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Play-Doh: A Hands-on Formative Assessment Tool Arren Swift Ph.D.

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Abstract

The use of Play-Doh as a formative assessment tool is examined in its functionality to enhance understanding of student knowledge. This formative assessment task for secondary students uses a constructivist approach to education and promotes engagement through the development of sculptures to communicate understanding. This task worked well with a flipped classroom model of instruction. The use of arts-based research methods provides students with a different medium to communicate knowledge. The activity promoted student learning through the use of multiple intelligences often not utilized in many social studies classes.

Keywords: Arts-based methods, flipped classroom, assessment

My first experience with Play-Doh through the lens of an educator occurred when I attended an NEH Landmark workshop in 2017. As historians enhanced our content knowledge throughout the day a local curriculum specialist shared strategies we could enact to complement the material in our classrooms. One of the many creative ideas shared was the use of Play-Doh. Rollins (2016) described the use of the pliable substance as a way to help students become functioning members on an assembly line by sculpting stars. Through the exposure and encouragement to use new mediums to enhance student communication, I was determined to use Play-Doh in my classroom. I found modeling the substance to be enjoyable and the ability to use an intelligence rarely commissioned in social studies was a welcome change.

I adopted the use of Play-Doh as a formative assessment tool. Play-Doh served as the medium students would sculpt to present knowledge. According to Greg Lombardo, the Vice President of Hasbro's global brand strategy claims "Play-Doh is more of a medium than a toy, it allows people to have open-ended creativity" (Klara, 2016, p. 37).

Play-Doh

Play-Doh was created unconventionally when considering the development of many toys. In the 1930s Cleo McVicker ran a family business that developed cleaning supplies (Slater, 2016). At the time many homes were heated by burning coal, a necessity that resulted in soot-covered interior walls. People needed a wall cleaner that would remove soot, that demand led to the development of the Kutol Wall Cleaner (Slater, 2016). The product worked well and the

company received large orders from the Kroger company (Slater, 2016). As America's dependence on coal was reduced the need to repurpose the compound became apparent.

A short time after its development, the Kutol Wall Cleaner was used by Kay Kufall as modeling clay (Slater, 2016). Kay was a schoolteacher and she communicated the usefulness of the product to Joseph McVicker, the son of Cleo (Slater, 2016). The substance's main ingredients were water, salt, and flour, which produced a non-toxic compound, making it safe to touch (Slater, 2016). In 1955 Joseph introduced the product at a school convention and marketed the substance under the new name Play-Doh (Slater, 2016). By 1957, Joseph added the colors red, yellow, and blue (Slater, 2016). The product became more popular as a result of the addition of colors. Today more than 3 billion cans of Play-Doh have been sold, which helped make it onto Time magazine's list of the greatest toys of all time (Klara, 2016).

Formative Assessments

According to the Organization for the Economic Co-operation and Development (2005) formative assessment refers to frequent, interactive assessments of student progress and understanding to identify learning needs and adjust teaching appropriately. Formative assessment is a process that occurs during teaching and learning and involves both teachers and students gathering information in a process to meet educational goals (Heritage, 2010). The goal of formative assessment is to enhance learning (Ateh & Wyngowski, 2015).

To enhance learning using formative assessment it starts with teachers identifying learning goals for a lesson and determining what is critical for success. The teacher then develops tasks that serve as a system of checks developed as criteria to meet the learning goal (Heritage, 2010). An assessment can help enhance learning if it provides information to be used as feedback by teachers, and by their students in assessing themselves and each other, to modify the teaching and learning activities in the classroom (Black, Harrison, Lee, Marshall, & William, 2003). Heritage (2010) states, there is no single way to conduct formative assessments. This freedom and flexibility create opportunities for teachers to use engaging methods to gather knowledge, inform their teaching, and help them consider what elements to reteach.

Constructivist Approach

Constructivist theory suggests that knowledge is not something to be transmitted but a process of meaning-making in social and cultural communities of discourse (Fosnot, 2005). A constructivist approach to education provides learners with meaningful experiences that engage learners in discourse, interpretation, justification, and reflection (Fosnot, 2005). The approach encourages students to engage in developmentally appropriate authentic work to understand essential concepts and structures of a discipline (Scheurman, 2018). This form of education allows teachers to transition their roles from an informer to a facilitator who directs students through questioning.

Arts-Based Research

An inquiry-based classroom requires a variety of mediums for students to use to communicate learning. According to Kara (2015), "arts-based methods are increasingly positioned as effective ways to address complex questions in social science" (p. 3). Some popular forms of arts-based methods include photography, video recording, drawing, painting, and sculpting. Through the use of arts-based methods, participants can honor the process of meaning-making of their experiences (Roberts & Woods, 2018).

