THE IMPACT OF FACILITATING ART EXPERIENCES FOR STUDENTS WITH LANGUAGE-BASED LEARNING DISABILITIES THROUGH THE USE OF UNIVERSAL DESIGN OF LEARNING WITHIN A MAKERSPACE

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THE IMPACT OF FACILITATING ART EXPERIENCES FOR STUDENTS WITH
LBLD THROUGH THE USE OF UDL WITHIN A MAKERSPACE

Abstract

The Impact of Facilitating Art Experiences for Students with Language-Based Learning Disabilities Through the Use of Universal Design for Learning Within a Makerspace will address the topics of utilizing Universal Design of Learning (UDL), and Project-Based Learning (PBL) to deliver an arts-based STEAM curriculum within a Makerspace, in order to reach the needs of all students, specifically those with Language-Based Learning Disabilities (LBLD). Using a qualitative research approach, the effects of one specific targeted arts program focusing on authentic and real-world learning opportunities for students with language-based learning disabilities with the use of Makerspace will be investigated. A selection of six students enrolled in a private independent school for students with language learning disabilities was studied over the course of a 6-week period. Students were given PBL and arts-based STEAM activities to complete using a Makerspace. Data was collected through observational field notes, student interviews and self-assessments, and artifacts. Information on best practices for utilizing UDL and PBL to meet the needs of students with language-based learning disabilities within an art program was revealed throughout the course of this research study.

Keywords: Project-Based Learning (PBL), Universal Design of Learning (UDL), STEAM, Makerspace, Language-Based Learning Disabilities (LBLD)

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CHAPTER I: INTRODUCTION

Background To The Problem

Ableism is defined as the unintentional or intentional discrimination of an individual who has a disability. This social prejudice is based on the idea that individuals who are abled are superior and individuals with disabilities are less than those who are not disabled. Not all disabilities are visible. Disabilities may fall into the broad categories of mobility, psychiatric, auditory, cognitive, developmental, intellectual, speech, environmental, and medical disabilities. Ableism easily finds its way through the walls of educational institutions. The most common form of ableism for an individual with a Specific Learning Disability is that they can grow out of their disability or need support to help them perform in ways the abled individuals do. Ableism within the classroom can crush a child with a disability's ability to view themself as capable and successful learners. As a child, I struggled to learn to read and found many subjects in school challenging, causing me to question my intelligence and abilities. I was diagnosed with dyslexia; however, as a child, I was not equipped with proper learner empowerment to help me see my skills. Not being empowered to recognize the educational areas I was strong in led me only to see the areas I struggled in. The prevalence of ableism caused me to view my dyslexia as something embarrassing and something I didn't want my peers to know about. The stigma of having a disability made me feel that if people knew I had a learning disability, they would immediately think I was capable of less, or I was unintelligent. My experience is a great example of how ableism can crush a child's self-confidence and self-worth.

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Suppose there would have been one teacher early in my schooling who was able to encourage me to use my interest and abilities in the arts to support me within my other classes and content areas. In that case, earlier on, I might have found greater academic success in the classroom. I may have begun building confidence as a learner and in myself at a much younger age. Fast forward twenty years where this scared, self-doubting, and frustrated child is now on the other side of the experience as a stakeholder in her students' educational experiences, specifically students with diagnosed language-based learning disabilities. My personal experiences as an individual with a disability allow me to advocate for these students' educational and emotional needs. Although the shoes I walk in are different from those of my students, I feel as though I can relate more than others can.

The main focus of our school pedagogy is to help students understand their disabilities and feel empowered to self-advocate through the implementation of Universal Design for Learning there and after, referred to as UDL. The mission of The Hillside School there and after, referred to as THS, is to provide an individualized approach to learning for students with diagnosed language-based learning disabilities there and after referred to as LBLD, like dyslexia, dysgraphia, dyscalculia, processing disorders, and those demonstrating difficulty with attention, focus, and executive function skills there and after, referred to as EFS. Attention-deficit/hyperactivity disorder there and after referred to as ADHD, is a common comorbidity with some of the mentioned LBLDs. Under this methodology of an individualized approach and concentration on strengthening EFS, students are encouraged to make connections and transference between content areas. Teaching students how to transfer knowledge and specific skills

and strategies between content areas and highlighting to learners how to use their strengths in specific areas is something I personally benefited from as a child. It is important that we provide these skills to all learners at all levels of abilities. When a student is able to identify that something is challenging, it is common for them to want to avoid that subject or that content. Who wants to feel incapable voluntarily? By incorporating their interests and strengths into those tough areas, they are able to work through challenges more effectively and are left with more self-efficacy. The implementation of strategies and frameworks that encourage students to find their strengths and advocate for themselves when they need support helps students move from classroom to classroom utilizing the same strategies and feeling confident and capable.

My goal as an educator is to provide my students with the experiences and support, I wish I had as a child. Due to my personal account as an individual and educator with a LBLD and my resume as an educator for students with LBLD, my topic is very relevant to my current setting and vice versa. I aim to utilize this relationship with my students and the specialized school where I work to show why supporting differences, instead of teaching to the "typical learner," can make all students as successful as my students are due to the environment, pedagogical practices, and curriculum in place.

The advantage I have going into the study is that I can relate to my students and quickly put myself in the shoes of either the learner or the educator. Potential disadvantages I might have are the biases of being an individual with a learning disability and having to separate my personal experiences from those of my students. Overall, my goal is to be able to demonstrate that learners with disabilities and students requiring additional learning support need to be taught in a way that the use of UDL, Project-based

learning there and after, referred to as PBL, and the utilization of a STEAM-based

curriculum (Science, Technology, Engineering, Art, and Mathematics). This cultivates

the growth and use of their EFS and experience and utilizes the transference between

content areas, allowing them to use their strengths and interests to steer and guide them

throughout their educational career. These skills and practices can then be transferred

with a future-forward agenda, supporting all students in achieving their goals. While

these conditions are ideal for students with learning disabilities, they are conditions and

accommodations that can benefit all learners!

Problem Statement and Research Question

THS is considered a transition school. This means that it is common for students

to come and only stay for a few years while they gain learning strategies and work on

their EFS before transitioning back into their next school setting. Because there is no

"fix" to a learning disability, students are able to reacclimate to other school settings and

still find success by utilizing learning strategies that best suit them and their needs. Due

to students transitioning at different points, not all of my students have had the same

previous art experiences and come from art rooms that are structured with different

curricula. Throughout my observations over the past 5 years, I have seen a lot of students

come from previous art rooms that utilized teacher-directed instruction and fixed student

outcomes, meaning students were used to working on projects that were provided for

them in a step-by-step form with almost identical outcomes for each student work. While

these guided projects are fun and still include a background in art production, art

criticism, art history, and aesthetics, they are being guided to one visual representation of what their art should look like.

The real problem I have witnessed that students face when they come from art education experiences like this is that they don't know how to envision their own creative ideas and plan for what they want their art to look like. They are challenged with creative problem-solving along the way. Students who have never experienced the opportunity to define what art is for themselves are more likely to self-doubt their own artistic abilities and measure their successes in comparison to those skills and outcomes of their peers. If a student was never interested in the context or theme of the teacher-directed instruction project, there is a chance they wrote themselves off as not good at art or didn't like it. Thanks to Joseph Renzuilli's Schoolwide Enrichment Model (known as SEM), we understand that "every learner is unique and that students learn more effectively when they are working on a real problem and are enjoying the process" Randee Bonagura (2017). With that in mind, stepping away from teacher-directed cookie-cutter projects and directing students toward the art education model of PBL and STEAM would allow all students to make their own connections to the arts and the potential they have in utilizing it in a way that is best for them.

Proactively working on removing this ableist idea that only disabled individuals learn differently and need accommodations and modifications is something more teacher preparatory programs should facilitate for educators. Only encouraging some education, general or specialized, in teaching with the consideration of all types of learners is ignoring the basic principles of the constructivist approach great minds like Dewey and Piaget told us decades ago. We know from Piaget's Constructivist Learning theory that "a

constructivist approach allows students to take responsibility for their own learning"
(Bonagura, 2017). Setting all individuals up to be successful and to be able to exercise
and strengthen their EFS is something we have the research and ability to do. EFS
include planning, focus, working memory, self-regulation, organization, time
management, etc., and are subject to be challenging for individuals with specific
disabilities. To some degree, all individuals who are disabled or abled could use practice
in these areas. For this reason, I am interested in researching how incorporating a
STEAM pedagogy supported by UDL through the implementation and use of a
Makerspace can encourage authentic learning through PBL while strengthening student
empowerment.

Joyce Huser states that "STEAM education provides an opportunity to make the
educational environment look, feel, and function more like the real world by developing
authentic connections between academic content and practice" (Huser, (2020, p. 3)".
With the following in mind, I ask this research question. Given that through the arts,
students can make connections with their peers, other subject areas, and the world around
them, and Joyce Huser (2020) suggests that STEAM education is reliant on experimental
and project-based learning, in what ways might a Makerspace within an art classroom
impact and help students retain cross-curricular skills? Huser goes on to explain that
learners who are not easily engaged by traditional separate subject instruction are often
more involved in STEAM classrooms; providing students with STEAM-centered
approaches to learning can encourage more tremendous success and engagement for all
students, despite their level of ability or learning modalities (p.6).

The understanding we have of UDL, a framework that optimizes teaching and learning for all, and how specifically it is a tool that can accommodate students with Specific Learning Disabilities (SLD) or differences. Within UDL, the curriculum model of PBL, with a STEAM pedagogical framework, can inspire us to look specifically at how a Makerspace creates an environment that can speak to the needs of all students, specifically students with SLDs. This process will foster the development and growth of students' EFS will be promoted through these practices. The combination of these frameworks, approaches, and environments is also equipped to foster and promote the use of students' EFS.

Theoretical Framework
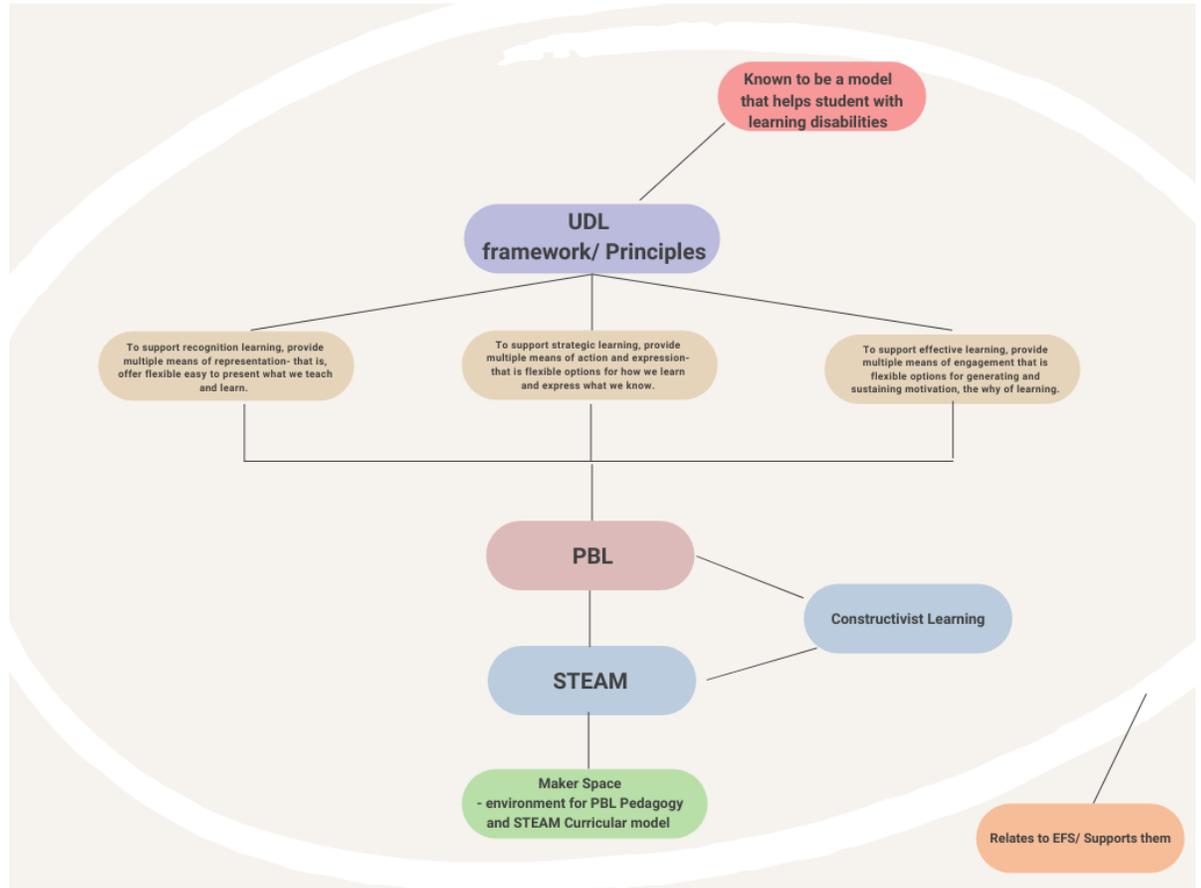
Figure 1. Concept Map

Depicted in the concept map above are the concepts and sub-concepts that will be discussed and viewed in this research. At the top is UDL, specifically its framework and principles. These principles have been designed and used to aid not just individuals with learning disabilities but all students. Accommodations for students with or without disabilities are easily facilitated when using UDL. UDL provides multiple means of engagement, representation, action, and expression. The UDL framework targets three brain networks. They are as follows; the affective networks (the 'why' of learning), recognition networks (the 'what' of learning), and strategic networks (the 'how' of

learning)—utilizing UDL levels the playing field for all learners by allowing accessibility

for all without having to make specific modifications or accommodations for just

individuals with disabilities, for there are already instilled within this framework.
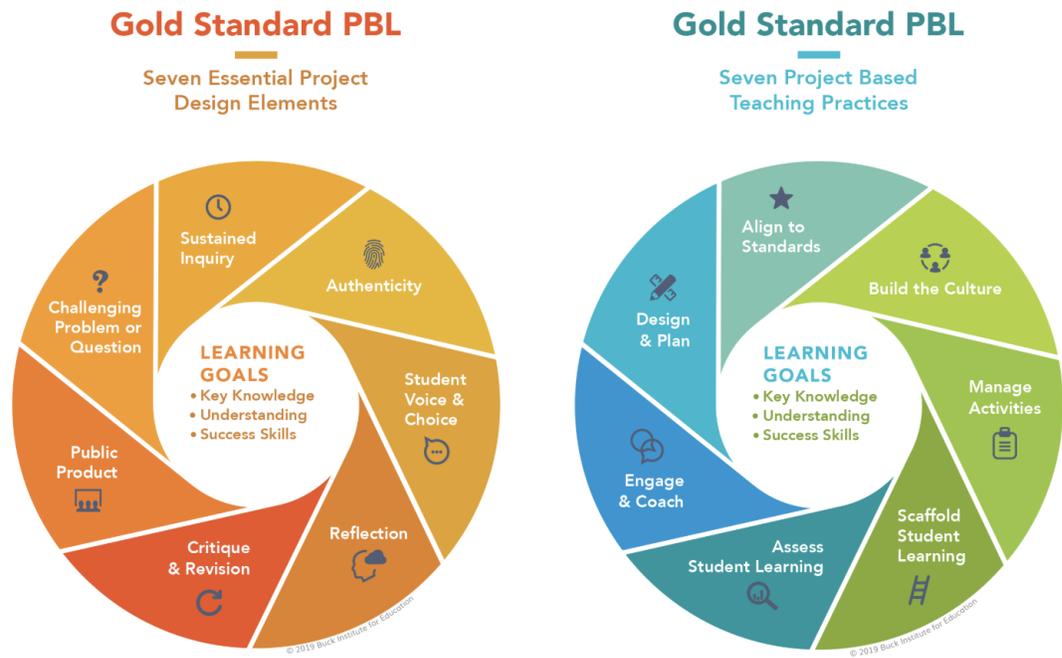
Figure 2. PBL Works: Gold Standard PBL, Design Elements, and Teaching Practices.

 (https://www.pblworks.org/what-is-pbl)

The curricular framework of PBL is similar to the structure of UDL. Some

commonalities they share are the development of self-reflection, self-assessment, student

voice and choice, sustained inquiry, and scaffolded student learning. Overall, both

frameworks and theories attend to all learning styles, visual, auditory, and kinesthetic,

and allow for the creation of successful learners. By utilizing design elements and

teaching practices that truly keep the students at the center of their learning with the close

support of the educator, students can be purposeful, motivated, resourceful,

knowledgeable, strategic, and goal-directed. Utilizing the environment of a Makerspace

within an art classroom to demonstrate the learning processes and potentials of PBL and

STEAM will speak to the needs of students with learning disabilities and facilitate hands-

on learning.

Significance of The Study

This study aims to aid in students' abilities to connect with their peers, other

subject areas, and the world around them. "The PBL design method emphasizes the

artistic processes of creating projects and provides appropriate scaffolding and guidelines

for students to be more independent, active, and responsible in discovering ideas or

solving problems using the PBL concept during the project completion (Hawari & Noor,

2020, p. 106)". My research will connect how a Makerspace within an art classroom

impacts and promotes students' ability to solve problems and make things creatively. The

results of this research will also benefit students because it will demonstrate how

STEAM, PBL, and a Makerspace can allow students to gain transferable knowledge,

helping them see the connection between different content areas and the greater purpose

and application of their learning.

Limitations of The Study

This study is situated in the specific context of a student's experience, with a

learning difference, at a private school. The student-to-teacher ratio is limited to one

teacher per eight students. These small class sizes ensure that each student is given

enough one-on-one attention. While most of the students at THS qualify for Individual

Education Plans (IEPs) or 504s, these supports are not used within our private school.

The accommodations and modifications that students would receive from these

specialized education plans are already in place and utilized within the structure of the

school. A limitation of this study is the frequency and duration I will see my students.

While I have the flexibility to design my curriculum and lessons with my study and data

collection in mind, I cannot add hours to the day or adjust the schedule of when I see my

students. I see each of my students once a week for an hour class period. Having the

opportunity to see my students more than once a week for a longer period of time would

impact the amount of content and creativity that could potentially happen. With this in

mind, it will be crucial that my study is designed with the frequency and duration of time

I see my students so that I can still document and closely monitor the implementation of

this study. The methods of research I will engage in will be purposeful sampling, the

utilization of multiple cases (students) to collect interviews, observations, documents, and

artifacts. The interviews will be specific to students' personal feelings about their

performance within the structure of my study. Since my students are minors, they have all

received parental or guardian permission to participate in specific aspects of my data

collection.

Definition of Terms

504 Service Agreement:

A "504" refers to Section 504 of the Rehabilitation Act of 1973, a federal civil

rights law in the United States. It is designed to protect individuals with disabilities from

discrimination in programs and activities receiving federal financial assistance. The term

"504" is commonly used to refer to the accommodations and protections provided under

this law. A student that does not qualify for special education services under The

Individuals with Disabilities Education Act (IDEA) still may qualify for services under a

504 if the disability is shown to limit their educational performance substantially.

