Change Agent Project by Todd Miceli and Shantel Breen

Gathering Formative Data to Individualize Instruction using Desmos

Introduction

One of the goals of our school system is to enhance the meaningful collection of formative data, enabling teachers to modify instruction and meet the individual needs of their students. However, a downside to collecting formative assessment data is that teachers often feel they have limited time and lack adequate resources. As part of this Agent of Change project, we will explore two tools that can effectively and seamlessly collect meaningful formative assessment data through daily lessons, providing teachers with easy access to data to inform their instructional decisions.

Problem Identified and Audience

Our Agent of Change project will focus on a professional development module for math and science teachers in grades 6-8 who teach both online and in physical classrooms. The professional development will concentrate on the technological tool, Desmos. It will address the challenge of collecting formative assessment data that is both meaningful and time-saving. The emphasis will be on how technology can help teachers collect and use this data to improve instruction. This project aligns with our school system's overall mission of using formative assessment data to enhance instruction, making it a worthy change agent initiative.

Goal and Mission

The mission of this professional development plan is to support middle school mathematics and science teachers in utilizing digital technology to enhance formative assessment practices. By providing teachers with the knowledge, resources, and skills necessary to implement effective formative assessment strategies, the goal is to improve instruction through the lens of student engagement and achievement in the classroom. Through continuous professional development

opportunities and collaboration, this professional development plan seeks to create a community of educators who are committed to using data-driven initiatives to support student learning in math and science. The long-term and short-term goals can be described as the following:

Short-term goals	Long-term goals
● Educators will understand formative assessment practices and its significance in improving student learning outcomes. ● Educators will be provided with the necessary skills to effectively integrate digital technological tools into their instruction as formative assessment strategies.	● Educators will use formative assessment data to inform their instruction and provide differentiated support to students. ● Educators will continuously engage in collaborative learning with other educators to share best practices and ideas for using digital technology for formative assessment.

Strategies and Tactics

As department chairs, we are working with our teams to continuously improve instructional practices. In collaborating with our teachers, we identified a need for growth in formative assessment and how to use this data to enhance instruction. Part of our role involves leading professional development aligned with the goals of our school and district. Throughout the school year, we will deliver professional development in three parts. Teachers will have the opportunity to implement each part in their classrooms following the training. Part 1 will occur during the first marking period at the start of the school year. Part 2 will take place during the second marking period, and Part 3 will be towards the end of the third marking period.

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Part 1	Introduction to Formative Assessment Delivery: September	• What is formative assessment? • Why is it important? • Why do we need to gather data from it? • What are the tech tools that can be used?
Part 2	Using Formative Assessment to Drive Instruction Delivery: January	• How can the data provided by the tech tools be used to identify patterns in student performance? • How can the data help to provide differentiation within our classrooms? • How can we use formative assessment data to drive instruction?
Part 3	Reflection and Renewal Delivery: April	• How did we use formative assessment data? • How can this improve our future endeavors with it? • How did the use of technology improve our ability to collect data?

Part 1: Introduction to Formative Assessment

During this phase of the professional development, teachers will explore the purpose for formative assessment and how it can be used to tailor instruction within their classrooms. Teachers will have the opportunity to explore the many features of Desmos using it as an interactive tool for collecting formative assessment data. Teachers will act as students as they explore the many features that Desmos provides. Teachers will be given the task to use Desmos to collect formative data in at least 3 lessons before the next session. Teachers will be asked to bring samples that will be used for discussion in Part 2.

Part 2: Using Formative Assessment to Drive Instruction

After teachers have had an opportunity to explore using Desmos to collect formative assessment data, they will have the opportunity to explore the data in part 2 of the professional development.

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Teachers will work together to identify patterns in their assessment data and develop strategies for using the data to improve instruction within their classroom. Teachers will look for patterns in the data, outliers, and clusters. The focus of part 2 will be reading and interpreting the data.

Part 3: Reflection and Renewal

During this last part of the professional development, teachers will reflect on the effectiveness of Desmos as a way to collect formative assessment data within the lessons. Teachers will identify ways to improve their instruction using the tech tool and will develop a plan for using the tool more consistently in the upcoming school year.

The SAMR Model of Technology Integration

The SAMR model is a framework for integrating technology into education and was developed by Dr. Ruben Puentedura. The SAMR model was created to help educators improve their use of technology in the classroom. The acronym SAMR stands for Substitution, Augmentation, Modification, and Redefinition and each one of these levels is divided into two main categories: Enhancement and Transformation. Educators can integrate technology in ways that enhance student engagement, promote critical thinking, and allow creativity in the learning environment by understanding and utilizing the SAMR model.

