitor their learning, make necessary pedagogical changes and hence take remedial measures. Following were the questions for the exit slips/cards:

- Write three things that you remember from today's lesson.
- What was the most important thing that you learnt in the class today?
- Your best friend was absent today. Summarize today's lesson.
- Rate your understanding of today's lesson on a scale of 1-10. Explain your rating.

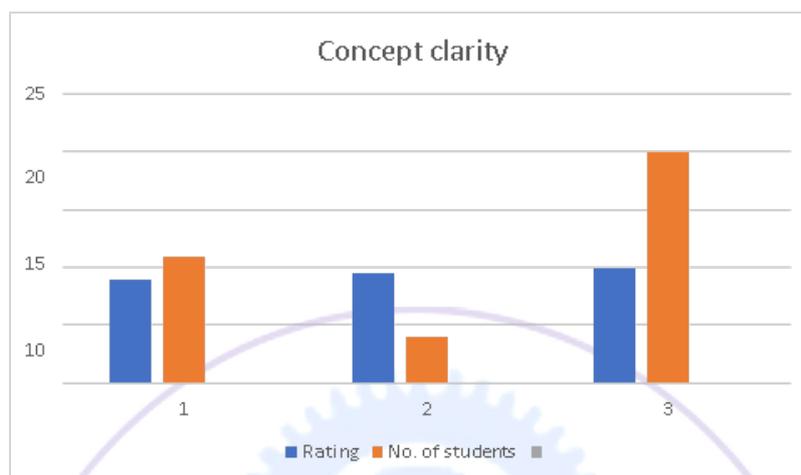


Figure-1

- What was the most challenging part of today's lesson? Why?

Few responses:

Ex.15.2 because in it some questions are hard to do. You have to give 100% attention to it. Then only you will understand it.

The most challenging part was Ex.15.2

I didn't find anything challenging. I am quite confident that I can get full marks in the topic of probability.

Nothing

There wasn't a major part which was challenging, but I would say questions 3,4,5 of ex 15.2 were different than the others but instead it was fun to solve them.

Solving q3(exercise 15.2) was challenging but after ma'am explained it was clear

To me the the most challenging part was understanding the optional exercise(EX 15.2) because it contains some tricky and HOTS questions but purvi mam made sure that we understood it and I understood it.

We did the sums really fast so it helped me practice my speed

- If you were a teacher, what part of today's lesson would you like to take out? Why?

Few responses of students:

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i would take out introduction of the chapter

All the lessons were important ,so i would not take out any lesson

I would not take out anything.

If I were the teacher then I would have taken out the easy questions from the textbook and give them as homework to students .

If I were the teacher I would not remove any part of today's lesson as I really love the way the teacher teaches and the best part I like is interaction.

I would not take out any part from the chapter because all the topics are important now or in the future

The way of guessing the possibility between 0 and 1.

I would take away the Hots Questions because they were interesting and easy to understand and many of us knew all the methods to solve the questions.

- An unanswered question I still have is ...

Few responses of students:

All the doubts of mine are clear. There are no questions unanswered.

----- No such question -----

I dont have any unanswered question

No I don't have any unanswered question.

I don't have unanswered question.

Actually, I have understood everything that Ma'am has taught us because she explains everything so well.

my every questioned are answered

no

I have a doubt in solved example 12 of the textbook.

Findings & Conclusion:

Exit ticket allowed the teacher to understand where knowledge gap existed, what needed to be addressed, what students had mastered, and what may be enhanced in the classroom.