Constructivist Learning:

Constructivist learning is an educational theory and approach that emphasizes the

active involvement of learners in constructing their own knowledge and understanding of

the world. Constructivist teaching methods aim to assist students in assimilating new

information to existing knowledge and enabling them to modify their existing intellectual

framework appropriately to accommodate that information.

Executive Function Skills (EFS):

"'Executive Functions' are defined as the system of cognitive processes that

control and manage other cognitive processes- a group of processes that are responsible

for strategy, planning, and regulating behavior." Hall, Meyer, Rose (2012)

Individualized Educational Program:

An IEP is a legal document created for students who are eligible for special

education services in the United States. It is developed collaboratively by a team of

professionals, including educators, parents, guardians, and other specialists. This program

is designed to address the unique educational needs of a student with a disability.

Language-Based Learning Disability:

A language-based learning disability (LBLD) refers to a spectrum of difficulties

related to the understanding and use of spoken and written language. It is a specific type

of learning disorder that primarily affects the acquisition, understanding, and use of

language skills. It typically manifests difficulties in listening, speaking, reading, writing,

spelling, or organizing language.

Makerspace:

"Makerspace is a place where students can engage in creative experiences to solve

problems, tinker, design, learn new skills, and be entrepreneurial. Individually or in

groups, students can work on projects that involve STEAM (science, technology,

engineering, art, and math) concepts that align with state and national curriculum

standards. It is a place that encourages risk-taking, revision, and reflection and is stocked

with materials that provide equal access to all learners" Randee Bonagura (2017)

Project-Based Learning (PBL):

John Thomas (2000) explains that project-based learning requires "complex tasks, based on challenging questions or problems, that involve students in design, problem-solving, decision making, or investigative activities; give students the opportunity to work relatively autonomously over extended periods of time; and culminate in realistic products or presentations." According to Ronald Marx et. al. (1994), project-based instruction often has a "'driving question' encompassing worthwhile content that is anchored in a real-world problem; investigations and artifacts that allow students to learn concepts, apply information and represent knowledge in a variety of ways; collaboration among students, teachers, and others in the community so that participants can learn from one another; and use of cognitive tools that help learners represent ideas by using technology…"

STEAM (Science, Technology, Engineer, Art, Mathematics):

"The State Agency Directors of Arts Education (SEADAE) defines STEAM as an intentional, collaborative pedagogy for teachers that empowers learners to engage in real-world experiences through the authentic alignment of standards, processes, and practices in science, technology, engineering, the arts, and mathematics" Joyce Huser (2020).

Specific Learning Disabilities (SLD):

The Individuals with Disabilities Education Act (IDEA) defines specific learning disability as, "The term 'specific learning disability' means a disorder in 1 or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations."

Universal Design for Learning (UDL):

"UDL is a framework for instruction organized around three principles based on the learning sciences. These principles guide the design and development of a curriculum that is effective and inclusive for all learners" Rose & Gravel (2010).

The Three UDL Principles:

1. To support recognition learning, provide multiple means of representation- that is, offer flexible, easy-to-present what we teach and learn.

2. To support strategic learning, provide multiple means of action and expression- that is, flexible options for how we learn and express what we know.

3. To support effective learning, provide multiple means of engagement that is flexible options for generating and sustaining motivation and the why of learning. Rose & Meyer (2002)

Assumption To Be and Not To Be Debated

Given that the location and student population included in this study are limited to
students with specific LBLDs, the impact of the implementation of combined pedagogy
used in this study may not be easily replicated. However, the positive effects of
implementing a makerspace in the k-8 Art room, introduced through PBL design with an
established framework of UDL practices, will be debated.

Given our understanding of the Constructivist approach to learning from historical
figures like John Dewey, and Jean Piaget, it is assumed that this profound concept of
making as an instructional practice and the current maker movement extends upon those
concepts. Therefore, it will not be debated that the utilization of a makerspace capitalizes
on the principles of PBL, demonstrating that the process of physically making objects is
an effective way to develop and demonstrate the skills and understanding desired through
making and PBL.

Summary / Roadmap of Chapters

We know that students are more empowered when they are responsible for their
own learning and are given the environment to work on real-world problems
authentically and creatively. In the following chapters, we will explore UDL, a
framework that optimizes teaching and learning for all, and how specifically it is a tool
that can accommodate students with LBLDs. STEAM education can allow the
educational environment to look, feel, and function more like the real world by
developing authentic connections between academic content and practices. Makerspaces
are a place that encourages risk-taking, revision, and reflection and is stocked with
materials that provide equal access to all learners. With consideration of the needs of all

students within the 21st century, we are questioning how the framework of UDL, PBL,

and STEAM can flourish and benefit students' abilities within the art classroom. In

chapter two, Review of the Literature, I will discuss the history of UDL, STEAM, and

PBL to show further how these theories and practices relate. With that information in

consideration, I will demonstrate where my study will sit in relation to the reviewed

literature.

CHAPTER II: LITERATURE REVIEW

Introduction

For most students, there is always at least one subject that they would consider themselves good at or interested in. For others, it is a struggle to find any bit of self-confidence within educational settings. As we continue to evolve throughout the 21st century and see new jobs and skills required for our future generation, career readiness standards within education are more relevant than ever. Considering the theories and pedagogical approaches that historically surround the arts within education, we will look closer at the following topics: UDL and the Constructivist Theory and how they relate to the history of UDL, STEAM, PBL, and Makerspaces. By encouraging students to see how they are able to connect what they are learning within each content areas of school, we can inspire student motivation and a more real-world, relatable schooling experience for students.

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Educational Theories and Frameworks

Educational Contexts of Learning By Doing

Universal Design For Learning (UDL)

Rose & Meyer (2002)

Constructivist Theory

Dewey (1938)

Cullen et al. (2012)

Weimer (2002)

Vanada (2016)

Burnette & Norman (1997)

Student-Centered-Learning

Andrews (2010)

Project-Based Learning (PBL)

Hawari, A.D.M., & Noor, A.I.M. (2020)

Boss (2011)

Science, Technology, Engineering, Art, Mathematics (STEAM)

Huser (2020)

Jia, Y., Zhou, B., & Zheng, X. (2020)

Makerspace

Bevan, B.,Petrich, M., & Wilkinson, K. (2014)

Bonagura (2016)

Fleming (2015)

Figure 3. Graphic Organizer of Key Concepts and Organization of Literature Review

Educational Theories and Frameworks

Universal Design for Learning

Dr. David H. Rose is a developmental neuropsychologist, educator, and co-founder with Dr. Ann Meyer of the Center for Applied Special Technologies (CAST). Rose is credited with developing the Universal Design for Learning (UDL) in 1984. UDL is a framework for instruction that is based on the learning sciences. With proper utilization of his framework, one can design an inclusive and effective curriculum for all learners. The three UDL principles are:

1. To support recognition learning, provide multiple means of representation-that is, offer flexible ways to present what we teach and learn.

2. To support strategic learning, provide means of action and expression- that is, flexible options for how we learn and express what we know.

3. To support effective learning, provide multiple means of engagement, that is, flexible options for generating and sustaining motivation, the why of learning.

(Rose & Meyer, 2002, p. 2).

UDL was initially developed by Dr. David Rose and Dr. Ann Meyer years before there were any laws protecting the idea that one size does not fit all. With the development of this theoretical and historical framework from these two researchers from the Harvard School of Graduate Education, one can see the validity of these principles. UDL levels the playing field for learners.
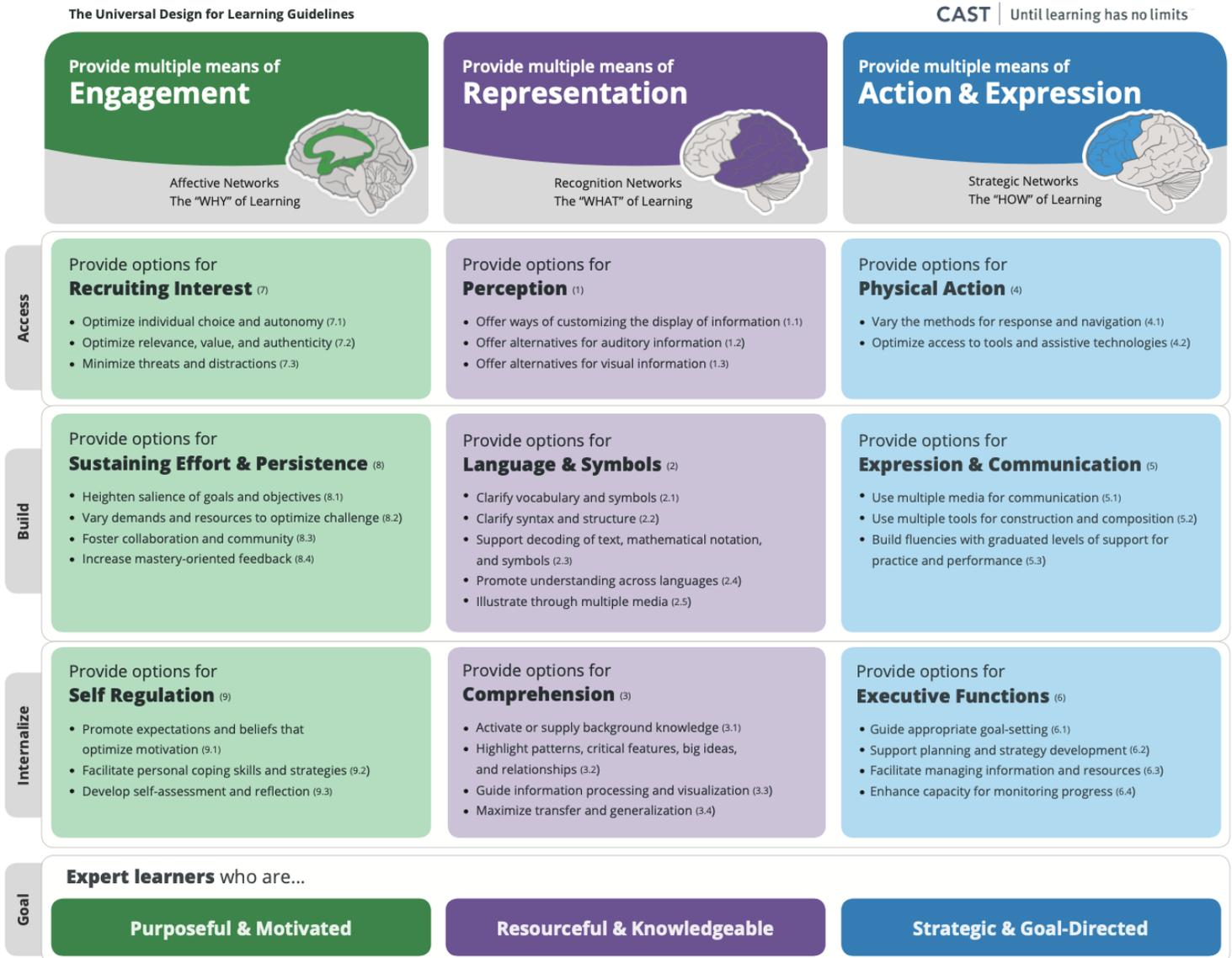
Figure 4. The Universal Design for Learning Guidelines Graphic Organizer

(https://theartofeducation.edu/2014/12/19/where-are-you-on-the-choice-spectrum/)

Learning designed for all includes general, special education, early education, and

even postsecondary education. "'Universal' does not mean 'one-size-fits-all.' Rather, it

means that all their individual differences have equal and fair access and opportunity to

learn the same content in ways that work best for them" (Rose & Meyer, 2002, p. 4).

Historically there was no protection or requirement of fair access and equal opportunity

for individuals with disabilities until the Americans with Disabilities Act (ADA) of 1990

was implemented. More recently, in 2004, the Individuals with Disabilities Education

Act (IDEA) was passed. IDEA is a law that provides free and appropriate public

education to eligible children with disabilities throughout the nation and ensures not only

special education but related services to those children.

> "Advances in neuroscience and education research over the past
>
> 40 years have reshaped our understanding of the learning brain.
>
> One of the clearest and most important revelations stemming
>
> from brain research is that there is no such thing as a 'regular
>
> student.' Instead, learning is as unique to individuals as their
>
> fingerprints or DNA. The notion of broad categories of learners-
>
> 'smart-not smart,' disabled-not disabled,' and 'regular-not
>
> regular,'- is a gross oversimplification that does not reflect
>
> reality" (Rose & Meyer, 2002, p. 3).

UDL is a theoretical framework that is designed to help the success of all learners.

Ableism within education has created a stigma that students with a learning disability

should be expected to perform or learn in a way equivalent to others, even if the

appropriate accommodations have not been made. Suppose UDL was universally

implemented into our education system. Would there be less of a presence of ableism, as

we assume everyone learns differently, and we would be providing each student with an

effective curriculum that meets the needs of all?

UDL principles provide easy access points to arts education; educators can

purposefully highlight the why, what, and how they may aid students in seeing the use of

skills they typically use in the art room as overarching learning strategies.

> "The arts allow for instructional options across many of the UDL
>
> Guidelines and checkpoints, as well as the possibility of engaging
>
> many supporting neural networks. For example, teaching the arts
>
> can provide additional multimodal opportunities for content to be
>
> represented, which relates to the brain's recognition network.
>
> Furthermore, the arts provide opportunities for non-linguistically
>
> and cross-linguistically representing information, symbolism, and
>
> metaphor, using a wide range of forms… This represents a shift
>
> from concentrating on the arts as a subject area to emphasizing the
>
> arts as a learning strategy" (Glass, 2010, as cited in Rose & Meyer,
>
> 2002, p. 107-108).

Constructivist Theory

Constructivism is vital to understand as an educator because of its placed value on

the student being at the center of their learning environment (Dewey, 1938).

"Constructivist learners engage in inquiry-driven, project-based, collaborative, and

reflective processes, which better develop their abilities as critical thinkers and creative

problem solvers" (Cullen et al., 2012; Dewey, 1938; Weimer, 2002, as cited in Vanada, 2016). Since the constructivist approach to learning has been around for so long, it is understandable why so many sequential theories and practices have derived from this original theory.

This idea that student-centered, project-based pedagogies allow students to engage in learning authentically and personally demonstrates that a one-size-fits-all approach to learning has proven inadequate for decades. "Constructivism shares conceptually close connections with learner-centered philosophies and project- and design-based pedagogy" (Burnette & Norman, 1997, as cited in Vanada, 2016). With the framework of UDL and its three-step approach in combination with the constructivism theory, we see these related topics repeated.

Student-Centered Learning

Student-centered and project-based learning is a 21st-century take on the constructivist approach. Concerning the art classroom, there is a differentiation between student-centered art classes and discipline-centered art classes. It can be assumed, with our knowledge from historical figures like John Dewey and Jean Piaget, that putting the student at the center of the art class is more productive.

> "A student-centered classroom places students in the center of their own
> learning. It is an environment where previously reluctant learners
> transition into engaged learners, taking on the role of helping shape their
> own curriculum. A student-centered class differs from a discipline-
> centered class in three ways. First, there is a shift in focus from the project

or assignment to the student. Students, not the teacher, generate ideas for

projects that are embedded with personal meaning. When students visually

express their ideas, they become truly vested in artmaking. A second

difference is a subtle shift in the teacher-student relationship, as it

becomes a partnership. Because students choose a direction for artmaking

and study/ research, they view the teacher as one who guides, not dictates,

their artistic path. The third distinction is a transition in assessment. A

summative focus on which final grades are essential is replaced by a more

collaborative and ongoing process in which students' engagement in their

chosen area of exploration is important. (Andrews, 2010)"

Putting the student at the center of the art room, like in any other classroom, evens

out the power dynamics and allows the student to take control of their learning. In order

to facilitate inquiry-driven projects, one must allow students the room to make their own

decisions and venture down their natural path of inquiry. As depicted in *Figure 2*,

Scaffolding does just this by modeling for students how to go about a process and

showing them how to make the decisions necessary. As Andrews mentions, this switch to

a student-centered classroom requires a switch in assessment strategies and is more

conducive to authentic formative assessments. With the students' needs and interests

being at the center of the classroom, typical completion grades would not be appropriate

for adequately gauging the success and learning of each student. To facilitate the natural

learning and interest-driven quality of a student-centered classroom, the student should

also be a part of the assessment process. For example, self-assessments would be a great

way to involve students in this aspect of their learning. Student self-assessment is an

authentic formative assessment strategy that dovetails with UDL in providing students a

front-row seat in the what, how, and why of their learning. By asking students to evaluate

their own process as well as product, they are not just completing a task and then getting

a grade or feedback on it; they are the ones evaluating their work along the way and

deciding whether or not they are demonstrating specific skills or have evidence of their

learning. Self-assessments could be rubric based or can take the form of open questions

assigned by the teacher with open space for students to share their thoughts. Facilitating

student self-assessment throughout a project allows students to have more designated

time for developing their final product, encouraging more student-centered learning.

Educational Contexts of Learning by Doing

Project-Based Learning

As gathered from the literature sourced on UDL, constructivism, and student-

centered learning, the student is learning through doing within these curricular

frameworks. Randy Bonagura (2016) explains how PBL is a method of teaching built on

the work of education and child development experts like Piaget, Dewey, and Montessori

and facilitates rigorous, hands-on learning that is relevant for students making their own

connections to their learning. Using a PBL curricular model, students' needs and interests

are, again, at the center of everything. "In PBL, the project is the centerpiece of the lesson

where a proposed project is introduced along with open-ended questions that are the

driving force for students to investigate and find their own solutions" (Boss, 2011, as

cited by Bonagura, 2016, p. 15). These open-ended or essential questions allow students

to be able to insert the exact problem-solving solutions to these curricular-based

questions as they would real-world problems.

> "Essential question (EQ) promotes multidisciplinary investigations,
>
> requiring students to apply skills and various contents from science or
>
> social students. In addition, teachers would be able to implement thematic
>
> and cross-curricular teaching and learning practices effectively while
>
> carrying out PBL projects using EQ elements and frameworks" (Patton,
>
> 2012; MacMath, 2017, as cited by Hawari, A. D. M., & Noor, A. I. M.
>
> 2020).

Not all problems can be solved with a fixed solution, and not all solutions

demonstrate learning. "Learning goes hand in hand with the making; one doesn't come

before or after the other" (Bonagura, 2017, p. 15). PBL can help encourage students to

think about tasks or challenges in an open-ended way and not as something with a

beginning or an end. Using a PBL approach within the art classroom highlights learning

with process over product. While students still work towards making a product, more

weight is placed on the process instead of the finished product. In exchange, students will

learn to work on other artistic motivations like making for the joy of experiencing the

process, making to invent, or even making as a form of exploration.