Enhancement	Transformation
Substitution: technology is used to substitute traditional tools with no functional chance (for example, using ebooks to read over physical books. **Augmentation:** technology is used to substitute traditional tools but with functional improvements. (for example, using that ebook	**Modification:** technology allows for significant task redesign such as group work collaborations or real-time collaborative documents. **Redefinition:** technology allows for the creation of new tasks that would have not been possible without the technology. For

but having interactive features to enhance the experience such as annotation tools, hyperlinks or embedded videos).	example, students creating online blogs or multimedia presentations to share on YouTube.

When it comes to professional development regarding the use of technological tools as formative assessments, the SAMR model can guide teachers in transforming their teaching practices. At the substitution level, teachers can utilize online quizzes instead of traditional paper ones. At the augmentation level, teachers can enhance formative assessments by using tools that provide instant feedback to students. At the modification level, teachers can create interactive assessments where students can manipulate digital elements to showcase their understanding. At the redefinition level, teachers can have students collaborate globally on assessments, which will provide diverse perspectives. Professional development based on the SAMR model will support teachers in progressing through these stages to utilize technological tools effectively for formative assessments.

UDL Guidelines

Throughout our Agent of Change project, we considered Universal Design for Learning (UDL) principles to ensure an inclusive and effective learning experience for all teachers. UDL emphasizes providing multiple means of engagement, representation, and action and expression to accommodate diverse learning preferences and needs. Our Professional Development specifically addresses the following UDL Principles:

Provide Multiple Means of Representation	Provide Multiple Means of Engagement
1.1 Customize the display of information: Offer information through various formats such as videos, interactive demonstrations, and written guides on using Desmos, allowing teachers to choose the format that best suits their learning preferences.	**7.2 Enhance relevance, value, and authenticity:** Use tools like Desmos to engage teachers with interactive learning activities that are relevant to their teaching practices and can be directly applied in their classrooms.
3.3 Guide information processing: Scaffold the learning by gradually introducing tools and strategies, building on prior knowledge, and connecting to the teachers' current practices, to help them process and apply the new information effectively.	**8.3 Foster collaboration and communication:** Segment the professional development into three parts to maintain engagement over time and provide continuous opportunities for teachers to implement and reflect on their learning while fostering collaboration and communication among participants.

Conclusion

As Change Agents, we designed this professional development to provide middle school math and science teachers with technology like Desmos to integrate formative assessment practices into their daily lessons. Addressing the challenges of time constraints and resource limitations, this initiative will support teachers in making data-driven instructional decisions that meet the diverse needs of their students. Using the SAMR model as a guide, teachers will progress through stages of integrating technology, transforming their teaching practices to enhance student learning. Through continuous professional development and collaboration, we will foster a community of educators dedicated to improving student engagement and achievement.

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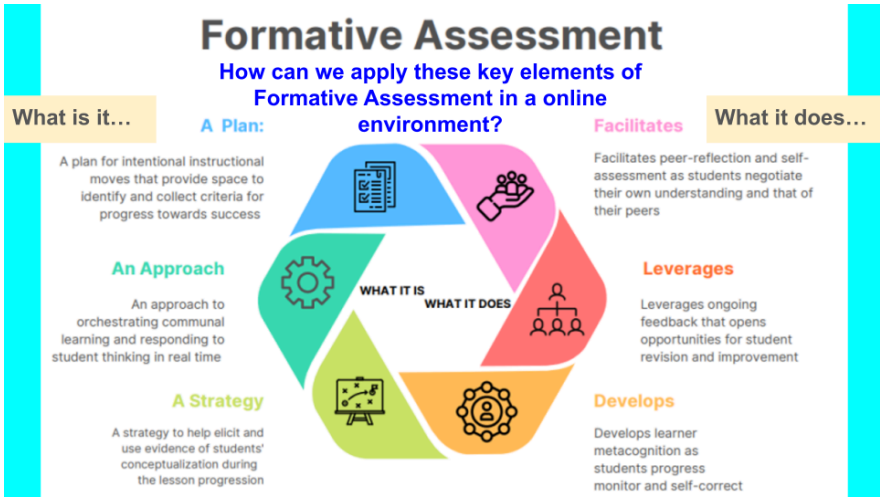
Artifacts

https://teacher.desmos.com/activitybuilder/custom/668d31ecfa7f1b5f53f77d0b



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