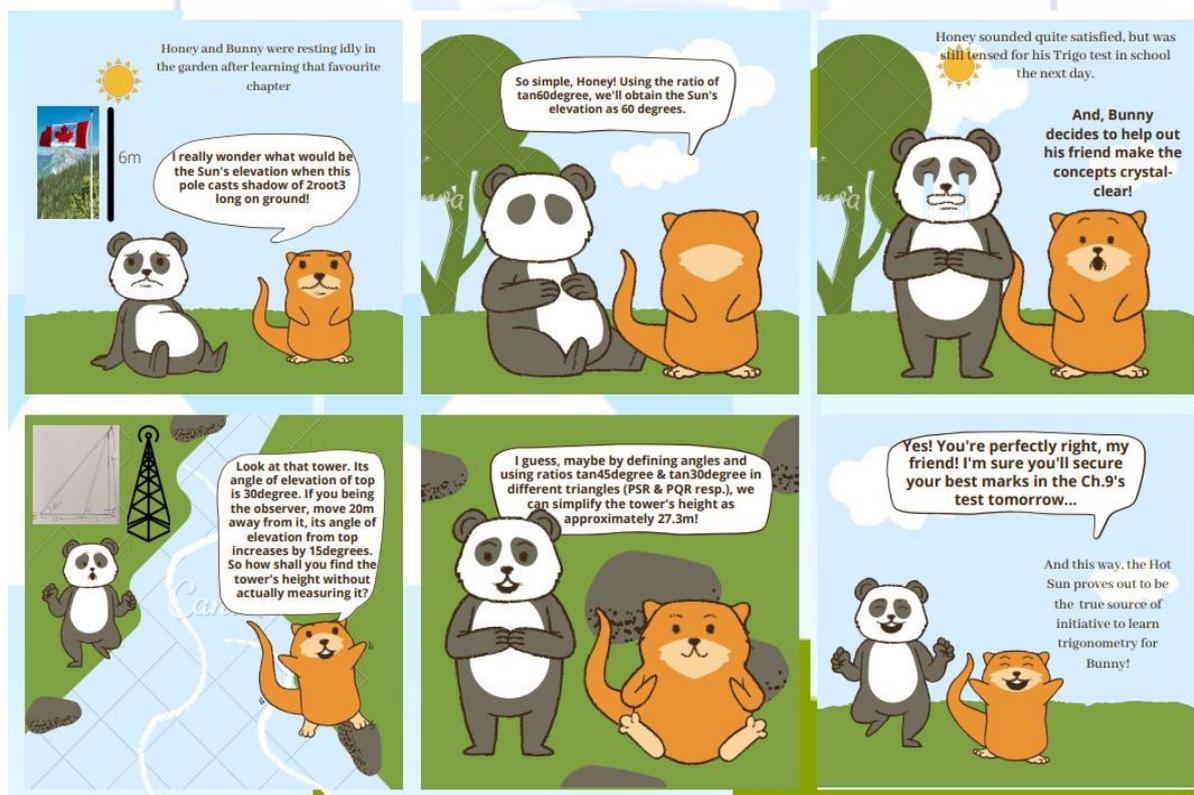
(ii) Creative extension Projects

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When students were given trigonometry word problems, they frequently sighed and whined. Many of them attempted to solve the problem without first making sense of it, or relying on hint words rather than mathematical logic. The word problems did not entice pupils to participate in the math. To overcome this, connecting course content to students' interests is a typical way to increase participation. Researcher decided to try to leverage on her students' interest for comics, graphic novels, and anime by asking them to convert lifeless word problems into comics with built-in reading supports.

To help students make connections between basic trigonometric ratios and understand the practical application a project to create a comic strip based on trigonometry was given.

Students were asked to create a comic strip which involved a storyline using the concepts taught. The main objective of this project was to test the creativity, comprehension, remove the fear of trigonometric formulas by relating the concepts to daily life situations. Few examples of this project given in the Trigonometry chapter of Std- X is as mentioned below.



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Hi! Coco the panda here. I am in search for my friend Dodo. Please help me if you have seen a fat and cute looking panda like me.

Hey Coco I'm here. Please help me to get down. I'm stuck here.

How did you reach there? Anyways don't worry I'll figure out something. Let me put on my glasses and turn my mathematician mode on.

I have a slide of size 20 cm by which you can slide down. But I'll have to find the height of the tree and distance between tree and the ladder.

To find the height of the tree(x) I'll have to apply trigonometric ratio sin.
 $\sin 30 = \frac{x}{20}$
 $\frac{1}{2} = \frac{x}{20}$
 $x = 10$

Let me also find the distance of the slide from the foot of tree.
 $\tan 45 = \frac{10}{l}$
 $1 = \frac{10}{l}$
 $l = 10 \text{ cm}$

I did it!

Finally now we both are back together.

Name: Sanskruti Sheth
 Class: 10-A
 Roll no. 26

Hey Dad!! it seems dark out here in space. It's too scary out here!!

DAD: Well, due to the solar storm here in space, we are lost, so now we gotta make some plan to reach Earth

ME: Dad!! We can make use of Trigonometry to find our location and distance from Earth

DAD: I know that we are directly above the sun and so are spaceship. Sun and Earth forms a right angle.

ME: Here, $\cos C = \frac{BC}{AC}$, $\cos 60 = \frac{1 \text{ AU}}{AC}$, $\frac{1}{2} = \frac{1 \text{ AU}}{AC}$, $AC = 2 \text{ AU}$

ME: Yay!! I know that Earth forms an angle of elevation with our ship and sun as line.

DAD: So, we are 2 AU far from our home, so according to our speed, we shall reach in 200

ME: Taking Trig ratio $\cos 60$, we can find the distance between our ship and Earth

WARNING
 MAY SPONTANEOUSLY START TALKING ABOUT TRIGONOMETRY

Findings:

Following feedback was given by the students:

- Helped them to practice essential skills like reading, understanding visual concepts, understanding context clues, speaking, and ultimately, communicating complex ideas in the span of 3-4 panels.

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- ✚ Helped them identify the application of trigonometry to find height, width, depth, and angles to complete different tasks.
- ✚ It also evoked thought about provocative issues and could help students understand highly complicated matters in a condensed and succinct form.
- ✚ They discovered various online tools to create an effective comic strips .
- ✚ Most of the students found it an enjoyable activity, however, this activity could not impress a few students as they found it time-consuming.

Conclusion

Learning assessment is a crucial part of the instructional process, and its efficacy is dependent on teachers' abilities to design and select exams and assessment processes that give meaningful measures of learning outcomes. As a result of the assessment, the student will receive 360- degree feedback on both quantitative and qualitative performance. The assessment techniques must provide a clear distinction between learning and scoring. Because evaluation provides educators with feedback on their instructional tactics, it aids in the scientific planning and improvement of such strategies.

The feedback teachers get from their students goes in one direction. Formative assessments must be structured to assess the information, understandings, and abilities that learners need to achieve their learning objectives. Teachers must design or choose tests that are brief enough to inform their lesson right away.

The feedback that learners receive works the opposite way around. Learners will receive data from a variety of sources in a feedback-rich environment, including peers, teachers, self, digital apps, external mentors, and so on. Learners evaluate and analyse this formative input on their own, with a peer, or with their teacher, and then plan their next steps in their learning. Timely, actionable, and detailed formative feedback is most successful.

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A large, semi-transparent pink watermark of the letters 'CTE' is centered on the page. The letters are in a serif font, with the 'C' and 'E' being larger than the 'T'. The watermark is overlaid on a faint background image of a person's face, possibly a historical figure, which is also semi-transparent.