Grady (2004) states, "visual images cry out to us to imbue them with meaning" (p. 7). Images encode an enormous amount of information with multiple layers of complex information with the possibility of multiple interpretations. Mannay (2010) argues that to gain an understanding of the internal narrative of an image, one must acknowledge the image-maker and determine what they intended to show. Thus, we must question the student to find their meaning within the creation of their work. Rose (2007) claims, there are three ways in which images are developed: how an image is made; what it looks like, and how it is seen. When considering these questions as we review student work it becomes imperative to question the creator of the image. Grbich (2007) confirms this point by stating. intermingling the visual and verbal data is integral to the process of meaning-making.

Using Play-Doh

Many educational scholars contend that social studies suffers from legacy practices and persistent traditional instruction based on lectures, textbooks, and teacher direction (Cuban, 1982). Heafner (2020), the former president of the National Council for Social Studies Education recently stated, "social studies is made boring and robbed of its capacity to make sense of an uncomfortable past, a chaotic present, and inchoate future" (p. 4). To enhance social studies education, we must develop inquiry-based lessons. By providing students a chance to consider multiple perspectives, process information, and share their knowledge we can create more engaging experiences.

As students embrace the digital world of education and we must recognize that the use of hands-on activities is an essential part of the social studies curriculum. "One of the biggest complaints about online school is the zombie-like after-effects of spending too much time focused on a screen" (Swan, Danner, Hawkins, Grant, & Lee, 2020). Using manipulative objects as formative assessments, educators can break up the required screen time by encouraging students to display their knowledge through arts-based methods. One medium I prefer to use in my class is Play-Doh.

The use of Play-Doh to communicate understanding has been used in the field of science through the creation of models (Bobrowsky, 2020; Negrao, et al., 2020; Way, 1982). Like science teachers, I wanted my students to use Play-Doh as a way to communicate understanding. I often provided historical documents for students to analyze or a section of text for the students

to review. Social studies teachers are expected to incorporate reading in their instruction in ways that enhance students' skills in analysis, exploration, interpretation, and evaluation of authors' claims in primary and secondary sources (Ateh & Wyngowski, 2015). After reading and analyzing the students were tasked with using Play-Doh to develop something that encompassed meaning from the document or text.

I found this method valuable because I was enacting elements of a flipped classroom. In the flipped classroom model students are held accountable for preparation before attendance and class time is used to engage in discussions and application activities that focus on the integration of theory with experiential learning (Darnell & Means, 2017). To use the elements of a flipped classroom effectively I knew I needed a formative assessment that would determine student mastery of concepts covered outside of class. I wanted a strategy that was engaging and fun. I needed something less oppressive than a standard quiz but yet something that would help me determine what concepts I needed to clarify.

Ateh and Wyngowski (2015) claim research on how people learn suggests four interdependent factors that enhance learning: focus on the learner, well-organized knowledge, ongoing assessment for understanding, and community support and challenge. I worked to infuse these four ideas into my class. Darnell and Means (2017) state, one challenge of enacting a flipped-style classroom is accountability. I knew I would need to use frequent formative assessments. New ideas would need to be incorporated into the curriculum and processes that students found enjoyable would be needed. I designed my class time to be spent on application-based, hands-on learning activities where students received frequent and immediate instructor input and feedback (Michaelsen, Knight, & Fink, 2002).

I enacted the use of Play-Doh as a formative assessment tool in the Advanced Placement courses I taught. It was a great combination. I was able to assign readings to be completed outside of class than for the bell work activity, the next day students would be assigned a vocabulary word or concept to sculpt. I prepared a list of words that provided variety to what students would be directed to sculpted. This helped prevent the students from copying the work of their peers.

For example in the Advanced Placement American Government and Politics course, students were asked to read about the roles of the president. When my 12th-grade students arrived at class the next day they were assigned specific terms such as a chief diplomat (see Figure 1). The objective was for the students to identify the roles of the president. The previous day the students were assigned the section in the textbook that covered the material. The summarization and Play-Doh sculpture served as a formative assessment of the students' ability to read the text and comprehend it. This task examined unit two Roles and Powers of the President and specifically key concept 4.A.2., which states

Formal and informal powers of the president include: § Vetoes and pocket vetoes—formal powers that enable the president to check Congress § Foreign policy—both formal

(commander-in-chief and treaties) and informal (executive agreements) powers that influence relations with foreign nations § Bargaining and persuasion—informal power that enables the president to secure congressional action § Executive orders—implied from the president's vested "executive power," or from power delegated by Congress, executive orders allow the president to manage the federal government § Signing statements—informal power that informs Congress and the public of the president's interpretation of laws passed by Congress and signed by the president (College Board, 2020).

As the students entered the class the bell ringer assignment was posted on the board asking the students to summarize one of the powers of the president in 25 words or less and sculpt the Play-Doh to enhance understanding of the concept.

Figure 1.

