2024

FOUR LESSONS TO BUILD UPON: A STUDY OF POSTSECONDARY COMPOSITION CLASSROOM CURRICULUM

Tucker D. Nielsen
Michigan Technological University, tdnielse@mtu.edu

FOUR LESSONS TO BUILD UPON: A STUDY OF POSTSECONDARY COMPOSITION CLASSROOM CURRICULUM

By

Tucker D. Nielsen

A THESIS

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

In Rhetoric, Theory and Culture

MICHIGAN TECHNOLOGICAL UNIVERSITY

2024

This thesis has been approved in partial fulfillment of the requirements for the Degree of MASTER OF SCIENCE in Rhetoric, Theory and Culture.

Department of Humanities

Thesis Advisor:	*Dr. Holly Hassel*
Committee Member:	*Dr. Jennifer Nish*
Committee Member:	*Dr. Mark Rouleau*
Committee Member:	*M. Bartley Seigel*
Department Chair:	*Dr. Kette Thomas*

Table of Contents

Acknowledgements

I personally thank Dr. Holly Hassel, M. Bartley Seigel and Dr. Dana Van Kooy for supporting my undergraduate and graduate humanities work. I worked with Seigel at our Writing Center, where he encouraged me to pursue graduate school in writing administration studies. He has been supportive as a mentor and colleague. Dr. Van Kooy was my senior seminar professor who prepared me for graduate work before I got my degree. Dr. Hassel provided me invaluable insight into writing studies through her work and experience, guiding me as I crafted and implemented the study.

I also thank my committee members Dr. Jennifer Nish and Dr. Mark Rouleau for their input and expertise in reviewing the thesis. My gratitude extends to the other faculty and staff of Michigan Technological University I work and chat with. Their conversations, guidance, and company are what make Michigan Tech welcoming in its

My good friend and colleague Nila Horner suggested combining my passion for LEGO® bricks and writing pedagogy as a plausible approach for engaging students. Other members of my cohort have also supported my work and strengthened my sense of belonging in the Rhetoric, Theory, and Culture program.

I am thankful to my parents, as well as my siblings Maisy and Stockton, who have supported me heavily throughout my life. They also encouraged my passion for LEGO® bricks throughout my life. I could not have gotten to where I am if not for their patience, kindness, and support.

My partner Krystal supports my work heavily. As an undergraduate, she appreciates my focus on students of all disciplines to incorporate their voices. She

provides moral support and encouragement that allowed me to persevere through the rockier aspects of graduate school.

Finally, I thank God for providing me the resilience to complete this study and give back to the world, fueling my hope that every person will someday be equally heard.

Abstract

Soft skills in technical professions may be valued by employers, but post-secondary students engage with a dichotomy arguing against the blend of soft and hard skills. This study utilized activities with LEGO® bricks to determine how plausible kinesthetic learning methods are within university composition classes. Four in-class activities based on the class's four core assignments were spread across the Spring 2024 semester at Michigan Technological university. Through written reflections, lists, posters, and photos of students' builds, students practiced and demonstrated engagement with identified composition and critical thinking skills.

Two criteria (Audience Expectations and Genre Expectations, were not demonstrated as clearly in the four activities, compared to the overwhelming majority demonstrating Composition Process and Composition Reflection in their artifacts. Each activity demonstrated limitations with using just LEGO® bricks for in-class activities, but the amount of clear demonstrations and positive reception of the students ensured these types of activities are useful in university writing classrooms.

Keywords: Experimental Composition, Kinesthetic Learning, LEGO® Writing Pedagogy

1 Introduction: The Stereotypes Associated with STEM Students and Composition

I initially studied Computer Engineering. My classes at Michigan Technological University were primarily filled with coding courses and engineering fundamentals. I heard from my peers about how impractical and terrible classes such as Composition were for them. As I took other humanities courses before my official major transfer over to English, I listened to complaints from other students about how these classes did not address their needs as engineering students. The only course that seemed to apply to them was HU3120 (Professional and Technical Communication) due to genres like resumes and cover letters being practiced with.