Using the open-ended nature of PBL leaves room for creativity and for the needs

of each diverse learner to be addressed. "Diverse learners include students who learn

using different modalities, such as being predominantly visual, auditory, or kinesthetic.

Diverse learners also include students who learn with varying levels of adult support for

academic, social, and emotional needs; those who learn better individually or in a group;

and those with varied interests" (Bonagura, 2017, p. 15). It can be concluded that the

room for consideration of diverse learners needs to be addressed within PBL; the

framework of UDL can be utilized as a model for natural check-ins and guidance through

the process.

Science, Technology, Engineering, Art, Mathematics, Education

With the contextual evidence linking the importance of UDL and PBL, it should

not be surprising that STEAM is yet another lineage of constructivist theory and student-

centered learning. "STEAM pedagogy supports a variety of instructional models, such as

UDL, that creatively engages a diverse body of learners" (Huser, 2020, p. 15). STEAM is

able to capture all of the positive qualities we see in these student-centered learning

environments. "STEAM education provides an opportunity to make the educational

environment look, feel, and function more like the real world by developing authentic

connections between academic content and practice." (Huser, 2020, p. 5). STEAM holds

the potential to help students make connections between content areas they typically

would not. By allowing them the space to make their own connections, PBL is being

implemented.

> "Scholars have increasingly realized that arts and humanities subjects help
> students understand the connections between different disciplines from a
> more comprehensive perspective, and STEM education has evolved into a
> new STEAM Age" (Watson and Watson, 2013; Kant et al., 2018, as cited
> by Jia, Y., Zhou, B., & Zheng, X. 2020).

While I acknowledge the distinction between STEM and STEAM, this is not a central

concern of this study. By adding the 'A' to STEM, the clear connection between the

scientific process of inquiry and the artistic process of making is connected.

In the 21st century, career readiness is a big topic in STEAM education. By

capturing learners' attention and showing them that they possess the skills to find success

in multiple disciplines, you are motivating the learner. "When the arts are authentically

included in STEAM pedagogy, future-forward agenda in education like cultural

relevance, social-emotional learning, workforce development, and issues yet unknown

can be purposefully addressed" (Huser, 2020, p. 6). By bridging the content areas for

students and providing them with real-world challenges, students are inherently learning

how to make connections for themselves and may find more substantial continuity within

their education experiences.

"For STEAM learning to be authentic, students need to explore real-world challenges,

subsequently experiencing both the processes and products of their fully-synthesized

learning. In addition, those problems must occur at the natural intersection among

STEAM disciplines" (Huser, 2020, p. 5). Within the STEAM classroom or any related

subject areas, students can be encouraged to think within a consistent cycle, using the

same vocabulary across content areas.

"In examining the relationship between educational theory and practice, it is necessary to

think of the various disciplines as a feedback loop in which each simultaneously affects

the other, each influencing the other for the benefit of learners" (Huser, 2020, p. 5). This

process may follow the pattern of planning, building, evaluating, reflecting, redesigning,

and back to planning, etc.

STEAM provides students with multiple opportunities to find success. With the PBL curriculum being used within a STEAM pedagogy, students are being given the platform to engage with these real-world challenges through their investigations and access points, facilitating authentic connections and learning.

Makerspace

With the utilization of STEAM, Makerspaces have become a common addition to many schools and even libraries. The makerspace movement is a relatively new term that is pedagogically located within the constructivist philosophies of education. A simple definition of a school makerspace is a place where individuals have the opportunity to make in accordance with their own interests, exploring both tools and materials to develop projects rich in creativity (Flemming, 2015). A makerspace would be considered an environment to allow the curricular and pedagogical models of PBL and STEAM to flourish. Makerspaces can be anything from high-tech to low-tech, yet allow students to explore PBL and student-centered learning.

> "One of the overriding themes in maker education is individuality. For the student to be given the productive opportunities to shape his or her environment through making is a critical element in helping each of them to define his or her individuality within a social and sharing context. Their individuality within such an environment comes out of the solutions that students create and form the self-confidence and self-awareness that come from the process of designing, making, and sharing" (Flemming, 2015, p. 7).

By providing students the opportunity to learn within the structure of an arts-based

makerspace classroom with STEAM pedagogical practices, students would be provided

equal opportunities for learning due to the theme of individuality within maker education.

Summary

Dr. Rose's UDL framework levels the playing field for all students within

education. We have seen from multiple sources that the concept of 'normal' learners is an

incorrect assumption and that learning is as unique as an individual's DNA (Rose &

Meyer, 2002). Given the laws of ADA and IDEA that exist to protect the needs of diverse

learners and learners with diagnosed disabilities, why not acknowledge that every student

is unique and provide them with a curricular environment that is designed to help them

find success? The framework of UDL is linked to the historical constructivism theory that

students are at the center of their learning and that they are provided with more authentic

and personal experiences when subjected to PBL. With these brain scientists and child

philosophers sharing similar perspectives of how to help children find more tremendous

success in education for decades now, all signs are pointing to UDL, student-centered,

PBL learning as best practice.

PBL is implemented with a STEAM pedagogical practice. STEAM has become

an essential part of contemporary education with a strong drive towards helping students

with career readiness and finding real-world applications to their learning. More recently,

makerspaces and the makerspace movement have become popular in settings like

libraries and other classrooms within schools. The push for DIY and tinkering allows all

learners to be at the center of their educational discoveries. Each of these topics is a

continuation into the next with similar premises and philosophies that demonstrate great

successes independently. If combined into one curricular structure and pedagogical

practice within one specific environment, it can only be assumed that this would facilitate

great success for students of all abilities.

In order to deliver the best practices for students within the art room, history

points to the benefits of utilizing UDL and student-centered learning. Through the arts,

students can connect with their peers, other subject areas, and the world around them.

STEAM education is typically reliant on experimental and project-based learning. For

these reasons, this study aims to create an environment inspired by the framework of

UDL, student-centered project-based learning, within a makerspace to facilitate STEAM-

based art education. Students will be at the center of their learning and will be involved in

the completion of formative assessments that take the form of verbal and written reports

to measure the success of the environment and structure of the curriculum.

CHAPTER III: METHODOLOGY

Design of the Study

Setting

This study takes place within THS Art Room. THS is a K-8 independent private school currently serving students grades 1-8 with language-based learning disabilities. The mission of THS is to maximize the potential of the child with learning disabilities through excellence in education. THS develops resilient learners equipped with strategies, self-confidence, and advocacy skills to succeed in traditional learning and workplace environments.

THS opened its doors to 10 students at the Lutheran Church of The Holy Spirit in Emmaus, PA, in 1983. In 1989 THS relocated to its current location in Lower Macungie. Today THS has 43 students enrolled. THS students are intelligent children who learn differently from their peers and therefore need a different approach to match their learning style. Students may be diagnosed with a language-based learning disability like dyslexia, which affects reading; dysgraphia, affecting writing; dyscalculia, affecting math; or processing disorders affecting language, auditory, and or cognitive processing, and demonstrate difficulty with executive function skills, attention, and focus. THS is a tuition-based private independent school and a non-profit organization. Some of our attending students receive need-based financial assistance, while others receive none. Tuition is sometimes paid for by sending districts, but this intervention is a performance need-base. The sending district evaluates Student assessments and benchmarking yearly to ensure they are making appropriate progress.

To provide a differentiated learning environment for our students, THS limits class sizes to no more than eight students per class. This 1:8 teacher-to-student ratio allows students to gain confidence in their abilities and feel empowered to self-advocate while simultaneously receiving individualized attention based on their needs. THS is accredited by the Middle States Association (MSA) of Colleges and Schools and has maintained its accreditation for over 30 years. The Hillside School is also affiliated with the International Dyslexia Association (IDA) and The National Association of Independent Schools (NAIS).

THS's facilities include a gymnasium/multipurpose room, classrooms paired with observation rooms, an art room, recently renovated science labs, a library, and a playground. The art room is the second largest room in the school and is located at the far end of the East Wing, which was added to the original building. Because of the size of the room and the fact it was not part of the initial build, there is no observation room looking into my classroom. This means that anyone interested in what is happening in the art room is encouraged to join in on the fun personally.

I am fortunate to have a spacious art room equipped with many countertops, cabinets, and built-in shelves. A double-sided sink with a trap on the left side accommodates a range of art materials like plaster and clay. My storage closet is tucked in the corner of my classroom and is home to our old Skutt kiln. The room easily accommodates my small classes and leaves plenty of room for artistic exploration and a wide variety of project sizes. Students have three large workspace tables, although some prefer to work on the floor. I am fortunate enough to have a generous art budget. We are

a private school, and the arts and art integration and STEAM are a large part of our

school's culture.

The focus of this study is incorporating PBL, STEAM, and the utilization of a

Makerspace within an art classroom in order to fully place the students at the center of

their learning and encourage hands-on learning to solve problems. For that reason, I have

already organized and named a section of my art room our makerspace. This makerspace

is situated on a 48-inch workbench with a pull-out drawer, upper and lower shelf, and a

pegboard. The supplies within the makerspace are as follows; pipe cleaners, popsicle

sticks, different types of tape, rubber bands, tracers, straws, sharpies, mini whiteboards

and dry erase markers, staplers, pushpins, hole punchers, paper fasteners, plastic utensils,

ribbon, foam sheets, and small foam pieces, beads, clothespins, cotton balls, pom pom

balls, an assortment of recycled cardboard, paper towel and toilet tissue cardboard rolls,

and other recycled packaging materials like foam and bubble wrap. Part of our classroom

procedure is students still ask to use supplies from the makerspace or to use the paint that

is out on the counters, etc. If students are not permitted to use a supply, for example,

paint, we will discuss why they cannot use it. The common reason is that there isn't

enough time left in class to set up to use the material and clean it up, or there might be a

better medium choice for their specific making needs, and we address that. On the wall

above the makerspace is the maker cycle I hope to encourage my students to work within.

These phrases are conducive to art making and general or other content areas like

STEAM, science, or any tinkering process. This makerspace is situated next to like

crayons, colored pencils, oil pastels, chalk pastels, and twistable Crayola crayons. In

general, I have my room set up to encourage students to collect their own materials and

have them labeled with signs with clipart images of the supply, along with the name of

the supply, utilizing UDL.
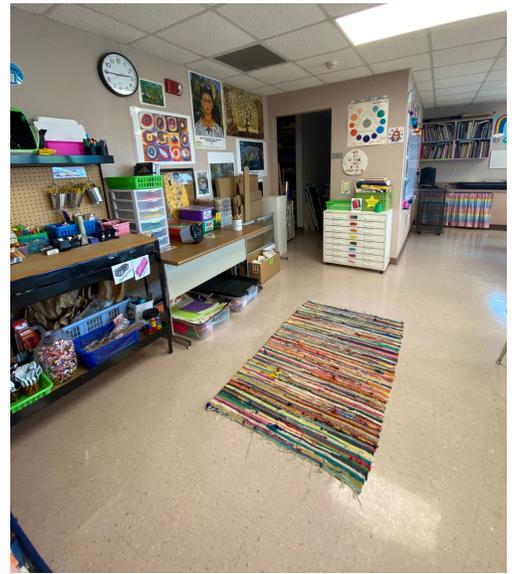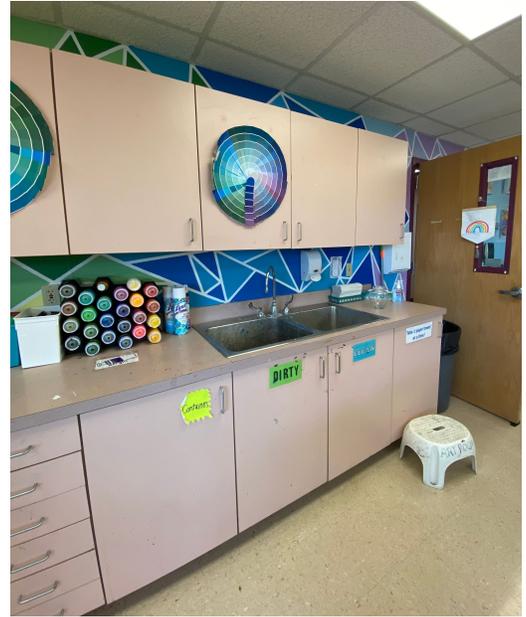
Figure 5. Photographs of THS Art Room

Figure 6. Makerspace and Maker Cycle
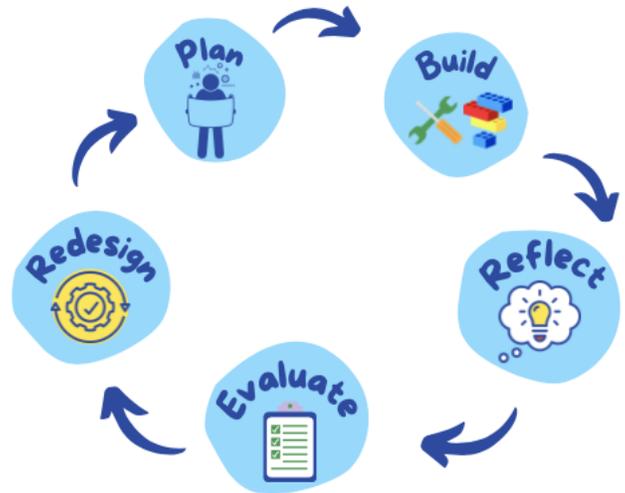
Participants

Through this study, I am investigating how PBL, STEAM, and a Makerspace can authentically facilitate real-world learning opportunities within the art room, specifically a more concrete display of appropriate planning, managing, and evaluating projects while demonstrating more creative confidence. My study is comprised of 6 students at THS. Each of the 6 students is in a different homeroom class. By choosing students from grades 1-8, I have collected data demonstrating a range of findings due to the diverse group of students and developmental levels. Only students with guardian permission to participate in the study's data have been collected. Despite their participation in the study, all students received the instruction model and curriculum used in this study.

Participant	Age	Gender	Race/ Ethnicity	Observed Artistic Ability	Learning Disability/ Difference
J.F.	13	M	White	Meets Grade Level Expectations	Mixed Dyslexia
N.K.	10	F	White/ African American	Approaching Grade Level Expectations	ADHD
N.W.	9	M	White	Approaching Grade Level Expectations	ADHD SLD- Reading, Math, Written Expression
R.H.	12	F	White	Exceeds Grade Level Expectations	Dyslexia Dyscalculia
W.S.	11	M	White	Meets Grade Level Expectations	SLD- Reading, Math
V.M.	15	F	African American /Latina	Exceeds Grade Level Expectations	SLD- Reading

Figure 7. Chart of Participant Demographics

Participant Introduction

It is important to note that although any impairments or disabilities that these students have, they are all abled individuals and show great strengths in their own areas. For the sake of providing information within the context of the study, students' specific disabilities or differences will be outlined. It is a common misconception that there is a fix to disabilities that impact students' academic abilities. Students are supported with accommodations and modifications that appropriately reflect their individual needs.

Teaching students to look at their disabilities or differences as a strength is something I
personally find crucial. Experiencing the world in a different way than others just
strengthen your ability to think creatively and become a solution-finder.

J.F. is a seventh-grader and has been my student for 4 years. He is, at first, quiet
and timid. Once comfortable with individuals and his surroundings, he can be more
outspoken and engaging. J.F. is a determined learner who, over the years, has shown
growth in self-advocacy and flexibility. J.F. is quiet during instruction, benefiting from
individual check-ins to ensure he understands the directions. J.F. will work independently
but will happily accept input and support from his more outspoken peers. J.F. is engaged
in the art classroom but is more driven by physical activity and sports like soccer. J.F. is a
great school citizen and demonstrates responsibility and leadership. J.F. has mixed
dyslexia, which is uncommon, for most individuals diagnosed with dyslexia have either
difficulty sounding out words or have difficulty with rapid and automatic recognition of
printed words. Since J.F. has mixed dyslexia, he has a double deficit and is challenged by
both types of decoding. Common supports provided to J.F. within the art classroom are
the chunking of directions, multiple forms of engagement (verbal, visual, and kinesthetic)
to provide multiple modalities of learning instruction, and one-on-one check-ins to allow
for him to advocate if he needs any further support.

N.K. is a third-grader and has been My student for two years. She is very soft-
spoken yet full of creativity and ideas to share. N.K. is very caring to her peers and is
always willing to lend a helping hand or take a minute to check in on her friends. N.K.
has ADHD, and performance-wise, displays an impact from attending kindergarten
during Covid and being homeschooled during first grade. Supports within the art room

which benefits N.K. are the chunking of directions, many brain breaks that utilize

movement, and multiple forms of engagement (verbal, visual, and kinesthetic) to provide

multiple modalities of learning instruction. N.K. is great at self-advocating and asking for

help when needed. This help may be physical assistance with tools or supplies or even

repetition of directions or questions.

N.W. is a third-grader and has been my student for three years. N.W. is very

imaginative and empathetic. He is very interested in learning about history and has a lot

of general knowledge facts to share. N.W. is soft-spoken yet very outgoing and inclusive

to all. N.W. has a great imagination and loves to play. N.W. enjoys being creative and

making, however, is challenged with activities or making processes that require a lot of

fine motor skills. N.W. has ADHD and has an impairment in reading, math, and written

expression. These impairments affect his ability to comprehend written material, perform

mathematical operations, and express himself effectively in writing. Supports within the

art room, which benefit N.W., are pencil grips and worksheets with extra space for

writing. N.W. is also great at self-advocating and asking for help when needed. This help

may be physical assistance with tools or supplies or even repetition of directions or

questions.

R.H. is a sixth-grader and has been my student for three years. R.H. loves art and

has natural ability. R.H. is quiet around people she does not know, and is very outgoing

and goofy around those she is comfortable with. R.H. works with purpose and takes her

time while making. R.H. is involved with sports and other activities outside of school but

identifies strongly as creative. R.H. has dyslexia and dyscalculia. Common supports

provided to R.H. within the art classroom are the chunking of directions, multiple forms

of engagement (verbal, visual, and kinesthetic) to provide multiple modalities of learning

instruction, and one-on-one check-ins to allow for her to advocate if she needs any

further support. R.H. also benefits from the repetition of directions or instructions.

W.S. is a fifth-grader and has been my student for five months. W.S. joined our

school community in the middle of the school year. In the last five months, I have seen

him become more outgoing. W.S. participates in sports outside of school, like hockey and

baseball. W.S. enjoys making people laugh yet can be very serious when needed. W.S. is

always willing to give things a try, despite a lack of experience or knowledge. W.S. has

speech-language needs, specifically with pragmatics, which means that he sometimes

struggles with using language in social situations. W.S. sometimes shows difficulty

understanding non-verbal cues, taking turns in conversation, and appropriately using

language to express his thoughts and feelings. W.S. also has an SLD in both reading and

math, which means he has a specific learning disability that affects his ability to

understand and use language in these areas. Common supports provided to W.S. within

the art classroom are the chunking of directions, multiple forms of engagement (verbal,

visual, and kinesthetic) to provide multiple modalities of learning instruction, and one-

on-one check-ins to allow for him to advocate if he needs any further support. W.S. also

benefits from the repetition of directions or instructions. Since W.S. has difficulty

understanding non-verbal cues, it is important to state any feedback provided for him

explicitly.