Sculpting the Roles of the President



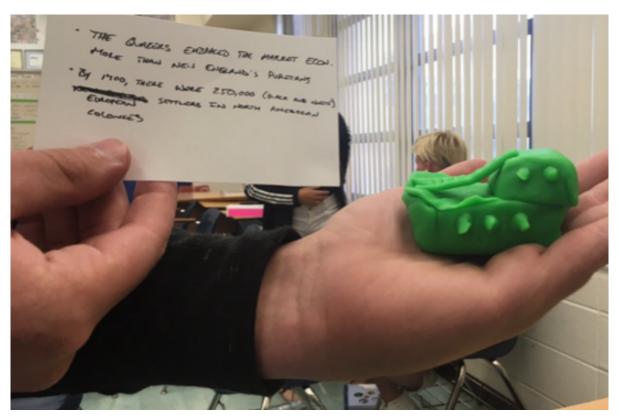
After five minutes I divided the class in half and conducted a gallery walk. The students took turns sharing their work with their peers and reviewing the roles of the president. I evaluated the students' work by looking at the Play-Doh sculpture, asking what they sculpted, how it related to what they read, and what they thought about that role the president performed. I did not assign points for this task but it provided the students with an opportunity to share their thoughts and creative talents with their peers. I was able to identify through questioning which

students needed to review the section in the textbook and encourage them to review the pages for homework.

In the Advanced Placement United States history course, I assigned the students a passage to read about the founding of the 13 colonies. When my 11th-grade students arrived at the class they were presented with a colony to sculpt and describe, (see Figure 2). The description had to include two facts about the colony and the Play-Doh sculpture had to relate to something they remembered from the text. This flipped classroom learning task helped my students engage with topic 2.1 contextualizing period two and specifically key concept 2.1.II, which states "In the 17th century, early British colonies developed along the Atlantic coast, with regional differences that reflected various environmental, economic, cultural, and demographic factors" (College Board, 2020).

Figure 2.

Sculpting the Thirteen Original Colonies



Similar to how I enacted the social learning experience in the AP American Government and Politics class I had the student share their work with peers. I asked my students to visit three colonies different from the one they examined and to look at the work of their peers and ask them one question they had about the colony. As I walked around the room I was able to listen to the students communicate and determine who had a grasp of the material by reviewing artwork,

looking at the facts written down, and listening to the answers students shared. I did not provide students with a grade but I jotted down the colonies the students did not examine and key facts I did not hear. I used this experience to enhance the short lecture I prepared for the next class period.

This learning process was enhanced through doing (Dewey, 1938). Every student was excited to open a fresh can of Play-Doh, breathe in the intoxicating smell, and create an object that showcased their artistic talents. These activities promoted the use of multiple intelligences and generated students' excitement because they want to see the work of their peers.

As the students shared their sculptures with the class they explained the significance of the person, event, or concept. This promoted social learning and the students felt empowered by their ability to share essential knowledge. The process allowed me to provide immediate feedback and solicit information from other members of the class. For example, I asked students in the AP US History class who founded the colony they examined and what colony was located nearby. The National Research Council (2002) stated, teachers are not the only ones to provide feedback, peers can also provide feedback that helps their classmates improve learning. If I was unable to determine the meaning of the sculpture I asked the artist follow-up questions. This process helped me determine the students' depth of knowledge and allowed the activity to not be dependent on artistic ability.

As the students shared their work occasionally I would add some additional information as it related to mastery of the key concepts. For example, I stated that the founder of Pennsylvania was William Penn and he believed it was important to establish positive relationships with Native Americans. Many of the students met the challenge and were able to provide evidence they mastered the material. For those who struggled with the concept, I was able to add a verbal explanation to communicate essential knowledge. I also took note of concepts students struggled with so I could follow up with notes or an additional activity that would add clarity to that concept. When a student presented a sculpture that I did not recognize or did not seem to correlate with the assignment I asked them what they made. I asked them what was the importance of that object and how did it relate to the objective we were learning. Sometimes students were able to explain my questions and their lack of artistic talent did not impede their ability to learn. Other students were not able to answer my questions and it became obvious they did not read the text.

The use of Play-Doh did have challenges to consider. Keeping track of time was essential. I had several artists who wanted to create a masterpiece and would have loved to allocate the entire class period to sculpting. I encourage you to devote five minutes to sculpting and display a timer on the board so the students know what is expected. Occasionally I had a student who did not want to use the Play-Doh so I made accommodations for the student to develop a written reflection and draw a picture. This was a rare occurrence as most of the students were so eager to start they often opened the cans of Play-Doh upon arrival to class.

Conclusion

I found using Play-Doh as a medium for students to explain concepts to be a fun and effective formative assessment tool. My students enjoyed an opportunity to create something and share their artistic skills and knowledge with their peers. Through this activity that promoted hands-on knowledge, my students were able to take a break from screen time and collaboratively share their knowledge through artistic skills.

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