In contrast, engineering departments at Michigan Technological University acknowledge the necessity of strong communication skills. On the Mechanical Engineering-Engineering Mechanics's Technical Communications page, the department specifies how math and science skills aren't enough to serve as functional mechanical engineers: "To meet the challenges ahead, mechanical engineers must be able to communicate clearly in a variety of modes—to diverse audiences and across cultures" (ME-EM 2024). The department addresses both the technical talent and communicative skills required for the field, especially considering how global the audiences are. Mechanical engineers cannot rely on just their technical prowess to succeed in their careers; they require a fluency in both technical language and general language to successfully work with others. Other writers have also noted this necessity for science fields not for external audiences but for the students' themselves.

In the preface for *Writing in Engineering: A Brief Guide*, Robert Irish states that by providing engineering students with communication strategies, the strategic logic is revealed about conveying their rationality to others. He states that "if students understand the reasoning that drives writing, not only are the lessons more likely to stick, but also the writers will be able to adapt to the frequently changing demands of the engineering world" (Irish xvii). He emphasizes that communicative pedagogy also includes understanding the logic of making choices in composition. communication strategies are not simply about communication but reasoning and critical thinking. Any person working within a field requires critical thinking skills to decide what genre conventions to utilize and how to implement them effectively for their goals. Presenting composition practices for both the audiences' sake and the student's sake becomes a challenge upon itself, as Michigan Tech alumni Roxane Gay noted heavily when she taught composition.

Roxane Gay wrote on the topic of student perception towards writing in her dissertation. She taught a composition-type course in which she observed a dissent within her program towards engineering students. She defined its characterization as negative with a generalization of engineering students having poor writing skills overall. "By the end of the seminar I was, frankly, quite worried, wondering if I was adequately prepared to teach what were, in essence, very bad writers" (Gay 14). There existed a stereotype that these incoming students, most oriented towards STEM fields, cannot adequately write effectively, and this generalization created dread in instructors like Gay to frame these students as incompetent communicators. Already a gap widened between Gay and her students.

Yet how the students were initially framed by the department countered with Gay's actual experiences, as she noted how the writing itself was surprisingly "competent, well reasoned and compelling" (Gay 14). For her, there was "a serious disconnect between the anecdotal characterization of Michigan Tech students as writers and my actual experience with their writing" (Gay 14). She shows the plausible divide crafted by instructors and administrators who may not be aware of students' needs and performances outside the realms of a language arts-framed perspective. Where a student may struggle with writing a book report, there may be another opportunity where that student excels in writing concise instructions for a chemical dissolution procedure. Gay's reality illustrates that student groups similar to Michigan Tech students have basic skills in writing or are open to refining their writing if they see the importance in it. These students are not incompetent but misguided and shamed for not fitting into the traditional student writing roles. Amongst the backdrop of information she weaves, Roxane Gay also notes how the discourse of engineers being "bad writers" comes not from a randomly-spurred idea but is instead "set against a very complex climate with many different stakeholders who have vested interests in their positions within that discourse". Part of that discourse could include stressing technical knowledge over communications, where students undergo specific training with an expectation that they'll learn how to write elsewhere. Rather than striking a balance between communicative/critical thinking and technical knowledge, engineering processes and the hands-on approach are held more significant. Stakeholders may express that students should have experience in numerous fields, but the exponential growth in computer processing and refined technologies has shifted focus to learning technical skills with minimal interference from soft skills.

While I grew up, the sciences and writing were taught separately, despite science classes sometimes assigning essays. There appeared to be a film that divided these fields that sometimes warbled when one field poked into another. Students between the 2000s and 2010s were most likely taught how to write in MLA style, which, while providing a basis to adopting writing styles, was not reflective of their interests outside of literature and language. I myself was first taught MLA through secondary school until junior year in a senior English course, where APA was introduced as another style. With this change introduced so far into years of mandated MLA and five-paragraph essays, there is a gap between genres of the world and theoretical genres in writing; of course, those heavily invested into physicality as engineering students would find such writing styles irrelevant to their experiences and therefore a waste of time. These types of students were most likely taught within confinement, where the content was delivered one way without variation or consideration of a student's individual needs. It was a blanket curriculum that worked within the requirements of George W. Bush's "No Child Left Behind" testing era of education, but it failed to understand how fluid language is. Students may already sense how fluid language is; after all, slang amongst students varies depending on social change and media trends that rapidly alter from week to week. Some of them may see how this one way of writing is not practical to them, but they fail to realize that it is indeed just one way to write. A majority of current students don't see writing's value because the curriculum holds no value for their interests.