V.M. is an eighth-grader and has been my student for a year. V.M. is very into

comic books, manga, and video games. V.M. is always reading or drawing her own

comics. V.M. participates in comic drawing classes outside of school. Despite V.M.'s

quiet demeanor, she is always good for a joke or two. V.M. pays great attention to detail

and works very slowly while creating. V.M. is typically reserved and hesitant but has

days where she is talkative and giggly. English is not the first language of V.M.'s

guardian; however, she herself does not speak Spanish. V.M. has a traditional SLD,

which means that despite having average or above-average intelligence, she can

sometimes struggle with reading, spelling, and or writing. Despite this diagnosis, V.M. is

a very strong reader and enjoys spending her free time enjoying many books. V.M. does

have an observed slower work speed than her peers. As a result, V.M. benefits from

frequent one-on-one check-ins, goal setting, and extended time to work on tasks.

The Role of The Researcher

As a researcher and participant, my role has been to conduct the study while also

participating by self-reflecting and making modifications to the study and my teaching.

This was crucial for the success of my study because my research looks at a student-

centered environment, making it necessary to attend to the needs of all of my students

throughout this process. Moreover, I participated in a way that kept my roles of teacher

and researcher consistent since those are roles that inform each other within the context

of this study.

Since I previously mentioned that THS could be considered a transition school,

some students have been there longer than I have. Other students have just recently

become part of our community. Considering the five years I have been a member of THS,

it has been easy for me to build strong personal relationships with all of our students.

Even if a student is still new to our community, I am able to learn about them quickly and

become familiar with their strengths and needs. While, in general, it is essential to keep a

balanced role as an educator and friend, I aim to facilitate a comfortable and safe space

for my students. Considering the frequency with which students come and go from our

program, I must keep the procedures and expectations for my classroom and students

explicitly defined and a topic of frequent discussion.

Considering the small size of our community and student population and the

diagnoses of our students, it is vital to keep a well-established relationship with the other

faculty and staff members. As stakeholders in all of the students at THS's education, we

must consistently communicate behaviors and developments seen in all content areas and

specials. I have other responsibilities like running the art club, completing recess duties,

and teaching art and STEAM. STEAM is a separate course that is offered to all students.

There is a middle school and an elementary school section. I have the privilege of co-

teaching this course with our science teachers. Capitalizing on our small population and

genuinely working together to identify and communicate concerns or successes within

our student's performance is what is equitable for our institution. With that in mind, it is

essential to note that I do not have a set curriculum to follow, and I can design lessons

that meet the developmental needs of my students and promote the cross-curricular

student-centered learning I will deliver within this study. This is an area where I believe

my personal experience with having a learning disability aids me in being able to provide

UDL and differentiated instruction (DI) to my students.

Researcher Procedure

The design of this study is a bounded system because it is bounded by time and

space, specifically a current, real-life system. The specifics of my classroom have driven

this study, for example, the students within it, their diverse backgrounds, their various

ages and grade levels, and the curricular structure of my classroom. In addition, this study

has been driven by the parameters of the school year's calendar and my classes' duration,

time, and frequency. Each student has an art class once a week for an hour. In addition to

that time, I offer recess periods where students can participate in extra art and work on

their projects independently or engage where they can do so independently or in self-

driven art activities.

This study is composed of data collected from 6 different individuals within the

same school setting. I have facilitated purposeful sampling for my data collection. This

utilizes multiple cases or students from whom I've collected interviews, observations,

documents, and artifacts from. The interviews were specific to students' personal feelings

about their performance within the structure of my study. The observations and artifacts

are summative. The documents take the form of formative assessments like exit tickets

and other authentic assessments.

Ethical Considerations

Due to the ages of the study participants, they have been permitted by their

guardians via a signed permission slip. None of the participants were put in any situations

where they were subjected to danger or less than equitable circumstances. Participating

and non-participating students continued to receive art education instruction based on

their appropriate developmental needs. All students participated in the same formative

assessments within the classroom setting, so they did not feel any pressure or eliteness

with being participants. Not participating students did not have their responses recorded

or calculated into the data. Participants of the study were not compensated for their

participation in any way.

A bias that I bring to this research as the researcher is my own experiences as an individual with a learning disability and my affinity for my school and student population. Moreover, I believe this distinction allows me to provide more consideration for my student's needs and the accessibility of my data collection process.

Research Methods

The underutilization of UDL and PBL within contemporary classrooms is a current issue that will largely affect the future success of our students. UDL was developed in 1984 with historical influences from constructivist theories. Both of these frameworks and theories are designed to aid all students in finding success and engaging in learning. With these resources available, implementing them in combination with more contemporary educational theories will positively impact the students while they are in my art class as well as in other areas of their lives. As educators, we are tasked with preparing students for their future. With today's 21st-century developments, we must implement 21st-century pedagogies like STEAM and makerspaces to be ready and provide students with an authentic, real-world learning experience.

As the histories of UDL, PBL, STEAM, and makerspaces were explained in Chapter 2, there are years of evidential practice that demonstrate that independently these theories, frameworks, and pedagogies make for successful learning. Since THS is a school specifically for students with language-learning disabilities, UDL is a framework that lends itself well to the differentiated needs of our students. We have seen from Dewey and Piaget that students perform better when they are at the center of their learning, and PBL helps facilitate that curricular model. We have seen that STEAM is a more contemporary pedagogy that aims to prepare students for the 21st-century thinking

needed to attain career readiness and helps students make connections between content areas.

Placing a high value on arts education and providing students with the resources to see real-world connections between what they are learning and making in art and STEAM, we are truly embedding the framework of UDL, PBL, and STEAM. It is not uncommon for students to struggle to answer the 'why' when they are tasked with creating or working on a task. Helping students see a real-world connection to the tasks or projects they are being assigned gives them intrinsic motivation to put forth their full effort and engage with the tasks genuinely. Creativity is an inherent strength for students with learning differences. Encouraging them to utilize these strengths and channeling them into other skills or subjects empowers them and demonstrates their abilities to succeed. By breaking these skills down into processes and a series of self-assessments and evaluations that students can complete, we can provide them with every possible opportunity to find success and achieve their highest potential.

Visual and Verbal Data Collection

Visual Methods of Data Collection

Visual data within this study takes the form of sketches or project plans, concept maps, and even examples of in-progress artwork. Having students fill out project plans and art class goal sheets provides them with their own feedback and support on many different things. By having students document their plans or ideas in a way that resonates with them, they are able to assess their own needs and the next steps for their project. Skills that are documented and developed are growth in vocabulary skills, big-picture

planning skills, the ability to reflect and redesign, and the ability to self-advocate for things they need for more successful learning opportunities.

Sketches can be very informative on how a student predicts or sees their project taking form and gives a visual representation of what is happening in their head. Written goal sheets also provide information about the student's creative plans or goals. In-progress artwork serves as a physical representation of their ideas, as well as a concrete place for them to evaluate what is next in their process or evaluate how well they were able to craft their idea. These forms of visual data collection leave room for the student to be at the center of their learning and give them the platform to share their perception of their learning achievements.

Specific visual data sheets that were used are student-completed Executive Functioning Skills in The Art Room (see *Figure* 9) assessment sheets. Students completed these self-assessment scales twice, once at the beginning of the study and once at the end. These Executive Functioning Skill assessment sheets are based on Peg Dawson and Richard Guare's Executive Skills questionnaire (P. Dawson & R. Guare. 2009). Fully assessing a student's executive functioning skills would allow more information to be gathered, thus allowing the educator to utilize teaching strategies that would help foster the growth of pinpointed weak executive functioning skills. For students that have SLD's, executive functioning skills are critical for their success in an educational setting. All humans benefit from having strong executive functioning skills because they help us operate within the daily demand and fluctuations of life. The initial questionnaires are rating scales that provide access points with either a numerical, an alphabetical, a written expression, or a color code that would indicate the student's

answer to the question. Within the second distribution of the Executive Functioning

Skills in The Art Room- UDL (see *Figure* 10), visual symbols have been used to

accompany the text to provide UDL for students to understand the posed questions better.

Another visual data collection method used in this study is Maker Process Worksheets

(see *Figure* 15). Listed on these worksheets is the makerspace process that is displayed

above the makerspace, located within the art room shown in *Figure* 4. Photographs of

The Hillside School Art Room. This process moves in a circular motion, noting the

following; plan, build, evaluate, reflect, and redesign. These bubbles move in a circular

motion but can move in a non-uniform circular motion allowing the steps to become

interchangeable yet still continuous. Breaking down the maker process into chunks on a

worksheet allows students to visually represent what those steps will look like in

accordance with their project and how they plan to work within those making stages.

Additionally, this worksheet allows students to keep track of their ideas and plans so they

don't have to spend an extended amount of time at the beginning of each class re-

familiarizing themselves with what they're working on. The last piece of visual data

collected is an Art Project Goal Sheet (see Figure 16). This worksheet acts as a large

sticky note. For each box on the sheet, students can set one or multiple goals with the

date. Each box has a checkmark so students can visually go through the process of seeing

what they plan to do each day and being able to check off if they are able to complete it

or not. This visual form of data allows for the discussion to arise of how to set smart

goals, what is too hard of a goal, what is an easy goal, and how to moderately choose one

for themselves or with the assistance of a teacher. In addition to helping students keep

track of their progress, this also acts as a visual check sheet so at the beginning of each

class, they have the records to see where they left off and what they can prioritize for that class period. The visual chunking process mimics the chunking process that educators will instructionally use to modify the delivery of directions and content for students within a UDL framework.

Verbal Methods of Data Collection

Verbal data collection can provide insight in many ways. These would take the form of semi-structured interviews and narrative interviews. Keeping in mind the small class sizes at THS, whole-group discussions would be considered small-group discussions in other educational settings. Providing students with different learning disabilities multiple ways to provide feedback or data is crucial in practicing equitable data collection. While some of my students have verbal or auditory processing learning differences, others have written or reading learning differences. Providing students with multiple ways to provide information makes for more honest and accurate data. With consideration of each student's needs, semi-structured interviews will be conducted in a way that will leave room for each student to have access to those resources and modifications needed.

Limitations

This study is limited to the weekly art class, where students spend one hour. A

consideration must be made that there is no guarantee that the students participating in

the study will be present, and not absent, for their weekly art class at any point

throughout the duration of this study. This study is also limited in its focus on a

population of students who are diagnosed with language-based learning disabilities.

Students will continue to receive instruction and assistance according to best practices

and the mission of the school. While some of our students have documented IEPS, due to

the nature and practice of our school, we are not legally required to follow these IEPS.

Students will be given tasks and projects to complete without due dates.

Self-report data samples, including interviews, surveys, questionnaires, self-

assessments, and artifacts such as photographs and samples of students' work, were

collected from participants. While all students were asked to complete said surveys,

questionnaires, and self-assessments, only participating students submitted their

responses for data collection. Keeping in mind that all participants have learning

differences, each survey, questionnaire, worksheet, etc., has been created and presented

equitably, allowing success and engagement for all students. Additionally, specific

modifications or accommodations were made for specific student needs. For example,

interview questions were rephrased for some students to be delivered at a more

appropriate comprehension level for them. Other modifications or accommodations that

were given were handouts with large font, distinguishable space between letters, and

space to write. If a student would prefer to fill out their ideas on their own blank piece of

paper, that is an equitable alternative. Due to the nature of self-report data, student self-

reflections or surveys are ambiguous and require interpretation by the researcher. While

support has been put in place to allow each participant a universally designed forum,

specific students' attention or focus impacts their ability to complete the said form

accurately and honestly.

Data Analysis

Organization of Data

Data were organized in a variety of ways. *Art Project Goal Sheet* (see *Figure* 16)

and *Maker Process Worksheets* (see *Figure* 15) were utilized daily by students and kept

in their class drawers. Since all students in the class completed these worksheets, there

was no need for privacy, and they could be kept communally. These sheets were

documented while in progress by a photograph and later scanned after the completion of

the project. All photographs of visual data and student artifacts were stored digitally with

password protection. Verbal data like semi-structured interviews required audio recording

and was later transcribed. Written notes were taken at the time of the interviews for

immediate reference. *Executive Functioning Skills in The Art Room Surveys* (see *Figures*

9 and 10) were completed by only students participating in the study, and therefore they

were kept in file folders according to the student's initials and locked in a filing cabinet.

Coding of Data

Visual data and artifacts were coded in accordance with themes presented in both

the visual and verbal data, using a thematic coding strategy. Self-report data were coded

according to the numeric scale that the student rated themselves while engaging in the

survey twice. Verbal data that audio recorded was later transcribed and coded according to the repeating themes seen independently in student answers or throughout all student responses. Visual artifacts like photographs and scans of student worksheets were used as references of how students initially engaged and planned during each project and how they progressed through it until the final product was created. Just as these forms of data allowed students to keep track of their own progress, they allowed for more observational data to be collected as well. For this study, the themes were making art to deal with stress and boredom, how students place themselves in the center of their learning and art-making, and how they view and think through the maker process while creating. These themes reflect those of the instructional models of PBL and student-centered learning. I coded based on these general themes at first, and as I went deeper into the process, more themes emerged.

Methods of Analysis

The data was approached with a thematic analysis coding system. In addition, constant comparative methods were used to record data for each student and continuously compare the data between each student. I used an inductive analysis process. I identified themes based on the data I collected and based on the themes from my literature review and research questions. Once I identified some themes, I went through the data and identified certain phrases or words that represented these themes that were said in interviews and seen within observations. I had a solid foundation for further analyzing the data. Through this process, it was important that I pay attention to what the students were experiencing and the challenges or successes they encountered.

Timeline for the Study

Prior to the launch of this study, I submitted my proposal to Moore College of Art and Design's IRB on January 20th, 2023. After receiving approval, I continued my ongoing literature review while simultaneously seeking site permission. Once approved by the Head of School at THS, I began seeking participant permission by distributing permission forms. After collecting the Researcher Sit Support Form, Rights for Students, and Parental Consent Form for Participants in Research, I was able to launch my study in the first week of March. Beginning with the first rounds of *Semi-Structured Interviews* (see Appendix C), I met with all six participants individually. Within that meeting time, I had students complete their first *Executive Functioning Skills in The Art Room Surveys* (see *Figure* 10). All participants completed these from March 20th, 2023, to March 24th, 2023. The introduction and starting times of the projects and lessons outlined in this study were implemented at varying times due to the procedures already in place within my classroom. As a way to deliver equitable instruction for all students, there are no due dates, which allows students to engage in the content and process at their own speed.

Before the implementation of the outlined lesson and project, participant V.M. was removed from the active participant list. V.M. 's homeroom teacher left mid-school year. This choice to remove V.M. from the rest of the study was in an effort to protect her social and emotional needs. At no time in this decision process was her compatibility attributed to her participation. At the time that this was decided, V.M. had only participated in the first round of the Semi-Structured Interviews and EFS survey. The audio recording was deleted, and the visual data collected was also destroyed.

The second round of *Semi-Structured Interviews* was visually adjusted to more

appropriately align with UDL (see Appendix D), and images or characters visually

expressing the question or topic were added in the margin line of the survey questions

students were being asked. The researcher's protocol did not change beyond that. In

addition to the second round of interviews, participants completed *Executive Functioning*

Skills in The Art Room- UDL (see F*igure* 10), which were also accompanied by images or

characters that visually expressed the question or topic. This second round of interviews

and surveys was completed the week of April 24th, 2023- April 28th, 2023. All students

worked weekly on the outlined lessons and projects. A final collection of artifacts and

photographs was taken prior to the last day of school on June 9th, 2023.

In the following chapters, each method of data collection will be explained in

terms of collection and coding themes. I will also discuss how the resulting information

from the data collection and coding impacted the way I approached instruction and the

expectations I had for collection and coding impacted the way I approached instruction

and expectations for students. Data is presented by assessment and data collection type in

a sequential order to help illustrate how incorporating PBL, STEAM, and the utilization

of a Makerspace within an art classroom will fully place the students at the center of their

learning and encourage hands-on learning to solve problems.

THE IMPACT OF FACILITATING ART EXPERIENCES FOR STUDENTS WITH
LBLD THROUGH THE USE OF UDL WITHIN A MAKERSPACE

Month	Process	Steps to Accomplish
January	Proposal Hearing	- Completed AEGR618 course requirements - Participated in proposal hearing January 20, 2023.
	Gain IRB Approval	- Submitted full proposal on January 21, 2023 - IRB approval granted on January 23, 2023
	Begin seeking site approvals and participants	As soon as IRB approval was granted, I contacted my site with a letter of inquiry to The Head of School
	Ongoing Literature Review	Continued literature review
February	Collect signed approvals of site/ participants	Gained needed approvals and consents of site and participants
	Prepared materials and prepared to lunch study	- Developed lesson materials and activities for data collection - Continued coursework to prepare for the field and solidified observation and interview protocols
March	Launched study- completed first round of interviews and surveys by March 20th, 2023	Met with each participant individually to complete the first round of interviews and the first round of EFS Survey Worksheets
	Began teaching identified lessons and started collecting data: observations/ artifacts	- Began teaching identified lessons for each grade - Began collecting artifacts and recording observations
	Coding of Data/ adapted protocols	- Transcribed and coded interview and survey worksheets - Made adjustments to the protocols

April	Completed second round of interviews and surveys with adjustments by April 28th, 2023	• Met with each participant individually to complete the second round of interviews and the first round of EFS Survey Worksheets
	Coding of Data	• Transcribed and coded second interview and survey worksheets
May- June	Last data collection and analysis	• Continued collecting observations/ artifacts • Analyzed and coded data • Finished Chapter IV and Chapter V
July	Finishing Up	• Edited and put final touches on thesis • Built thesis presentation
August 2023	Thesis Presentation & Exhibition	• Presented and exhibited thesis

*Figure 8.*Timeline of the Study

CHAPTER IV: RESULTS OF THE STUDY

Introduction to Data Collection Process

Introduction

This study focused on how incorporating PBL, STEAM, and the utilization of a

Makerspace within an art classroom will fully place the students at the center of their

learning and encourage hands-on learning to solve problems. This was implemented by

focusing on introducing and utilizing strategies that facilitated the strengthening of

executive functioning skills within students through surveys and UDL practices, as well

the implementation and use of *Daily Art Goal Sheets* and *Makerspace Process Sheets*. In

addition to these methods, students were also equipped with a designated area of supplies

within the classroom named the Makerspace, which was open for utilization during the

engagement they had with the lesson plans and projects outlined within this study.

Setting the Stage

With the goal of having students become more inspired and inclined to tinker and

make within the instruction of art and other subject areas, I decided to remodel a corner

of my classroom, bringing together an array of supplies and materials that truly

encouraged exploration and the creation of STEAM projects. All of the supplies utilized

were sourced from the supplies already occupying the art room. Since THS, the research

site, already practices with UDL and the close support of EFS building school-wide, the

class structure and art curriculum were not adjusted much to fit the parameters of this

study. As previously mentioned, flexible seating, brain and movement breaks, and the

utilization of self-regulatory and self-advocacy practices are encouraged school-wide. For

the students at THS, art class acts as more than their art education class but is a break

from the daily stress and frustration of other subject areas that students struggle to find

mastery in. The notable changes within my teaching aligned with this study were

encouraging students to document their making process and plans along the way and not

assigning specific materials to projects but a category of 2D or 3D materials. In return,

this placed the student more at the center of their learning.

Lesson Plan Summaries

Two lessons were used during the study to incorporate PBL, STEAM, and the

utilization of a Makerspace within an art classroom. Students N.K., N.W., and W.S.

completed a project titled *Dream Playground* (see Appendix B). Students were tasked

with an imaginary project of remaking our school's playground. Each student received a

map of the schoolyard with different objects and mark-making tools to map out their

ideas. These objects were be already provided on their tables for quick access and

immediate creation. The supplies include bingo daubers, stickers, tracers, paper scraps,

and full access to the makerspace and all of its supplies. Students were provided with a

current picture of our playground projected on the smart board as well as a handout to

look at more closely. Once students completed their playground map and initial idea, they

were given the chance to present their ideas to their classmates. By offering this

experience, they were able to receive in-the-moment feedback on their plans, stirring

excitement and offering verbal explanations of the symbols and shapes they drew and

what they represented. Once students were done sharing and engaging, they were

provided with makerspace planning worksheets. On this sheet, students were encouraged

to visualize and share their project plans and plans for the building, with space to go back

and evaluate, reflect, and redesign along the way. Giving the students this sequential

activity of planning and presenting their ideas to classmates before recording their plan

on the maker worksheet left room for them to do some initial evaluation, reflection, and

redesigning of their ideas. Once prepared, students transitioned to work.

Students R.H. and J.F. completed a project titled *Graffiti/ Street Art Model* (see

Appendix B). Students were tasked with creating a 3D object demonstrating their

understanding of the difference between graffiti and street art while sharing a meaningful

message. To begin this lesson and project, students were prompted to answer with their

current knowledge, what they thought graffiti is, and what street art is. And overall, are

they both illegal? With visuals on half the board and a blank whiteboard on the other, as

a class, we had a discussion and made a Venn diagram to compare and contrast their

ideas. Once this activity was completed, students were presented with the PowerPoint of

videos, images, and words to help them better understand and distinguish what the two

are. Once students had gone through the slides and discussed what they learned, they

were asked to complete a brainstorming makerspace paper to help them figure out what

they planned to make for their project.

Through their lesson on Graffiti and Street Art, students learned about the history

of both graffiti and street art, as well as some notable artists within those fields of

expression. Artists that students specifically looked at were Kate DeCiccio, Banksy, Jen

Stark, Keith Haring, and Jean-Michel Basquiat. Some of the specific examples of artists

also allowed us to explore the idea of deeper messaging and art as activism. Students

were asked to consider and apply a deeper meaning within their creations that reflect things that are important to them.

Both of these lessons incorporate PBL, STEAM, and the utilization of a Makerspace within an art classroom. By providing students with overarching project goals and topics, they were able to create in accordance with their own interests and ideas, with an open-ended range of supplies. Through the building process, students will be learning by doing some of the construction specifics and will be supported in utilizing STEAM skills and content areas. This approach ensures that all students have access to the same information in ways that are meaningful to them and that they are able to demonstrate their understanding in various ways. It creates an inclusive learning environment and promotes equity among students with diverse learning needs.

Data Collection

As previously outlined in Chapter III, Research Methods section, the data for this study were collected in both verbal and visual methods. The visual data collected includes Makerspace worksheets where students planned and worked through their projects, artifacts like sketches, observations, photographs of projects and materials, and student-completed *EFS Survey Worksheets*. The verbal data collected includes the two *Semi-Structured Interviews* that students completed.

Adjustments of Methodology

As previously mentioned in the study timeline in Chapter III, participant V.M. was removed from the study to protect her social and emotional needs. At no time in this decision process was her compatibility attributed to her participation. Other methodology adjustments include the second round of semi-structured interviews being visually adjusted to more appropriately align with UDL (see Appendix D), and images or characters visually expressing the question or topic were added in the margin line of the survey questions students were asked. In addition to the second round of interviews, participants completed *Executive Functioning Skills in The Art Room- UDL* (see *Figure* 10), which were also accompanied by images or characters that visually expressed the question or topic.

Presentation of Data

Executive Functioning Skills in The Art Room Survey

At the beginning of the launch of the study, students were asked to complete *Executive Functioning Skill Surveys* (see *Figure* 9). As previously stated in Chapter III, these *Executive Functioning Skill Assessment Sheets* are based on Peg Dawson and Richard Guare's Executive Skills questionnaire. By fully assessing a student's executive functioning skills, I, the educator, was able to utilize teaching strategies that helped foster the growth of pinpointed weak executive functioning skills for each student. Additionally, the language of the questions addressed within this survey of EFS was tailored to mirror the language used within the art classroom and the use of the makerspace and its maker process.

Name:.. **Date:**................

Executive Functioning Skills In The Art Room

Red .... 0= I do not agree at all
Yellow........... 1= This is kind of true
Blue.............. 2= This is true most of the time
Green .... 3= This is true almost all of the time
Purple........... 4= This is always true

1.) I find it helpful to make a plan for my project before I get started.

0	1	2	3	4

2.) I find it easy to stay focused on my art project.

0	1	2	3	4

3.) I am able to easily find my project and the needed supplies when I come to art.

0	1	2	3	4

4.) I am able to clean up my project and supplies at the end of art class.

0	1	2	3	4

5.) I am able to set a goal and achieve it during art class.

0	1	2	3	4

6.) During each art class, I am able to make decisions about what's important for me to focus on completing for my project during that day and what's not.

0	1	2	3	4

7.) I am able to advocate for breaks when I need them and get back on task when they are done.

0	1	2	3	4

8.) I can revise my plans when I gain new information or make a mistake.

0	1	2	3	4

9.) I can reflect on my own artwork and ask,
"How can I make this better? or How can I do this differently?"

0	1	2	3	4

10.) I can evaluate my own artwork and ask,
"How am I doing? or How is this going?"

0	1	2	3	4

Figure 9. Executive Functioning Skills In The Art Room Survey

The initial questionnaires are rating scales that provide access points with either a numerical, an alphabetical, a written expression, or a color code that would indicate the student's answer to the question. Within the second distribution of the Executive Functioning Skills in The Art Room- UDL (see *Figure* 10), visual symbols have been

used to accompany the text to provide UDL for students to understand the posed

questions better.

Figure 10. Executive Functioning Skills In The Art Room Survey- UDL

As previously stated, for students that have SLD's, EFS are critical for their

success in an educational setting. These surveys acted as a form of data collection,

recording how students evaluated their own strengths and abilities to utilize their EFS

within the art classroom. These surveys also acted as data that allowed me to see where

students might not feel as strong and could use some extra support within the classroom.

For example, in the first round of the *Executive Functioning Skills In The Art Room*

Survey, Figure. 11, N.W. identified that he sometimes finds it challenging to make

decisions in regard to prioritizing or configuring a sequential order of steps for his

artmaking process, specifically deciding what is important to focus on for that art class

(question 6). In *Figure* 12, you can see that N.W. identified that he felt more capable of

identifying how to prioritize what to work on during class. While this example shows a

fluctuation with other answers between the first and second rounds of surveys, it is

helpful to the educator to hear first-hand from the student what they need support in.

Executive Functioning Skills In The Art Room

Red .... 0= I do not agree at all
Yellow........... 1= This is kind of true
Blue............. 2= This is true most of the time
Green .... 3= This is true almost all of the time
Purple........... 4= This is always true

1.) I find it helpful to make a plan for my project before I get started.

| 0 | 1 | 2 | 3 | 4 |

2.) I find it easy to stay focused on my art project.

| 0 | 1 | 2 | 3 | 4 |

3.) I am able to easily find my project and the needed supplies when I come to art.

| 0 | 1 | 2 | 3 | 4 |

4.) I am able to clean up my project and supplies at the end of art class.

| 0 | 1 | 2 | 3 | 4 |

5.) I am able to set a goal and achieve it during art class.

| 0 | 1 | 2 | 3 | 4 |

6.) During each art class, I am able to make decisions about what's important for me to focus on completing for my project during that day and what's not.

| 0 | 1 | 2 | 3 | 4 |

7.) I am able to advocate for breaks when I need them and get back on task when they are done.

| 0 | 1 | 2 | 3 | 4 |

8.) I can revise my plans when I gain new information or make a mistake.

| 0 | 1 | 2 | 3 | 4 |

9.) I can reflect on my own artwork and ask,
"How can I make this better? or How can I do this differently?"

| 0 | 1 | 2 | 3 | 4 |

10.) I can evaluate my own artwork and ask,
"How am I doing? or How is this going?"

| 0 | 1 | 2 | 3 | 4 |

Figure 11. N.W. Executive Functioning Skills In The Art Room Survey

Figure 12. N.W. Executive Functioning Skills In The Art Room Survey- UDL

Semi-Structured Interviews

Semi-Structured Interviews (see Appendix C) were only completed by students

within the study to identify more themes and concerns that were behind their experience

with art-making. The interview questions were broken down into three categories, the

"why," the "what," and the "how," helping connect where the students were able to

engage more with art making and even identify the gray areas for them all. A portion of

the questions addressed how the students were able to relate the Maker Cycle to their

artmaking process. Those questions are highlighted in *Figure* 10. The remaining

questions address student motivation and how they relate to their artmaking, pictured in

Figure 11. These individual interviews allowed students to answer honestly and take the

time to reflect on their answers for themselves even. Both times these interviews were

given, they were presented to the student after they completed the *Executive Functioning*

Skill Surveys.

1. Do you make art outside of art class?

2. How do you know when you want to make something?

3. Why do you find yourself making art?

4. Why do you think we make art in class?

5. What type of art do you like to make?

6. How do you come up with ideas?

7. Does your art solve problems?

8. What do you do with your art when it's done?

9. How do you get started when you make art?

10. What materials do you like to use?

11. What materials do you not like to use?

12. Are there other types of art-making you want to explore?

13. How do you know how to put your plan into action?

14. How do you know when you want to change your ideas?

15. How do you know when your work is done?

Figure 13. Interview Questions Related to Maker Process

1. Do you make art outside of art class?
2. How do you know when you want to make something?
3. Why do you find yourself making art?
4. Why do you think we make art in class?
5. What type of art do you like to make?
6. How do you come up with ideas?
7. Does your art solve problems?
8. What do you do with your art when it's done?
9. How do you get started when you make art?
10. What materials do you like to use?
11. What materials do you not like to use?
12. Are there other types of art-making you want to explore?
13. How do you know how to put your plan into action?
14. How do you know when you want to change your ideas?
15. How do you know when your work is done?

Figure 14. Interview Questions Related to Student Motivation and Artmaking

Makerspace Worksheets

Makerspace Worksheets, Figure 15, were completed by all students, not just those

participating in the study. Only the worksheets completed by students within the study

were scanned and utilized. The purpose of these worksheets was to help students practice

the making cycle and physically keep track in writing what their plans were and what

planned to do within each phase of making. The idea of creating a piece of art can be

daunting for some students. Breaking down the "why," the "what," and the "how" within

these worksheets was a strategy to facilitate UDL, encourage PBL, and utilization of

students' EFS skills. Despite the consideration of student equity while designing

worksheets, some students choose to do without the worksheet and just record their ideas

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and plans on a piece of paper. This accommodation is an easy modification to make. As

long as students were able to understand the sequence they were working in, recording

their ideas on the specific worksheet was not required.

Name: _____

Plan

Build

Reflect

Evaluate

Redesign

Figure 15. Makerspace Worksheet

Art Goal Sheets

Art Goal Sheets, Figure 16, were also completed by all students, not just those participating in the study. Only the worksheets completed by students within the study were scanned and utilized. The purpose of these worksheets was to help students work on setting daily smart goals to work towards completing a larger goal of the completion of their project. These goal sheets were created to work in conjunction with the *Makerspace Worksheets*, allowing students to translate their larger plans from their maker sheets to daily goals and bite-sized chunks. In addition, this form of data helped break down the "why," the "what," and the "how" within these worksheets was a strategy to facilitate both UDL and encourage PBL and the utilization of student's EF skills and a STEAM curriculum. A large part of working on a STEAM-based project is constantly reflecting on and adapting your product or creation. These worksheets let students keep detailed notes of what they set out to do each class and essentially create a road map of where their steps took them. In addition, this supports students with EFS deficits in time management by showing them what they did last class and where they can pick back up at. Acknowledging not all students have the ability to record detailed notes for themselves, in that case, drawn sketches act as another source of notes and goal setting. While the idea of using the same paper for all your notes for the duration of a project seems helpful, a resulting challenge is helping students stay organized and making sure they don't lose their worksheets class to class. There were indeed some students who misplaced their goal sheets while working on their projects, and in that case, new worksheets were provided, or students were encouraged to take their own notes on another piece of paper. Specific students, N.W., and W.S., benefited from more one-on-

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one check-ins when it was time to set goals, and some even preferred that I scribe their

goals for them.

Name: _____   ART PROJECT GOALS!

☑ Write the date
☑ Set a goal
☑ Check it off
☑ & repeat!
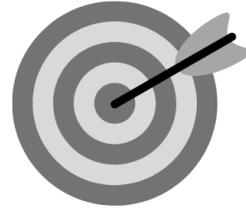
DATE: ☐

DATE: ☐

DATE: ☐

DATE: ☐

Figure 16. Art Project Goal Sheets

Data Analysis

Coding Strategies

The data collected from the *Semi-Structured Interviews* were organized into a collective document, sorting all of the participants' answers, from both the first and second interviews, by question. This made it easier to see the differentiation between each student's first and second interview answers and the similarities between each student's answers, if any. This presented more specific themes to code within other data collections. The themes and sub-themes revealed through this process can be seen in the excerpts provided in *Figure* 15.

Coding:

Making Art To Deal With Stress/ Boredom

Calm

Bored

Student-Centered Artmaking

Creativity

Individual Interests/ Ideas

Maker Process

Practice/ work on skills
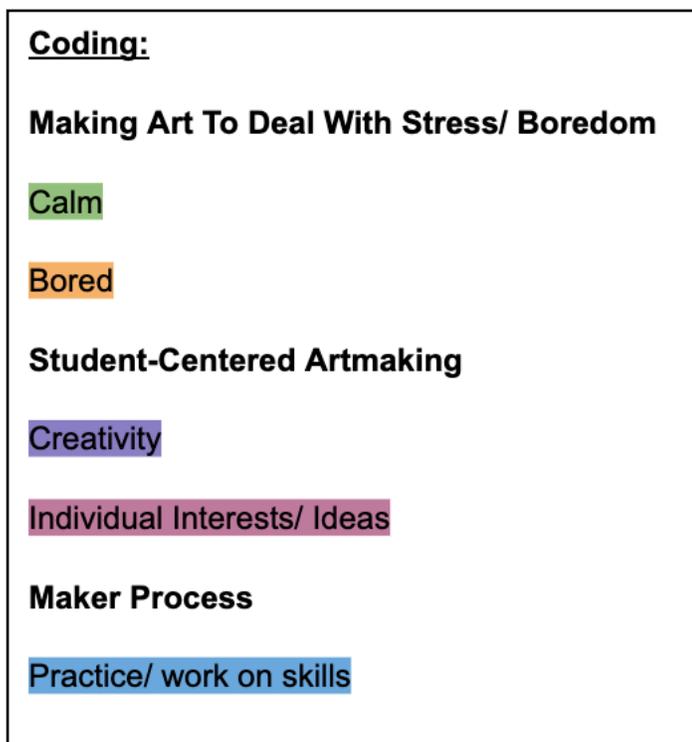
Figure 17. Thematic Color Code for Semi-Structured Interviews 1&2

The Semi-Structured Interviews provided data showing that students were able to

utilize the Maker Cycle in helping them identify process steps like how to get started and

how to know when they are done making. Figure 16 shows student responses from the

first and second interviews demonstrating this.

(Q): How do you get started when you make art?

JF(1): Come up with an idea and follow through until you're finished with the idea.

JF(2): You make a brain frame or the whatever it is to say this is what were gonna do first like a sketch or whatever…(RR): *So you go through a series of tasks, you plan, and then you go from there.* JF(2): Yeah

NK(1): You have to figure out what you're going to make

NK(2): Thinking what I want to do

NW(1): Plan!

NW(2): Plan!

RH(1): By grabbing my materials and working

RH(2): By getting a pencil, a piece of paper, an eraser, and maybe some coloring materials unless I'm doing just a sketch.

WS(1): Get a piece of paper

WS(2): I make a rough draft and then get the tools I need

(Q): How do you know when your work is done?

JF(1): When I can't add anything, or I can't fix anything, and then I know I did my best work.

JF(2): I can't add anything or I can't change it anymore and I've done my best.

NK(1): When my arms get tired

NK(2): When my brain tells me and my arms get tired

NW(1): Because it's all finished

NW(2): You went over everything, and you completed it, and you finished the step, and your done painting it, and you're done every single step

RH(1): When in my mind I think it looks good and looks finished.

RH(2): When I think it looks good, I think I couldn't do any better, that it is all done. So there's nothing else I can give to it. I don't have any more ideas to put on it.