Fourteen years ago, Roxane Gay dove into the depths of the negative connotations of engineers and writing that persists to this day. While observable changes have occurred, such as with the Michigan Tech Mechanical Engineering department noting the

need for collaboration, it doesn't change the societal stigma of engineers possibly communicating effectively. There is additional concern when students themselves repeat these falsities and create self-fulling outcomes to never improve their communicative skills. I never took Composition at Michigan Technological University. Instead, I took Dual Enrollment in English in 2016 at Ferris State University before graduating high school and had the credits transfer in when I started at Michigan Tech in 2017. When working with peers in my other freshman courses, I overheard how awful the humanities courses were and how impractical they seemed at a STEM school such as Michigan Tech, composition in particular. When I finally fully transitioned into my English degree, I observed that the classes themselves were not impractical for students; instead, it was HOW the students were taught about the writing process.

Like Roxane Gay, I also taught composition classes at Michigan Tech as part of my master's program starting in 2022. I began teaching one of six sections in the pilot "Monster Comp" program in a TA type position. I soon transitioned into an independent instructor starting Spring 2023 and continued until after Spring 2024. Often, I've observed my own students not participating in the course by not showing up or submitting assignments. If I'm able to get a reason from these students, they will tell me that they have no excuse, major life events occurred, or they're not good writers and might as well fail the class. While I offer accommodations for students, I still see students drop the class quietly despite it being a core class for graduation. I suspect that these students went through Language Arts classes in secondary school that presented composition as a specific method that worked across numerous genres. Students may have also not gotten to write about what interests them and be provided an experimental,

engaging space to try out methods for their future communications. The writing discourse Gay and I encountered demonstrates an inherent disinterest in trans-disciplinary application between students and composition, whether that be driven by secondary education, societal expectations, or postsecondary writing curriculums. This led to me to find a method to engage students in writing classes in order to subvert their preconceived notions and strengthen their communicative abilities, a method that worked with materials they were familiar with.

I decided to devise an approach to postsecondary writing pedagogy through the use of tactile materials; in particular, the durable and versatile LEGO® bricks. When I initially presented the idea to combine LEGO® bricks and writing pedagogy at the 2023 Upper Peninsula Teaching and Learning Conference, I did not have physical bricks for the audience members to work with. Instead, they first viewed a picture of a LEGO® brick-built sailboat and reimagined it as a rhetorical analysis writing piece. Then, they observed a picture of a brick-built rubber duck and wrote down procedural rhetoric on how they would theoretically reassemble this model if they had the bricks. Responses were positive with how engaging the presentation allowed the audience to be. Even without the tactile connection, the audience was able to visualize components based on the visual barriers between parts.

In devising and structuring this study, I intend not to replace other learning styles regarding language pedagogy, especially linguistic and lexiconic methods proven successful. Humanity is a spectrum of identities, thoughts, and perceptions; students reflect this complexity in that they are not a single entity nor copies of a particular individual. Educators are responsible for determining what learning methodologies cater

to their students' needs the best, including a possible range of learning activities if need be. In fact, learning methods such as phonics already have tactile methods embedded into their system. For example, a student can write out the syllables for "duck" and then use letter blocks to understand how each letter is connected to form the word. This study also uses materials to create lateral connections between language concepts and the tangible world as practice. This practice of stacking blocks to visualize something like spelling or writing rhetorical analysis is a bridging process of kinesthetic learning rooted in play. Kinesthetic learning crosses tangibility and the consciousness to make sense of the world a user interacts with, often through play. To play is to learn, and this play should be continued beyond the kindergartens and elementary schools of Western cultures. Kinesthetic play in post-secondary composition pedagogy engages the body as a facet to unraveling narratives mixed within the world's perceived stimulations. Incorporating it beyond the younger population allows for extended development that impacts how humanity grapples with the world and the play that enables our corporeal investigations. As we already interact through the senses involving touch in our existences, there is the natural bond that should be involved further in these writing classroom spaces. After all, play is an aspect of life and learning already; to hold back on this inherent worldly relationship only holds back the fun.