WS(1): When nothing can make it look better

WS(2): When I can't think of anymore things to do

Figure 18. Excerpt of Coded Semi-Structured Interviews 1&2

The Executive Functioning Skills In The Art Room Surveys (*Figure* 10) were

organized by creating a graph for each participant with their rating scales for each

question side by side. Organizing the results from both surveys in one graph

demonstrated either an increase, decrease, or consistency within their answers. See

Figure 19 for *Coded Executive Functioning Skills In The Art Room Surveys*. Since this

survey measures students' self-evaluation of their own EF skills within the art room, this

information was then able to be considered alongside the results of the coded Semi-

Structured Interviews and observational notes of the students at work.
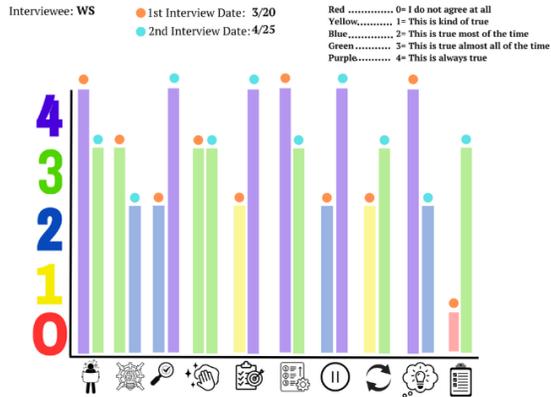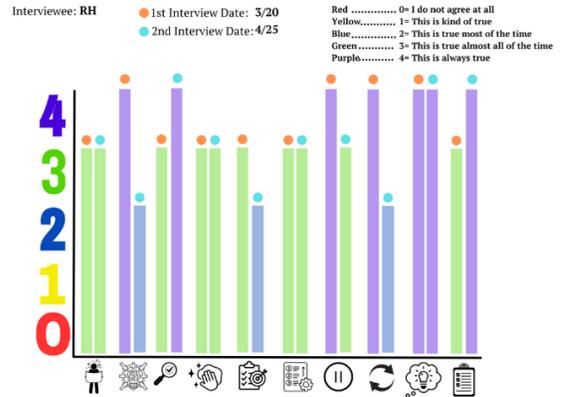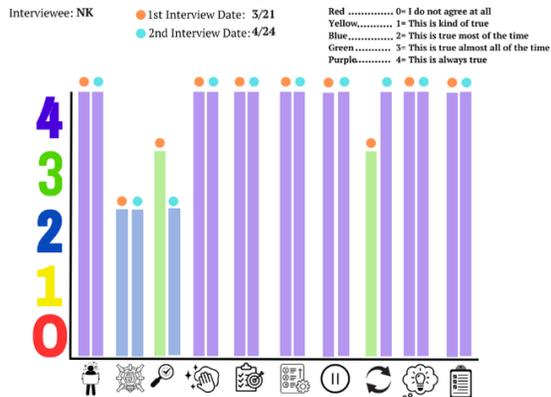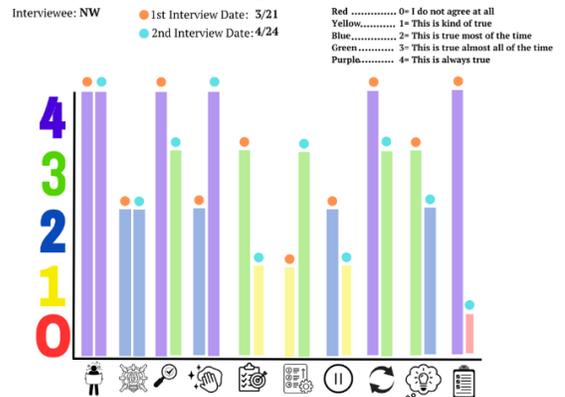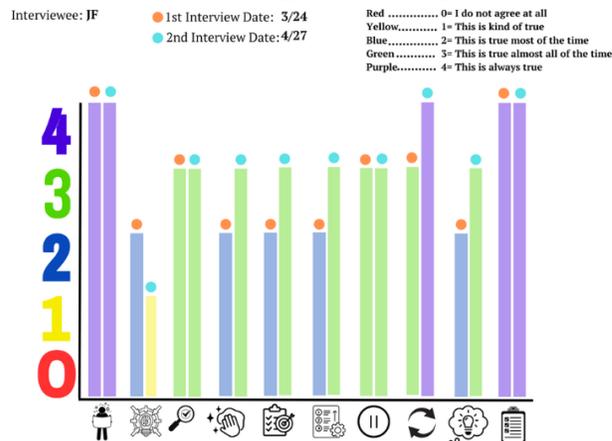
Figure 19. Coded Executive Functioning Skills In The Art Room Surveys

Summary of Findings

Throughout the duration of the study, I have witnessed students work through challenges, find the use of support strategies, and make art throughout the process. Just as any educational experience is not linear, students were faced with working through their ideas and learning how to learn in a new way. Overall, I began seeing that students were able to more effectively identify what part of the making process they were in and figure out independently what they needed to do next to put their plan into action.

With the combination of the student-centered approach and routine of goal-setting and *Makerspace Worksheets,* students were able to more consistently get themselves started on their projects and advocate for help or support where needed. Due to the fact that each student worked on their own independent project and identified their own processes, there was peer-to-peer interaction where students would ask each other how they did something or ask for feedback on how their peer would approach making or doing something. The students working on the *Dream Playground* Project in N.K.'s class all decided one day that they wanted to make their slides together with the same design. Having them all realize that they universally thought it was important to include a slide within their playground drew a parallel between activities they enjoy doing together outside the classroom and brought it within the context of the art room.

The emphasis on the process of making within PBL and the *Makerspace Process* aided students in keeping their final product or goal in mind. By starting their projects with a solid plan depicted in a sketch or steps, students were able to measure their work against their initial plan. While the product sometimes differed from the original plan, students were still at the center of that decision-making process and were encouraged to

reflect and evaluate the outcomes regularly. Student-centered PBL leaves room for

teacher feedback and help. Although students were at the center of their planning,

learning, and process, there were absolutely times when students would seek feedback

and ask things like "What do I do now" or just honestly share that they were stuck and

didn't know what should come next in their process. It is important to be mindful of how

you respond and encourage students to seek answers or trust their creative ideas and not

just tell them what you, as the educator, think they should do. During the study, I found

myself encouraging students with open-ended questions like "What did you do last"

"What part of your project do you like the most and what do you like the least, and

why?" "How does x and y fit together with z?". Towards the end of the study, when I

would move around the room and check in on them, it was common to hear students

justify their work by saying things like, "My original plan was different, but I changed it

because..." As a result of a student-centered approach with an emphasis on process,

student's opinion and focus of the quality of their work was naturally present.

CHAPTER V: DISCUSSION AND IMPLICATIONS FOR THE FIELD

Introduction to Findings

Some common themes that emerged throughout the coding process were making art to deal with stress and boredom, how students place themselves in the center of their learning and art-making, and how they view and think through the maker process while creating. These themes reflect those of the instructional models of PBL and student-centered learning.

Presentation of Findings

Authentic Student Learning and Making

My observations and several photographs demonstrate that participants, as well as the other students who engaged in this pedagogical approach, were authentically learning and making. As previously mentioned in Chapter I, it was common for me to initially see students approach art with hesitancies and uncertainties about how to begin making and what was the right way to engage with the project. Providing students with such open-ended possibilities and space to make according to their own interests created such an experience that left each student feeling empowered and excited to make. The authentic learning and making began as each class started their lessons.

Since each student had their own vision and plan for their projects, the learning process and skills gained looked different for each student. During the *Dream Playground* project, each student had a choice of what equipment and amenities they would create for their projects. Despite some common objects, there was a great variety of what students dreamed for their playgrounds. When students saw an overlap between their idea and their peers, they had a choice to find inspiration within each other's

building process or explore independently. One group of students decided that they were

going to work together on making their slides. Although there was no right or wrong way

to create a slide for their project, the students wanted to work through the process

together and make slides that resembled a real slide. Using popsicle sticks, craft sticks,

and hot glue, the students crafted their slides. The power of observational creative

imitation is powerful within the art room or creative spaces. This design slowly made its

way into the projects of students in other classes, while in contrast, other students still

explored their own slide designs.

Figure 20. Dream Playground Slide Constructions

Another authentic-making experience I witnessed was a 6th-grade student

working on the *Graffiti/ Street Art project*. Similarly, each student had their own vision

and plan for their projects, and the learning process and skills gained looked different for

each student. This student chose to create his artwork in response to a local park with a

skate halfpipe. This student noted that there was a lot of graffiti that already existed

within the park, so he wanted to create a model that included an intentional and positive

work of art. Due to the frameworks and pedagogies in place, this student was able to

produce a work of art that related to a larger lesson and concept, yet was able to engage

with the content in a way that fit their interests and life experiences. Constructing a skate

ramp was no small feat, but the student found purpose and meaning in this activity and

was able to plan and build this idea into a meaningful work of art.

Figure 21. Graffiti/ Street Art Skate Ramp

Maker Process

My observations and interview revealed that students were able to work through

the process of making in accordance with the outlined *Maker Process*. These processes

provided students with a step-by-step outline to plug any process or project idea into. The

circular process is one that can be utilized for tasks not just in a creative way but a

problem-solving way. The *Maker Process* acts as a formal process that mirrors the

framework of UDL, helping students define the what, why, and how of their learning.

Through the *Semi-Structured Interviews*, students expressed how this process

helped them figure out how to get started while making.

(Q): How do you know how to put your plan into action?

JF(1): Think about it, and fill out the brain frame and then find a good way to do it and try and do a rough draft or like draw it out and finish it.

JF(2): You're done with the planning step, and all the ideas, and got the stuff ready.

NK(1): You have to think about it

NK(2): Skip

NW(1): Cause I'm feeling good about it

NW(2): By doing the steps in order to do it

RH(1): Sketching it out first and thinking about the shapes that I would be using

RH(2): When I feel like it's ready and I have a good idea in my head and then I just like kinda get lost and then I just do it and I'm back in my brain and it's like oh it looks good haha

WS(1): I don't really think about it, I just know what I want to do, and I just draw until I like it, and I just make it

Figure 22. Maker Process Interview Findings- Planning

This was also revealed through observation. Students were able to identify what they

were doing by using the steps of the process as vocabulary words. Other points of the

process students were able to use this process to work through was deciding when they

were done with a project.

(Q): How do you know when your work is done?

JF(1): When I can't add anything, or I can't fix anything, and then I know I did my best work.

JF(2): I can't add anything, or I can't change it anymore, and I've done my best.

NK(1): When my arms get tired

NK(2): When my brain tells me and my arms get tired

NW(1): Because it's all finished

NW(2): You went over everything, and you completed it, and you finished the step, and your done painting it, and you're done every single step

RH(1): When in my mind I think it looks good and looks finished.

RH(2): When I think it looks good, I think I couldn't do any better, that it is all done. So there's nothing else I can give to it. I don't have any more ideas to put on it.

WS(1): When nothing can make it look better

WS(2): When I can't think of any more things to do

Figure 23. Maker Process Interview Findings- Finished

Encouraging students to understand what goes into completing a task to the best of their

ability can help them be more confident in their making. As mentioned, this creative

process is something that is able to be utilized in settings beyond the art or STEAM class.

The utilization of a makerspace also reinforced this finding because students' interactions

with it were explorative and in alignment with their own project goals and vision. It can

be further connected that the use of the makerspace and the *Maker Process* encouraged

the use of students' EFS. Keeping track of supplies, prioritizing steps, managing your

time, and being flexible are all utilized.

Results in Context of the Research Question

How Does PBL Strengthen Student Empowerment

Within PBL, the project that students are tasked with is the centerpiece of the

lesson. Students are provided an open-ended question or task that motivates them to

investigate and find their own responses or solutions. These open-ended or essential

questions allow students to insert the exact problem-solving solutions to these curricular-

based questions as they would real-world problems. Despite the focus on the student's

self-driven process, essential questions or planning guidelines are still presented by the

educator, guiding them along the way. By facilitating students with a set of steps or

questions to ask themselves, you are empowering them to find their own answers, thus

encouraging the same problem-solving strategies they would use to solve real-world

problems. Providing students with their *Art Goal Sheets* promotes the use of students'

EFS, allowing them to set goals and chunk the steps they plan to take while addressing

the problem.

How Does UDL and the Use of a Makerspace Encourage Authentic Learning

Creating learning opportunities that utilize the framework of UDL supports

recognition learning, strategic learning, and effective learning environments. UDL levels

the playing field in educational landscapes because it provides multiple means of

engagement that meet the needs of all types of learners. Makerspaces encourage learning

by doing. A makerspace is an environment that promotes student-center making and

inquiry-driven material exploration. The individuality that coincides with such an environment is a by-product of the solutions that students create and aid in forming the self-confidence and self-awareness that come from designing, making, and sharing (Flemming, 2015). Promoting contextualization of the what, how, and why of their learning encourages them to seek more authentic and deeper connections to their learning. Encouraging students to do this within a space that adequately supports that, a makerspace, truly places the student at the center of their learning.

This study investigates how applying these pedagogies and frameworks to an art experience for students with learning differences could positively affect student learning practices, helping them make deeper connections to their learning. This process was investigated from two main standpoints; how UDL can level the playing field for all learners and their needs, specifically those with learning differences, and how the environments of a makerspace can facilitate students to make their own authentic connections to their learning and making. With the use of the *Maker Cycle* and *Makerspace Worksheet*, students are able to more easily identify the what, how, and why of their learning and provide themselves with ownership of their work.

Results in Context of the Literature Review

Educational Theories and Frameworks

The utilization of UDL was essential and crucial in supporting all learners, but specifically the students with learning differences within the study. As Chapter II's literature review mentioned, constructivism is related to the framework of UDL, its three-step approach, and its close connections to student-centered philosophies.

The objective of utilizing the mentioned frameworks and philosophies allowed for the lessons presented to students to invoke the importance of their own ideas within the process of making. Students are supported in further developing their abilities as critical thinkers and creative problem solvers by presenting multiple access points to the topics and lessons. Within the *Dream Playground* Lesson and the *Graffiti/ Street Art Lesson*, students were given a large amount of voice and choice in approaching the projects with their own ideas and inquiry-driven processes.

Educational Contexts of Learning By Doing

PBL additionally facilitates inquiry-driven making and demonstrates to students that not all problems or tasks can be addressed or solved with a fixed solution. Through the use of *the Dream Playground Lesson* and the *Graffiti/ Street Art Lesson*, students worked towards making a product; however, more weight was placed on the process instead of the finished product. In exchange, students learned to work on other artistic motivations like making for the joy of experiencing the process, making to invent, or even making as a form of exploration. The utilization of the *Makerspace Worksheets* promoted the process of working towards a goal with a plan but not a fixed solution. Approaching the project with a plan, students understood what they were working towards but naturally saw opportunities to adapt them and make modifications along the way.

In Context of Research Environment

This study took place within a school setting with a diverse group of students with

diverse learning differences and needs. Since this study aimed to facilitate art experiences

for students with LBLD through the use of UDL, the environment influenced the study.

However, the opposite is true as well since the study influenced the environment. Given

the structure of the environment already utilized UDL, the study was influenced by this

environment, thus including it within its structure. Using UDL to meet the needs of all of

the learners participating within my classroom and within this study required that

instruction and day-to-day procedures be easily modified and adapted. THS uses UDL

throughout the school, so this is specific to the research site. This had an impact on the

study because the research environment had been shaped in this way prior to the study. I

can't say what this study would look like within the structure of another environment, but

if the researcher/teacher did not understand how to implement the framework of UDL,

the results might differ.

The study impacted the research environment because it encouraged students to

seek the what, why, and how of their learning, not just within the art room but all of their

learning environments. Also, the study impacted the research environment because it

facilitated students to grow their executive functioning skills, allowing them to become

more flexible and willing to solve challenges or problem-solve when things don't go their

way.

Utilizing a pedagogy that is so conducive to encouraging students to make their

own art in response to the essential question or prompt naturally highlighted the diverse

amount of creativity and interests that my students have. Although students were all

working towards a common goal, the effect utilizing PBL and a makerspace had on the

student's engagement and production was notable. Part of the structure of UDL within

my classroom is that I don't give due dates to keep the pressures of finishing and making

off of my students. Within the coding of the data collected within the study, the theme of

relaxation and making for enjoyment was a common occurrence. Seeing a large number

of my students consistently attending art and being engaged as soon as they walked

through the door was great evidence that they were proud of the work they were doing

and interested in their subject matters.

In Context of Researcher as Self and Practitioner

This study has reinforced my passion for art education and supporting all types of

learners. As mentioned in the background to the study in Chapter I, my own experience

within education has influenced my own drive to provide students with an authentic

learning experience– encouraging students to utilize their strengths and talents cross-

curricular. I hope this study helps reinforce the importance of creating curricular and

pedagogical approaches to art education that place our students at the center of their own

learning and growing skills that serve a great purpose in their futures.

Implications for The Field

The findings of this study are not just relevant to a school setting specifically for

students with LBLDs but for all learners. This is specifically relevant to the field of art

education in 2023. As art educators are expected to stay up to date on the latest methods,

pedagogies, and practices. This study exemplifies how historical pedagogies like UDL,

PBL, and student-centered learning are not necessarily new ideas, but when presented within the context of a makerspace environment, students are given the chance to engage in authentic learning and making experiences. This further aids students in seeing the connection between different content areas and the greater purpose and application of their learning.

A main takeaway from this study is not that all teachers need to switch to a UDL, PBL, STEAM, or art classroom with a makerspace, but that by providing instruction that truly resonates with students and leaves room for them within the lesson and project encourages more authentic learning. In my experience, a lot of students come from previous art rooms that utilized teacher-directed instruction and fixed student outcomes. The main problem I have witnessed that students face when they come from art education experiences like this is that they don't know how to envision their own creative ideas and plan for what they want their art to look like. They are challenged with creative problem-solving along the way. Students who have never experienced the opportunity to define what art is for themselves are more likely to self-doubt their own artistic abilities and measure their successes in comparison to those skills and outcomes of their peers. Students are more motivated when they see a purpose to their work and learning, and placing them at the center of their learning encourages them to be more accountable for their efforts but also makes them even more proud of their success and achievements. A takeaway from this study is that students are able to take the time and work through challenges and plans when given the support and time to do so and are more motivated when they are given the room to make their own choices and utilize their own ideas and style.

Implications for Further Research: Next Questions

Future researchers could study the impacts of utilizing a similar study within the

context of a general education or public education setting with a larger student-to-teacher

ratio. As identified in the limitations of the study, this study was researched in a specific

location with a specific population. Repeating this study in a different environment with a

different population may result in different findings.

Another consideration for further research would be to utilize similar language,

frameworks, and processes used within this study across different content areas and

measure student engagement and EFS. Encouraging students to see the what, why, and

how of their learning and aiding them to make plans and identify what materials they will

need to begin working in all subjects facilitates the strengthening of skills that are helpful

in real-life problem-solving.

Conclusion

In conclusion, this action-based research study explored the integration of PBL,

student-centered learning, makerspaces, and UDL principles within the context of an art

curriculum. Through the implementation of these innovative approaches, several key

findings and implications emerged.

First, PBL proved to be a highly effective pedagogical approach in art education. It provided students with opportunities to engage in authentic, hands-on experiences, fostering their creativity, critical thinking, and problem-solving skills. The projects allowed students to explore their own individual interests and express their unique artistic voice and choice. As a result, this increased their motivation and self-confidence within the art room and provided opportunities for a more personal and deeper understanding of their creative abilities.

Secondly, student-centered learning played a crucial role in the success of the art education pedagogy. By shifting the focus from the teacher to the student and their artmaking, it empowered them to take ownership of their learning experiences. Students were actively involved in their decision-making, goal-setting, and self-reflecting on their progress and making. This approach promoted greater student engagement, autonomy, and a sense of ownership, leading to more authentic art experiences and outcomes.

Furthermore, the incorporation of UDL principles ensured that the art pedagogy and learning environment catered to the diverse needs of all learners. UDL provided a framework for creating inclusive learning environments and supporting students in addressing their own learning and participation. By offering multiple means of representation, action, and expression, students were able to engage with the content in ways that were meaningful and effective for them. UDL fosters an inclusive and equitable art experience, which promotes the success of all learners.

Overall, the findings of this study highlight the significance and impact of integrating PBL, student-centered learning, makerspaces, and UDL principles in art

education. This approach promotes student engagement, creativity, critical thinking, and

inclusive learning environments and excludes the presence of ableism. By embracing

these innovative practices, art educators can empower students to become active learners

and creative thinkers. Moving forward, I encourage continued exploration, collaboration,

and research in this area. These potential findings will further enhance the effectiveness

of art education and ensure that all students have access to engaging, high-quality,

inclusive art experiences.

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Appendices

APPENDIX A: Permission and Consent

RESEARCH SITE SUPPORT FORM

Jason Seggern

████████████████

███████████████████████████

January 2023

To Whom It May Concern:

I, Jason Seggern, give permission to Lauren Bauer to conduct an action research study at ███████████ during the Spring 2023 semester in order to fulfill the requirements of her Master's thesis at Moore College of Art and Design. I understand that this project is intended to determine The Impact of Facilitating Art Experiences for Students with Language-Based Learning Disabilities Through the Use of Universal Design for Learning Within a Makerspace.

I understand that Lauren Bauer will be a teacher-researcher who will be teaching art while gathering data during the school day. I understand she will collect data using various methods, including observation, interviews, surveys, and conversations with selected students.

Sincerely,
Jason Seggern

_____   Date: _____

Jason Seggern

Head of School

THE IMPACT OF FACILITATING ART EXPERIENCES FOR STUDENTS WITH
LBLD THROUGH THE USE OF UDL WITHIN A MAKERSPACE

PARENTAL CONSENT FORM FOR PARTICIPATION IN RESEARCH

I give consent for my child, _____, to participate in a special project at ███████████████ Ms. Lauren Bauer, the art teacher at ███████████ ██████ and a Masters student at Moore College of Art and Design, is conducting a research project examining the benefits of facilitating authentic art experiences through the use of a STEAM-based arts education and its impact on student's engagement with a makerspace. This project will be conducted in class during the school day and will not impact time devoted to other academic subjects. The results of the study will not in any way affect your child's grades or academic activities. Your child's identity will be kept anonymous.

The project will involve the facilitation of a project-based art education curriculum. Students will be completing their typical art projects and daily lessons. Participating students will be completing self-assessments and will have the opportunity to keep an art journal that will allow them to reflect on their creative plans as well as personal experiences.

Students will be exposed to STEAM-based art lessons and activities throughout the course of the study. Participating students will be interviewed about their projects and the creative process. Sessions will be audio-recorded or video-recorded for the purpose of ensuring accuracy in field notes. Your child's artwork may be photographed throughout the course of the study.

Should you have any questions, please do not hesitate to contact me at lbauer@███████████. If you have further questions, you may also reach out to my professor, Amanda Newman-Godfrey, at anewmangodfrey@moore.edu or my MA Program Director, Lauren Stichter at lstichter@moore.edu .

Should you wish your child to participate, please sign and return this form no later than January _____, 2023. Thank you for your time and consideration in this matter.

PLEASE DETACH AND RETURN BY JANUARY _____, 2023

I,_____(Guardian Name), do hereby give permission for

my child,_____to participate in a special project at

██████████.

_____   _____

Parent / Guardian Signature   Date

THE IMPACT OF FACILITATING ART EXPERIENCES FOR STUDENTS WITH
LBLD THROUGH THE USE OF UDL WITHIN A MAKERSPACE

PARTICIPANTS' RIGHTS FOR STUDENTS

Researcher: Lauren Bauer

Research Title: The Impact of Facilitating Art Experiences For Students With Language-Based Learning Disabilities Through The Use of Universal Design of Learning Within a Makerspace

• I have read and discussed any questions or concerns about the Research Description with the researcher. I have had the opportunity to ask questions about the purposes and procedures regarding this study.

• My child and my participation in this research is voluntary. I may refuse to participate or withdraw from participation at any time without jeopardy to my child's grades, future student status, or other entitlements.

• The researcher may withdraw my child at her professional discretion at any time.

• If during the course of the study, significant new information that has been developed becomes available, which may relate to my willingness to continue to participate, the investigator will provide this information to me.

• Any information derived from the research project that personally identifies my child or me will not be voluntarily released or disclosed without my separate consent except as specifically required by law.

• If at any time I have any questions regarding the research or my participation, I can contact the researcher, Lauren Bauer, at (610) 967-3701 or lbauer@ ⬛⬛⬛⬛⬛⬛ to answer my questions.

• If I have comments or concerns regarding the conduct of the research or questions about my rights as a research subject, I will contact Amanda Newman-Godfrey, Assistant Professor Art Education, 1916 Race Street, Philadelphia, PA 19103, (215) 965-4034, anewmangodfrey@moore.edu or Lauren Stichter, Director of Art Education, Moore College of Art & Design, 1916 Race St., Philadelphia PA 19103-1179. lstichter@moore.edu (215) 965-4034

• I have received a copy of the Research Description and this Participant's Rights document.

THE IMPACT OF FACILITATING ART EXPERIENCES FOR STUDENTS WITH
LBLD THROUGH THE USE OF UDL WITHIN A MAKERSPACE

Consent: Please read the following and consent to each form of data collection.

➤ If audio recording* is part of this research:

_____I consent to having my child audio recorded for the purposes of this study.

_____I do NOT consent to having my child audio recorded.

➤ If video recording is part of this research,

_____I consent to having my child video recorded for the purposes of this study.

_____I do NOT consent to having my child video recorded.

***Any audio or videotaped materials will be transcribed using pseudonyms, and the researcher will only view original materials. All materials will be kept in a secure, locked location during the duration of this study, and originals will be destroyed following the study.

➤ Written responses and artifacts (artwork, photographs, self-report questionnaires)

_____ Responses and artifacts are permitted to be collected for the purposes of this study.

_____ Responses and artifacts are NOT permitted to be collected for the purposes of this study.

_____ Photographs* of my child and/or their artwork are permitted to be included in the results of this study and published in an educational thesis.

***No names or identifying information will be included with photographs

My signature means that I agree for my child to participate in this study.

Participant's Guardian's signature: _____

Date:___/____/___

THE IMPACT OF FACILITATING ART EXPERIENCES FOR STUDENTS WITH
LBLD THROUGH THE USE OF UDL WITHIN A MAKERSPACE

RESEARCH CONSENT FORM

DESCRIPTION OF THE RESEARCH:

Selected Hillside students assigned to Lauren Bauer's roster at ████████████ are
invited to participate in a research study that investigates the impact of art experiences for
students with language-based learning disabilities. With the use of a STEAM-based arts
program and project-based learning opportunities, this study will look at how a
Makerspace within an art classroom impacts and promotes students' ability to solve
problems, make things creatively, and make connections across content areas.

Through discussions, written self-report measures, and project-based activities, it is
hoped that valuable information will be gained on how to best structure art education
lessons so students can begin setting their own goals, take initiative and ownership of
their work, and reflect on their processes throughout the course of this research study.

For this study, students will participate in research sessions over the course of 10 weeks
during the Spring of 2023. This research study is primarily conducted during regularly
scheduled class times, so there will be no effect on the regular program. In addition, two
scheduled interview sessions will be audio-recorded and transcribed. These audio and
video recordings will provide information that I will use in writing my thesis. The audio
and video recordings will be destroyed upon the completion of my study. This study will
take place at ████████████ in the Art room during class time, and I, Lauren Bauer,
will conduct the research study.

RISKS AND BENEFITS: Participation in the study is completely voluntary. Non-
participating students will not be penalized in any way if you should refuse to participate.
No child will be singled out or pulled from any activities if they choose not to participate
in the study. There are no foreseen risks unique to this study that students would not
encounter during a usual art or classroom activity. If a participating child feels
uncomfortable at any point in this study, special arrangements can be made, and/or a
student can be pulled out of the study without penalty or repercussions. Grades will not

be affected if a student elects not to participate. The purpose of this study is strictly to
help me, Lauren Bauer, deliver art instruction and experiences that encourage the use of
STEAM and project-based learning.

PAYMENTS: There will be no payments for anyone's participation in this study.

DATA STORAGE TO PROTECT CONFIDENTIALITY: Students' confidentiality will
be preserved. I am the sole researcher of this study. For the collection, analysis, and
reporting of all data, all of the participants will be assigned a pseudonym to prevent
individuals from being identified. Any charts used in my thesis or presentations will be
coded. All the data that I collect for this research project will be kept in a locked file
cabinet in my classroom. The audio recordings will be destroyed upon the completion
and presentation of this study in the form of a master's thesis. If consent is given, I will
reserve the right to use the data and photographs of student artwork, but the students'
identities will continue to remain confidential.

TIME INVOLVEMENT: Participation in the study will take approximately 10 weeks.

HOW WILL RESULTS BE USED: The results of the study will be used to design an
informed art curriculum utilizing STEAM and project-based learning for students at ▆▆
▆▆▆▆▆▆. Conclusions from the investigation on the implementation of a
makerspace and the effect on student's ability to solve problems, make things creatively,
and make connections across content areas will be the motivation and driving factor in
project design. The results will also be included in a thesis, which serves to fulfill my
requirements for a master's degree in Art Education with an Emphasis on Special
Populations from Moore College of Art and Design.

APPENDIX B: Lesson Plans

Date: Spring 2023

Grade Level: Primary- Student

Activity:

Dream Playground

Materials:

Full access to Makerspace:

Found objects (recycled materials, caps, lids, cardboard, bubble wrap, scrap papers, egg cartons), pipe cleaners, cardboard, straws, tape, popsicle sticks, sticks, old pencils, pom-pom balls, art foam sheets, yarn, string, ribbon, etc. glue, scissors, pencil, colored pencils, washable markers, regular crayons, tempera paint sticks, oil pastels.

Vocabulary:

Makerspace, Found objects, recycled materials, composition, arrange, design, repurpose, recycle, reuse, shapes, lines, textures, space, community arts, dream playground, interactive, movable.

Primary Learning Objective:

Through the exploration of found object art making, students will learn that the process of making art with found materials can be used to reveal new purposes for everyday items.

Secondary Learning Objective:

Through the use of creativity to repurpose found objects to make art, students will learn that their artistic practice and creative ideas can be applied to real-life scenarios, like designing a dream playground.

Developmental Rationale/ Prior Learning:

Students will be approximately in the symbol-making/ schematic phase of development. During this phase of development, children's artwork becomes very decorative. Children develop a definite form concept and can visualize more carefully the lines and shapes of objects. Their drawings symbolize parts of an environment in a descriptive way. This project will encourage them to explore creating art in a decorative way while allowing them to view found objects as full of potential while creating art in a symbolized way. Students will have prior knowledge and skills to use basic materials like crayons, markers, glue sticks, scissors, pipe cleaners, etc.

Accommodations / Modifications / Adaptations:

Students will be able to complete the project at their own pace- no due date. Students will be offered one-on-one support throughout the whole lesson. Directions and lesson components will be delivered in bite-sized chunks. Lesson content will be delivered in multiple ways to reach more types of learners (first discussing personal experiences and relating to the topic, then looking at images on a screen, then exploring materials hands-on). For the self-assessment, students have the option to write, circle the symbol, or express their answers verbally. All students will be offered movement breaks or brain breaks throughout the transitions within the lesson and individually when needed. All supplies locations are labeled with images as well as words to make them more accessible to all. Demonstrations along the way for common trends in creating will be offered, for example, attachments and gluing techniques.

NAEA Standards:

VA:Cr1.2.2a: Make art or design with various materials and tools to explore personal interests, questions, and curiosity.

VA:Cr2.3.2a: Repurpose objects to make something new.

Do Now (Spark):

Students will be tasked with an imaginary project of remaking our school's playground. Each student will receive a map of the schoolyard with different objects and mark-

making tools to map out their ideas. These objects will be already provided on their tables for quick access and immediate creation. The supplies include bingo daubers, stickers, tracers, paper scraps, and full access to the makerspace and all of its supplies. Students will be provided with a current picture of our playground projected on the smart board as well as a handout to look at more closely.

Association/ Visualization:

Once students have completed their playground map and initial idea, they will be given the chance to present their ideas to their classmates. By offering this experience, they are able to receive in-the-moment feedback on their plans, sturring excitement and offering verbal explanations of the symbols and shapes they drew and what they represent. Once students are done sharing and engaging, they will be provided with makerspace planning worksheets. On this sheet, students will be encouraged to visualize and share their plans and plans for building, with space to go back and evaluate, reflect, and redesign along the way.

Transition to Work/ Makerspace encouragement phrases:
- Think about how you will transform your map into something 3D
- What material or surface is under your playground in different parts?
- Try mapping out where things will go before you attach them
- Think about what materials you can use to represent different parts of your playground
- How big is __ part of your playground compared to __ part of your playground?
- How can you show the size difference?
- This is great progress! What is next?
- How do you think you are doing?
- Is your playground similar to or different from your initial plan? Why?
- Is there anything that needs to be changed or added?

Clean-up:

After each class period spent working on this, students will clean up by returning any 2D materials they need to their designated class drawer, and any 3D objects that need to be stored can go on their class shelf for drying. Go over proper cleanup for maker space, making sure to leave it the way they found it. This lesson may take multiple art class periods. When a new work day starts, review major topics and ideas present at the project's beginning. Review the big idea and goal of designing a new playground. Encourage students to keep all of their supplies organized that they plan to continue using and leave shared areas clean for the next students.

Closure:

Students will have the chance to develop a title for their playground and formulate a phrase explaining why their plan should come to life.

Assessment (Formative):

Have students fill out an exit ticket self-assessment after the initial class period spent working on it. The assessment will help take a temperature of how students are feeling about the content and topics presented and gather overall how they feel about it. Per the accommodation/ modification section, For the self-assessment, students have the option to write, circle the symbol that represents their answer, or express their answers verbally. Another formative assessment will be the non-formal sharing opportunity of the student's finished works.

Lauren Bauer

Date: Spring 2023

Grade Level: 6/7th grade RH, JF

Activity:

Graffiti/ Street Art Model

Materials:

Full access to Makerspace:

Found objects (recycled materials, caps, lids, cardboard, bubble wrap, scrap papers, egg
cartons), pipe cleaners, cardboard, straws, tape, popsicle sticks, sticks, old pencils, pom-
pom balls, art foam sheets,   yarn, string, ribbon, etc. glue, scissors, pencil, colored
pencils, washable markers, regular crayons, tempera paint sticks, oil pastels, iPad, digital
media, printer, model magic, ruler, hot glue gun, hot glue sticks, duct tape, pencil, paper,
eraser, acrylic paint, tempera paint, water cup, paint palettes, paintbrushes, paper towels.

Other Resources:

PowerPoint:

https://docs.google.com/presentation/d/1ofQDfzY_P4H5i5pfJ9P9sjSG5R9mwOP3bqySl
vtWe5Q/edit?usp=sharing

Youtube Video:

https://www.youtube.com/watch?v=VhL5nCZXjY4

Vocabulary:

Makerspace, Found objects, recycled materials, composition, arrange, design, graffiti,
Basquiat, Keith Haring, Jen Stark, Banksy, murals, commissioned, muralist, street art,
activism, miniature model, small scale, sculpture, mixed media, social issue, social
change.

Primary Learning Objective:

Through the exploration of graffiti/street art and artists, students will learn how these art forms can relate to social issues, be a form of activism, and spread a message about what you, as the artist, care about.

Secondary Learning Objective:

Through the use of creativity to create this small-scale graffiti/ street art model, students will be able to use their own voice and choice in how they express themselves and explore these topics. Students will also gain maker skills during the planning and execution of these 3D models.

Developmental Rationale/ Prior Learning:

Students will be approximately in the preadolescent/ dawning realism phase of development. During this phase of development, children's artwork strives toward a more realistic take on things. Students have a clear understanding of space and how things exist three dimensionally. The purposeful use of shading and color appears.

Accommodations / Modifications / Adaptations:

Students will be able to complete the project at their own pace- no due date. Students will be offered one-on-one support throughout the whole lesson. Directions and lesson components will be delivered in bite-sized chunks. Lesson content will be delivered in multiple ways to reach more types of learners (first discussing personal experiences and relating to the topic, then looking at images on a screen, then exploring materials hands-on). For the self-assessment, students have the option to write, circle the symbol, or express their answers verbally. All students will be offered movement breaks or brain breaks throughout the transitions within the lesson and individually when needed. All supplies locations are labeled with images as well as words to make them more accessible to all. Demonstrations along the way for common trends in creating will be offered, for example, attachments and gluing techniques.

Do Now (Spark):

Students will be prompted to answer with their current knowledge, what they think graffiti is, and what street art is. And overall, are they both illegal? With visuals on half the board and a blank whiteboard on the other, as a class, we will have a discussion and make a Venn diagram to compare and contrast our ideas. Once this activity is completed, students will be presented with the PowerPoint of videos, images, and words to better help them understand and distinguish what the two are.

Association/ Visualization:

Once students have gone through the slides, and discussed what they learned, they will be asked to complete a brainstorming makerspace paper to help them figure out what they plan to make for their project. The big idea or task for their project is to make a 3D model that shows a street art/graffiti-inspired piece of artwork that has a positive message or shows how art can be activism.

Transition to Work/ Makerspace encouragement phrases:

- Think about how you will transform your idea into something 3D
- What material or surface will this structure stand on?
- Try mapping out where things will go before you attach them
- Think about what materials you can use to create the work of art
- How can you show the size difference?
- This is great progress! What is next?
- How do you think you are doing?
- Is your playground similar to or different from your initial plan? Why?
- Is there anything that needs to be changed or added?

Clean-up:

After each class period spent working on this, students will clean up by returning any 2D materials they need to their designated class drawer, and any 3D objects that need to be stored can go on their class shelf for drying. Go over proper cleanup for maker space, making sure to leave it the way they found it. This lesson may take multiple art class

periods. When a new workday starts, review major topics and ideas present at the
project's beginning. Review the big idea and goal of designing a new playground.
Encourage students to keep all of their supplies organized that they plan to continue using
and leave shared areas clean for the next students.

Closure:

Students can develop a title for their artwork and formulate a paragraph or video
recording explaining what graffiti/ street art is and what message their artwork holds.

Assessment (Formative):

Have students fill out an exit ticket self-assessment after the initial class period spent
working on it. The assessment will help take a temperature of how students are feeling
about the content and topics presented and gather overall how they feel about it. Per the
accommodation/ modification section, For the self-assessment, students have the option
to write, circle the symbol that represents their answer, or express their answers verbally.
Another formative assessment will be the non-formal sharing opportunity of the student's
finished works.