2 Constructing a Necessary Framework

Before setting up this framework, I pose two central questions that guided my study. I wanted to figure out how might LEGO® bricks aid in teaching and reinforcing composition concepts. I was also curious about how tactile teaching methods engage students in postsecondary writing/composition classrooms. Both questions will be explored in both the theoretical framework and the study itself.

2.1 How LEGO® Bricks Currently Function in Education

LEGO® bricks function as a medium for artistic, communicative, and performative purposes, with their quality and universal connection across generations of sets supporting the durability needed for such a tool. It deepens connections between objects, allowing for objects such as LEGO® minifigures to be utilized in roleplay pedagogy. Additionally, the familiarity of LEGO® as a global brand reinforces familiar connections with students and allows for an easier integration of material through a nostalgic lens. While LEGO® is indeed utilized as an educational tool, it is often utilized for teaching STEM concepts, as shown with LEGO® Mindstorms robotic building kits or the limited release LEGO® Education Panama Canal kit 2000451. What's more concerning is that these tools may be restricted to younger audiences rather than including all audiences, such as young adults still learning in colleges and universities.

Focus on toys in children's education psychology has been prevalent, while little focus on application beyond primary. Lack of college play studies leaves the field unexplored, as play studies generally focus on younger demographics in grade or middle schools. Arguably, development is most crucial there, yet college students are also not fully developed mentally and would benefit from this type of pedagogy as well. Scholars

identified how roleplay functions in a learning environment, as well as how LEGO® bricks incorporate realities for conducting roleplay. A missing focus however is where college students can be engaged with these methods, especially outside of STEM-focused classrooms. Studies regarding adult play and education are increasing, but they remain a minority amidst larger childhood pedagogical studies.

As of 2023, play studies have expanded on how role play is beneficial to one's mental development through the use of role play and LEGO® bricks. Paul Heinrich addresses how environmental factors, the inquisitive mind, and the surrounding players factor into what experiences are derived from an activity. In addition, Jacque Derrida highlights the ability to shift structures and disassemble older models to reinvigorate student engagement with writing materials. Tyler Shores addresses the infinity of LEGO® to be crucial to its significance in understanding the role it plays. All these authors touch upon the collaborative nature LEGO® has with education and what roleplay pedagogy could bring to classrooms. Yet there is a large enough area that lacks much needed research as to how writing in itself can be implemented with roleplay and how university students could benefit from these types of activities.

Play-based activities require equity in presentation and environment. Paul Heinrich describes that playful interactions need sufficient stimulation for full engagement but without overwhelming or threatening players (Heinrich 98). There must be balance in engagement without overstimulation, considering what students need versus what the instructor suspects is best for their class. To achieve this requires a greater understanding of the spectrum of play, and Historian Thomas Hendricks states that this balance requires play scholars to "continue to respect the great variety of playful behaviors and the socio-

historical contexts for these expressions. But let them also remember that players themselves address changeless concerns" (150-1). Those engaging with these play-based students engage not just in the actions and their context but also current effects amongst the players within these play structures. Players are the key to the systems' functionality; they are the core to how these materials relate and interact.

The composition study I've created works within the player-centric principle of play noted by Paul Heinrich and Thomas Hendricks developed with the study are meant to be reworked by the instructor who employs them. In restructuring environments for student learning, new possibilities reopen. Postsecondary students especially could benefit from this imaginative perspective, reincorporating play into their educational progress. is where the student may truly grasp the writing concepts needed to succeed beyond the writing centers. To continue relying on societal views of play and what education appears as in colleges will only limit the potential students have in grasping writing concepts.

Seeing the success of LEGO® bricks in other areas of teaching, such as in mathematics, coding, and social conflict resolution, it seems natural to integrate this hobby for millions of people into writing studies. New learning methods can allow for expanded teaching range to diverse student bodies as an instructor, especially if a commonly known object as a LEGO® brick is used effectively. LEGO® bricks can be utilized as tools for illustrating and explaining abstract concepts and lexiconic topics that students with visual and tactile learning styles would not have understood. This is achieved through the use of metonymy and deconstruction, which removes previous associations that would otherwise hinder the bricks' uses. The bricks are familiar objects

to students, as LEGO® bricks are generally considered as one of the world's best-selling toys. But it's really not a toy, as later discussed.

Within this study, I wish to establish how writing and communication studies are connected to the visual-tactile nature of kinesthetic play. I do not intend to dismiss other learning styles that could still educate, if not better for individual students, in matters of communication. Rather, this is an exploration of an underutilized relationship in academia that could perhaps benefit faculty, staff, and students across all educational institutions if adopted globally. I argue this primarily through established philosophical works based upon phenomenology regarding interaction and spatial being with external stimuli, yet I also include studies that investigate this relationship already and its potential to be used beyond classrooms with younger students. Kinesthetic, or tactile play, will be proven as a plausible curriculum practice for instructors and professors to utilize in their classrooms, as a way to further reinforce the worldly importance of their material and to engage their students beyond the writings they produce.

2.2 Kinesthetic Play

This section builds upon the concept of kinesthetic play as a connective tool in pedagogy and how the relationships it generates through play could convey abstract concepts, such as the writing concepts at work in this study. In modern cultural trends, play is presented as part of childhood development, yet the act of play itself appears vague beyond specific activities. In his book *Homo Ludens*, philosopher Johan Huizinga defines play as a voluntarily-executed action confined in a place that is based on tension, happiness, and separation from daily life (28). He elaborates on the spatial occupation of play as "a higher order than is seriousness. For seriousness seeks to exclude play,

whereas play can very well include seriousness" (45). Play may initially appear frivolous, but it includes serious ideas because play engages with the world in itself. Huizinga stresses that the encompassing nature of play extends its influence beyond a psychological manner; play provides a sense in its spatial occupation that provides meaning beyond the mundane nature of the world (1). When one plays, they act not in an exclusive space only they access with their traits, but they also invite other beings and objects to interact with that being and their interpretations of the surrounding world. What differentiates play from a general interaction, say a push of an object, is intent. Actions set in a playful mood derive from a willingness to change the surrounding environment.

Kinesthetic play is an end-all process in which play is carried out in the perceived manipulation of the outside environment through the things attached to the body. What one perceives as "skin" or "appendages" attached to a hand structure, is the apparatus in which contact is achieved and translated into. In Maruice Merleau-Ponty's *Phenomenology of Perception,* he notes the nature of touch and sensation in the realms of the appendages that translate sensation into conscious processing (Merleau-Ponty, 330). He notes the idea of human play extenuating beyond the physical realm to engage with conscious thought through objects (Merleau-Ponty, 383). Play merges bodily autonomy with the environment, establishing an interconnectedness. The act of touch unlocks a primordial sense to engage beyond the physical realm of one's body, instead of simply allowing for empirical nature to direct one's observations in the world. Within this study, touch is an experience of how the LEGO® bricks connect are what enable students to create visual-tactile connections between what they're learning and what they're

experiencing, deepening their reality to the complexity and natural, ongoing play in language.