APPENDIX C: Interview Protocol

Semi-Structured Individual Interview

Interview Protocol Form

Date: _____

Time: _____

Location: The Hillside School Art Room

Interviewer: Lauren Bauer

Interviewee: _____

Protocol

Each student participating in this interview will be given the same accommodations and modifications needed to approparelty and adequately access and engage with the following questions. As a form of best practice, each student has the option to sit wherever they want or stand within the classroom during this interview. They have the option to sit next to me and read the interview questions for themselves or have their own copy of the questions. Each student can ask for the question to be rephrased if they do not understand. The rephrasing of the questions will still accurately reflect the initial nature and meaning of the question; however, it may meet their cognitive processing abilities more appropriately. Each student will have as long as they need to engage in completing the interview questions. There will be a designated time at the conclusion of the interview for students to share anything else they feel comfortable sharing.

The steps for question/ dialogue will be as follows:
1.) The conditions of the interview will be as follows:

    a. Each student will meet with the interviewer one-on-one
    b. The entire duration of the interview will be audio recorded while the interviewer takes field notes and observations on the physical paper.
    c. Since each student is given the accommodation to advocate for how they need the interview questions presented to them and where they will be seated in the room, those specifics will be recorded in written notes by the interviewer.
    d. Transcripts of each session will be created in a word processing program.
    e. Each transcript will be identified with the student's pseudonym, date, and written notes collected during the interview.

2.) The researcher will greet the student and begin with the first question.
3.) Each student will have the right to "skip" a question; thus, no answer will be recorded.
 4.) Each student will be asked the questions in the same series; however, they will have the option to advance past it and come back to a question after the remaining ones have been asked.

Scripted Introduction:

Hello friend! I will be asking you 15 questions about your art-making, specifically about why you make art, what you like to make, and how you make it. Please answer all of the questions honestly. There are no right answers. I am asking you them because I want to know your answer to them! I am only going to ask you one question at a time. You can read them along with me on the sheet I gave you. If you need more time to think about your answer, we can go past the question and come back to it at the end. If you don't want to answer a question at all, you can say, "skip." I am going to be audio recording your answers so that I don't forget them once you leave. You might see me take notes while you answer. Anything I write down is good and is just notes for myself to remember what we talked about. The answers you give me will not be shared with your parents, teachers, or friends.

The "Why"

1. Do you make art outside of art class?
2. How do you know when you want to make something?
3. Why do you find yourself making art?
4. Why do you think we make art in class?

The "What"

5. What type of art do you like to make?
6. How do you come up with ideas?
7. Does your art solve problems?
8. What do you do with your art when it's done?

The "How"

9. How do you get started when you make art?
10. What materials do you like to use?
11. What materials do you not like to use?
12. Are there other types of art making you want to explore?
13. How do you know how to put your plan into action?
14. How do you know when you want to change your ideas?
15. How do you know when your work is done?

APPENDIX D: Semi-Structured Interview UDL

Name:

....

1.) Do you make art outside of art class?

2.) How do you know when you want to make something?

3.) Why do you find yourself making art?

4.) Why do you think we make art in class?

5.) What type of art do you like to make?

6.) How do you come up with ideas?

7.) Does your art solve problems?

8.) What do you do with your art when it's done?

9.) How do you get started when you make art?

10.) What materials do you like to use?

11.) What materials do you not like to use?

12.) Are there other types of art making you want to explore?

13.) How do you know how to put your plan into action?

14.) How do you know when you want to change your ideas?

15.) How do you know when your work is done?

APPENDIX E: Interview Answers at a Glance

Interview Answers at a Glance

1

Question (Q): Do you make art outside of art class?

JF(1): Sometimes

JF(2): Sometimes

NK(1): Yes

NK(2): Yes

NW(1): Yes

NW(2): Yes

RH(1): Yes

RH(2): Yes

WS(1): 100% Yes

WS(2): Yeah

(Q): How do you know when you want to make something?

JF(1): Like a thought. Like, ah Im kinda bored, and I want to make something right now… And then I do it.

JF(2): I don't know. Think about what could be cool

NK(1): When my brain tells me to

NK(2): My brian just tells me

NW(1): I'm normally bored

NW(2): It just pops into my mind

RH(1): Just when I see something that is cool looking and I get that feeling that I want to make that on a piece of paper

RH(2): When I see something inspiring and I think I can make something cool kinda like that

WS(1): When I'm bored

WS(2): normally when I watch youtube

(Q): Why do you find yourself making art?

JF(1): Hobby, something fun to do.

JF(2): To do it for the past time

NK(1): Because it's fun

NK(2): Because it's fun

NW(1): To get me off of bordom

NW(2): To get rid of my stress

RH(1): Cause It's fun and calming

RH(2): Because I like doing it and its fun and something to do in your free time and it's claiming

WS(1): Because if we have free time, I like to see things that pop out of the paper and look cool

WS(2): Because I like how it looks

(Q): Why do you think we make art in class?

JF(1): It helps build creativity.

JF(2): To make your brain think. Like creative stuff I don't know what it's called…(RR): *To get the creative juices flowing.* JF(2): Yeah!

NK(1): Because it's called art class!

NK(2): So you can practice

NW(1): Because that's your job

NW(2): To get rid of stress that may come in from the day

RH(1): To learn new things like the 7 elements of art and like other artists

RH(2): So we can learn about the 7 elements of art and learn about new artists and it's something fun to do

WS(1): I don't know

WS(2): Help calm down and relieve stress

Interview Answers at a Glance

2

(Q): What type of art do you like to make?

JF(1): Printmaking

JF(2): The clay was fun

NK(1): Drawings

NK(2): Like Pictures

NW(1): Paintings

NW(2): Crafts. (RR): *Can you give me some examples of crafts you like to make?* **NW(2): I like to make... make stuff with clay.**

RH(1): I like doing clay and coloring projects with like colored pencils

RH(2): I like doing clay, waterpaints, just normal paints, colored pencils, I like photography, uhm yeah

WS(1): Is art like making ice. (RR): *It can be whatever you want* **WS(1): Then yes**

WS(2): Artwork with ice and like drawing

(Q): How do you come up with ideas?

JF(1): I just look around, and I say that looks cool I want to try and make that...(RR): *So you see inspiration around you?* **JF(1): Yeah**

JF(2): Brain frames or like I think that looks cool I wanna do that...(RR): *So you find inspiration around you or you get inspiration from around you.* **JF(2): Yeah**

NK(1): Sometimes my brain just gives me my ideas really quickly

NK(2): My hands just start doing whatever

NW(1): I don't know

NW(2): can we come back to this one?

RH(1): By just thinking

RH(2): Oh, like by the colors or the shapes, the way it's shaped. I don't know if it's kinda hard to explain it's like or like I'll think of something in my head and I think that would be cool to make.

WS(1): They just pop into my brain.

WS(2): Youtube

(Q): Does your art solve problems?

JF(1): Depends on the problem

JF(2): I don't know

NK(1): Yes

NK(2): Yes

NW(1): I don't know

NW(2): Yes. (RR): *Can you give me an example of a problem your artwork has solved?* **NW(2): most of the time my stress.**

RH(1): Sometimes? Maybe

RH(2): Yeah like when I'm upset or kinda doodle it helps calm me down and stuff.

WS(1): No. Well actually depends what problems.. WS(1): Learning language arts

(RR): *Okay so you do projects in language arts* **WS(1): Yeah so we do it and I draw it** (RR): So you think its easier for you to learn if you draw it. **WS(1): Yeah**

WS(1): Not really

(Q): What do you do with your art when it's done?

JF(1): Hang it up and wait for the art show at the end of the year.

JF(2): We had STEAM Night

NK(1): I like to show my family

NK(2): Give it to my mom or my dad

NW(1): Take it home

NW(2): Take it home

RH(1): I put it on this portfolio that I have at my house

RH(2): I put it on this portfolio that I have or put it in my book that I draw in

WS(1): I show my sister and brag about it

WS(2): Hang them up in my hallway

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Interview Answers at a Glance

3

(Q): How do you get started when you make art?

JF(1): Come up with an idea and follow through until you're finished with the idea.

JF(2): You make a brain frame or the whatever it is to say this is what were gonna do first like a sketch or whatever...(RR): So you go through a series of tasks, you plan, and then you go from there. JF(2): Yeah

NK(1): You have to figure out what you're going to make

NK(2): Thinking what I want to do

NW(1): Plan!

NW(2): Plan!

RH(1): By grabbing my materials and working

RH(2): By getting a pencil, a piece of paper, an eraser, and maybe some coloring materials unless I'm doing just a sketch.

WS(1): Get a piece of paper

WS(2): I make a rough draft and then get the tools I need

(Q): What materials do you like to use?

JF(1): Clay

JF(2): Clay, the Suminagashi stuff

NK(1): Pencils, colored pencils, glue

NK(2): Pencils, cameras

NW(1): Scissors and crayons

NW(2): Clay

RH(1): Colored pencils, clay, markers, paint, yeah

RH(2): colored pencils, I like using those pastels. And yeah..(RR): Oil or chalk? RH(2): Oil pastels I think. RH(2): I like using markers.

WS(1): The paint sticks and pencils and lots of things and ice, and encaustic

WS(2): Sharp materials, hot materials, like hot glue glun, and popsicle sticks

(Q): What materials do you not like to use?

JF(1): I don't mind any

JF(2): I don't know

NK(1): I like using all the materials

NK(2): Skip

NW(1): Erasers because that means I made a mistake

NW(2): Glue because it sticks on my hands

RH(1): I don't like pencils that don't have erasers. I don't like using crayons.

RH(2):I don't like using crayons I just feel like they aren't like a plain color they have that shading. RH(2): I don't like using those little black brushes

WS(1): Markers, dry eraser board, and makers

WS(2): Glue because I normally break them

(Q): Are there other types of art-making you want to explore?

JF(1): I've done everything I can think of

JF(2): Sure

NK(1): Yeah.. photography

NW(1): Yes

NW(2): Weaving!

RH(1): Yeah, like looking at a sculpture and painting it and making it look realistic

RH(2): Yeah I don't really like know a lot so I want to explore more so I can know more about art.

WS(1): Making something with ice

WS(2): Ice

Interview Answers at a Glance

(Q): How do you know how to put your plan into action?

JF(1): Think about it, and fill out the brain frame and then find a good way to do it and try and do a rough draft or like draw it out and finish it.

JF(2): You're done with the planning step, and all the ideas, and got the stuff ready.

NK(1): You have to think about it

NK(2): Skip

NW(1): Cause I'm feeling good about it

NW(2): By doing the steps in order to do it

RH(1): Sketching it out first and thinking about the shapes that I would be using

RH(2): When I feel like it's ready and I have a good idea in my head and then I just like kinda get lost and then I just do it and I'm back in my brain and it's like oh it looks good haha

WS(1): I don't really think about it, I just know what I want to do, and I just draw until I like it, and I just make it

WS(2): I don't know

(Q): How do you know when you want to change your ideas?

JF(1): If it's not working out, I can see if I can try and work it out, and if not I see if I can work off of what I already did and change it.

JF(2): It's not working out.

NK(1): My brain tells me

NK(2): My brain tells me

NW(1): N/A

NW(2): Once we get done building, we should look over and see what happened as it goes along and see what you need to change

RH(1): When I see something that might be wrong, or I think about if there is anything I could change to make it look right.

RH(2): When I feel like something just doesn't look right, I'll erase it and do a new line.

WS(1): It might just come to my mind

WS(2): When I see someone else and I get inspired by them and then I do it

(Q): How do you know when your work is done?

JF(1): When I can't add anything, or I can't fix anything, and then I know I did my best work.

JF(2): I can't add anything or I can't change it anymore and I've done my best.

NK(1): When my arms get tired

NK(2): When my brain tells me and my arms get tired

NW(1): Because it's all finished

NW(2): You went over everything, and you completed it, and you finished the step, and your done painting it, and you're done every single step

RH(1): When in my mind I think it looks good and looks finished.

RH(2): When I think it looks good, I think I couldn't do any better, that it is all done. So there's nothing else I can give to it. I don't have any more ideas to put on it.

WS(1): When nothing can make it look better

WS(2): When I can't think of any more things to do

Coding:

Making Art To Deal With Stress/ Boredom

Calm

Bored

Studnet-Centered Artmaking

Creativity

Individual Interests/ Ideas

Maker Process

Practice/ work on skills

APPENDIX E: Student Artifact

Date	Observation	Dream Playground
3/24	-Student exploring bingo daubers -Utilizing them to create a map/ key for their playground	
3/24	- Student using tracers to create a map/ plan for their project	
3/24	-Completed map and key -Student finished their plan and was ready to transition to building	
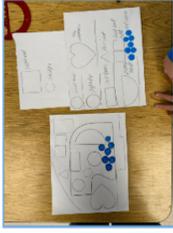
3/31	-Student transferring their plan into action -Pictured the gathering and exploration of material options for building -Studnet traced shapes of chosen materials to attach later: they decided to add color to the base before they added 3D elements	
3/31	-Student transferring their plan into action -Pictured them making marks and notations where they planned to place 3D elements	
4/13	-Student evaluating and reflecting on their built work in reference to their original plan -Studnet decided that there was not enough space to add anything further	

4/24	-Student setting a goal -Prioritizing what they want to work on for that class period -Referencing their plan sheet and current work	
4/24	-Student in-progress work	
5/4	-Student working on planning their map and key	
5/4	-Student working on adding base color to their project	
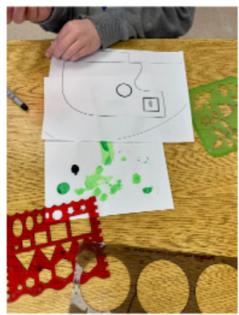
Date	Observation	Graffiti/ Street Art
3/24	-Introduction to the lesson with the whole class -Collaboratively, students completed ven diagram on the smartboard of what they thought were the similarities and differences between Graffiti and Street Art -Completed before terms were defined for them- measuring current understanding of the terms	
4/24	-Introduction to the lesson with the whole class (different class) -Collaboratively, students completed ven diagram on the smartboard of what they thought was the similarities and differences of Graffiti and Street Art -Completed before terms were defined for them- measuring current understanding of the terms	
5/5	-R.H. working on painting her street art mural	
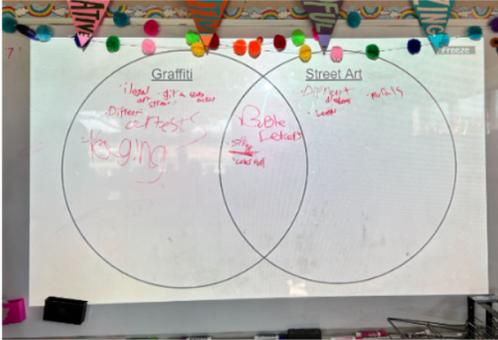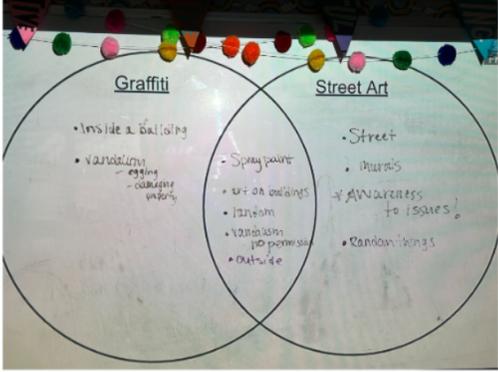
5/5	-Studnet working on painting structure -Student was inspired by a halfpipe skateboarding ramp at a local playground -They planned on adding a mural to the concrete to encourage a space that all are welcome	
5/5	-Student working on subway graffiti on train car -Student was inspired by art examples that they found	
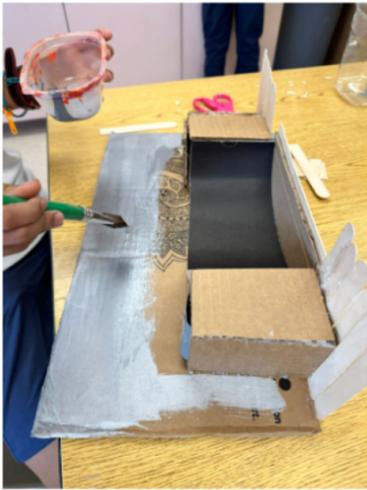
N.W. Dream Playground	Observations	Photos
4/13	• Was immediately engaged in the project. • Quickly created map and key	
4/27	• Began putting a plan into action • Difficulty with fine motor skills, so verbal check-ins to start 'plan' and 'build' stages • Collected Materials	
5/4	• Began by painting the base • Decided that creating a baseball field 3D would be too challenging, chose to draw it	
5/11	• Sourced materials for zipline/ experimented with material options • Decided to try straws • Used a hot glue gun to attach	
5/18	• Decided that he wanted to keep a lot of open space on his playground so that students could use their imagination and explore nature.	

N.K. Dream Playground	Observations	Photos
3/28	• Was eager to get started and had many ideas. • Asked for some help with spelling but responded well to the birds-eye-view map and key	
4/4	• Explored the makerspace and found lots of exciting items • The whole class benefited from the suggestion to pick one part of their playground to start with and to pick supplies for that • Started working through picking objects that she needed for building and not just ones that looked exciting	
4/11	• Continued working • Worked with peers, and a group of them decided to build their trampolines and swing sets the same	
4/18	• Independently sourced materials for the rock wall	
4/25	• She was able to point out that her finished product was different from her initial sketch • Related that the space her idea took up on paper was different from how it actually took up space	

R.H. Graffiti/ Street Art	Observations	Photos
3/31	• Was absent for initial introduction to lesson • Caught up quickly and jumped right in • Envisioned building a bench that would be in front of a mural for people to sit on and reflect	
4/4	• Created a plan and building steps based on her sketch • Used paper and measured out how big she wanted her project to be before she cut out the foam board	
4/14	• Worked carefully to cut the pieces with a box cutter and a ruler	
4/21	• Hot glued the two pieces together • Cut felt to be the cement • Started making bench	
4/25	• Finished making bench	
5/5	• Did a practice mural on paper • Was inspired by the mural on the art room walls that used geometric shapes and painter's tape to make clean lines • Wanted to make it look like a curtain was revealing the artwork	
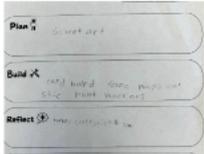
R.H. Graffiti/ Street Art		
5/12	- Finished painting the mural and attached the bench - Reflected that if she would change one thing, it would be that her bench would be further away from the wall.	
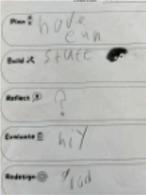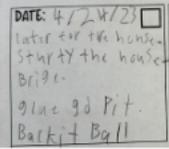
W.S. Dream Playground	Observations	Photos
3/24	• Started lesson • Spent the class time working on plan • Presented to class on the projector what his plan was • Chunked out how he planned to put his plan into action	
3/31	• Started collecting supplies and translating his 2D idea into a 3D form	
4/5	• Used Kwik paint stix to paint the base • Made the hockey rink sides out of cardboard- and made the base blue so it was an ice rink • Made slide	
4/21	• Spent whole class working on tree house • Discussed measuring popsicle sticks before cutting • Planned at the end of class what he needed to do next week to finish	
4/24	• Glued everything down to the base • Added duct tape for more design and color	