2.3 Playful Language

Language, as outlined as speech by Merleau-Ponty, is rooted in understanding the actions of thought and expression. Working with language of any degree, in its instruction and learning, opens the user to another realm beyond that which their body exists in. Language constructions form and dissolve in the wake of societal or environmental change. Philosopher Jacques Derrida is well-known for his work in pinpointing these systems' behaviors, most notably in how he approaches the natural play at work. He identifies how play comes into being "by orienting and organizing the coherence of the system, the center of a structure permits the freeplay of its elements inside the total form" (Derrida, 1970). One's exploration of a system of terms, perhaps a metonymic relationship, naturally leads to the movement of the objects within the term. But if the center shifts around with simple prodding, is it truly a center for that system? Derrida answers this query as he discusses language systems as a whole: "the center [of a given system] would not be thought in the form of a being-present... that it was not a fixed locus but a function…in which an infinite number of sign-substitutions came into play" (Derrida, 1970). Without a permanent center, a system of language tropes is open to play, leading to exploration of the items in a system. The center is nonexistent and simply a functional "central" point to play about. Challenging established systems and sectioning off parts (from an ever-shifting focal point) is what enables deeper understanding of what keeps the system together and how to improve it. Playing within a shifting system is what language narrows down to, where rhetorical situations like

assignments shift in purpose, context and audience. Students must come to terms with these shifts through connecting between the familiar (LEGO® bricks and writing) and the unknown (deep critical thinking of audience expectations).

Anything in the class can create a deep learning connection that other methods may not. What defines an object's educational use comes from the environment it is situated in. Rhetoric itself is a fickle art, with no scholar agreeing on a universal definition. Composition-based instruction is simply a reflection of the reality that rhetoric exists in, so the methodology should also be willing to shift with the chaotic world around. There, the learning process begins and the LEGO® brick becomes a bridging classroom tool between instructor and student.

2.4 Education on LEGO® Bricks as a Modality

Play is an essential aspect of education, as reinforced by Gilles Brougère and Brian Sutton-Smith. There is also room for metonymic connections and deconstructive principles also discussed. Not to mention, the need for reimagining the rhetorical educational space is stressed. Introducing LEGO® bricks into the classroom with these principles in mind should ideally lead to immediate learning, right? The unfortunate truth is that there are constraints within the LEGO® system, both by parts and mentality of the builders. What is important to work with students on is using the constraints of LEGO® to invent new connection points, as well as understanding when instructions are useful versus when they hinder in certain tasks. Thus, instructors and students should become familiar with how the LEGO® bricks work within these constraints before reforming the system for another purpose altogether.

To purpose LEGO® bricks as writing educational tools, one must acknowledge the physical limitations of the bricks and also be willing to work beyond what they are known for. There is deconstruction for every build, an imbalance to the centerless structure that is the potential of LEGO® bricks. Of course, there is the role that the player must assume, where their mind reimagines the bricks into other forms of their desires. This active metonymy, where the player creates the necessary transformations from brick to concept, is key to creating the deeper learning connections needed. These processes and engagements are plausible for university students to engage with and ultimately benefit from this new method.

2.5 Literature Review

While the practice of using LEGO® bricks to teach is not commonplace in university classrooms, studies utilizing this practice are not new to academic research. Within the last few years, scholarly instructors found methods for incorporating LEGO® bricks into their writing classrooms. In the following two studies, this idea is challenged by researchers who implement this pedagogy in another manner regarding linguistics for higher education.

Roy T. Cook and Sondra Bacharach start their collaborative book *LEGO® and Philosophy* as devil's advocates. They argue that while LEGO® sets invite users to build creations, there are instructions designed by other individuals or representing the user's reality (Cook and Bacharach, 8). Cook and Bacharach note the linear play patterns that highlight the irony of a creative building toy having instructions. Most people buy a LEGO® set for the model displayed on the box. They build the model step by step before leaving it as a toy to play with or a model to display. Buyers may reapproach the model

to modify aspects of it, but it's uncommon for someone to dismantle a large set to rebuild it into another creation. This lack of a willingness to deconstruct and rebuild leads to the nature of LEGO® sets and how some may fear destroying it. Naturally, the average LEGO® brick user who engages with a set may be afraid to approach LEGO® as a tool of possibilities. Perhaps then, it is best to consider the build and reductive processes from a different frame. My study utilized this idea by presenting students with the bricks as materials for assignments, asking them to create models that challenged their conceptions of what the bricks can accomplish beyond a toy medium.

Overcoming the stipulations of working outside LEGO® 's intended use for these bricks (as toys and sculpting materials) is necessary to achieving the representational aspect this essay seeks to create. While some builders may see the build and destruction process as intimidating, it's simply necessary to rework the bricks for teaching. In her chapter in *LEGO® and Philosophy,* Ellen Miller brings up Martin Heidegger to illustrate the purpose of engagements, both constructive and destructive: "For Heidegger, our engaged, lived experiences with things tell us about what it means to be human." (Miller, 81). Play in itself becomes a tool for teaching, as can other events of one's life. Here, the processes of working with LEGO® bricks transform the individual, whether they realize it or not. Simply fidgeting with two bricks could help show their connective possibilities. Processes that require little complexity are what enable students to make the required connections between the bricks and the rhetorical concepts. I wrote the prompts my students worked from with this principle in mind; even if the ideas they engaged with were complex in processing, the execution was simple enough for anyone in the class to possibly pick up the relationships between class material and the activities. This sets up

potential for students to engage in identities within composition by communicating through the LEGO® bricks and representing their ideas.

Amongst the authors of *LEGO® and Philosophy*, Tyler Shores provides an examination of LEGO® bricks' role in constructing user identity. He approaches the role within a philosophical light, touching upon Plato's and John Locke's discourse on play to make the point of play's necessity in societal functions. With play comes When specifically discussing LEGO® bricks, Shores notes how "LEGO® is a fundamentally optimistic medium—with an ethos built on the notion that anything can be built, and that true meaning and inspiration comes from freedom and flexibility of thinking, as well as the meaningful engagement with LEGO® and with thoughts and ideas" (24). Much like Derrida's concept of deconstruction, Shores is addressing how LEGO® bricks have no particular center that players must strive for. The given context is entirely dependent on their environment and what the structure at that given moment requires of them, much like writing genres one could learn about.

Working from instructions can demonstrate unusual techniques in building that those who build custom models learn from. Addressing the issue of physical limitations in LEGO® parts, Bob Fischer's chapter in *LEGO® and Philosophy* summarizes how one could view this as a constructive element in building: "It's your working knowledge of those little pieces that allows you to make judgements about what can and can't be done with them" (211). If anything, the constraints of these pieces is what enables one to repurpose a piece, something LEGO® has done numerous times in sets.

Later in *LEGO® and Philosophy* , Ellen Miller reinforces that LEGO® brick constraints act as guides to the players' rationale of their play realm, tapping into

knowledge that translates into stories and structures "(Cook 211). Not only does the individual learn from the constraints and playing with them, but they also learn from what perceptions they already have. Their background knowledge of what the LEGO® bricks can achieve physically is what determines how they approach a build. Yet the build is secondary in the approach. What becomes a priority is expanding the ideas of what LEGO® represents, which is narrowed due to how the bricks were initially marketed.

One example of kinesthetic play outside of early education derives from a study conducted by Kathleen Fitzpatrick and Megan Barker of their Biological Sciences Department. They conducted a class lesson in LEGO® bricks to expose how readers interpret and understand written science reports. The lesson's activity involved two students sitting back-to-back. The Author dictated the shape, colors, and parts without naming the structure. The Reader then built the described structure by only relying on the Author's wording. After ten to fifteen minutes, the students compared the two structures and engaged in a class debriefing that asked about what challenges both roles faced, and the skills required to overcome them.

Fitzpatrick and Barker's study found that the activity was "a lively icebreaker, bringing a playful aspect to the start of the semester" (Fitzpatrick, 2). Similar to Purves workshop, this activity was a single session meant to get students thinking about communication across different mediums. Of the 78 of 138 students enrolled in the two semesters, approximately 68% very much agreed that the activity was "enjoyable", while 64% very much agreed that the activity made them think about challenges in clear communication (Fitzpatrick, 2). Fitzpatrick and Barker showed how the tactile nature of

building the model and describing it unlocked a reasoning in the author and reader that's otherwise unobtainable without a clear distinction.

Similar to Fitzpatrick and Barker, linguistics instructor Travis West utilized object representation and manipulation to reinforce linguistic meaning. West implemented his methods while teaching Hebrew through the lens of the book of Genesis. West derived his practice being influenced by Parker Palmer's "subject-centered" pedagogy, as West notes how placing subjects at the center of a given space (students or objects) shifts control for how the learning process proceeds (380). Despite the shift in focus, West emphasized how the leveled hierarchy of student and teacher should remain unchanged in how both roles engage and teach the material to one another (380). West practiced the subject-focus system in his Hebrew class by using objects and actions to focus students on the language itself instead of him lecturing what the words mean.

Center-based kinesthetic learning came into practice one morning when Travis West and his co-teacher Pam realized their class session started a half hour earlier than previous sessions. They decided to have the students arrange the objects representing aspects of Genesis in consequential order based on the Hebrew text read to them (380). West reported how his students were engaged and working cooperatively to understand the read text to chronologically organize the objects: "I narrated the story, but we all told it together. In that moment, the subject was truly at the center–literally and figuratively (380). As the students moved the objects while West narrated the story in Hebrew, there is an association between the text read to students and the objects they manipulated. Travis West's activity demonstrates how kinesthetic play reinforces abstract concepts like languages and activities centered on student collaboration also reinforce meaning.

Both of these studies examine how kinesthetic play in learning may be practiced in classrooms. For Fitzpatrick and Barker, their activity of relaying instructions through LEGO® models demonstrated to students how reader and author interpretation vary for a given text. This activity is only completed for one lesson at the beginning of the semester as an introduction to the report writing process, rather than a curriculum of tactile play for a semester-long communicative class. Travis West's case study is practiced longer over a week, which more reflects how a kinesthetic play-based classroom could appear when applied for an extended period of time. The study also revealed how collaborative exercises could benefit the activities the students complete, therefore reinforcing a group knowledge of language that may otherwise be lost for some individuals. With one study using communication and another utilizing vocabulary and linguistics, the activities of each demonstrate potential for incorporating kinesthetic play into postsecondary learning spaces. Contrasting with writing studies and kinesthetic learning, play rhetoric has been studied and researched to understand its role in education. What holds relevance for this essay is how playing with toys brings about learning experiences. rhetoric viewed under an educational lens. Play's relevance to development is a given at this point, based on the academic attention it receives. Gilles Brougère and Brian Sutton-Smith explore aspects of play as a tool for education.

Gilles Brougère proposes two theories for how toy rhetoricians view educational play: as either predetermined by the company's rhetoric or the material quality and toy design. He proposes the idea of toys themselves presenting the visual rhetoric for their educational and play value (Brougère 37). Toys designed well with ergonomics are inherently perceived as "educational" and enable greater control for narrative building.

He also proposed another lens to view educational play through, involving how play is derived not from the toy itself but its interactions between itself and the player that enable an educational relationship (Brougère 38). The interpretation is driven by the interaction directly with the object, not with the narrative created by manufacturers for how to utilize the toy. Both theories place emphasis on how the player interprets learning cues, whether from the object or environment.

Another philosopher Brian Sutton-Smith also discussed player-centric learning and the importance of lifelong play in *The Ambiguity of Play*. He mentioned the rhetoric of the imaginary, where the player challenges their mind through improvisation and constructed realities. His perception of the imaginative play framework comes from interpreting culture and ideology through play discovery (128). Sutton-Smith concentrates on an introspective aspect of play, where the mind creates and speculates to induce learning opportunities. Simply listening at times may create the personal connection that play builds upon if the listener is engaged with the environment through one sense. A student's mind can be placed in a learning situation through constant challenges of what is reality.

Engaging a student in challenging reality should be expansive beyond age, as Brian Sutton-Smith notes how "… the paradox in which children are said to play and adults not to play has something to do with the contrast between the progress rhetoric and the rhetoric of fate" (72) The progress rhetoric equates education to the progression of the self. Unfortunately, this learning can be restricted to only what seems appropriate for the child's progress at a certain age (72). Here, the child is constrained by societal expectations as to what toys or materials can be used in the learning process. I've

observed from my elementary and secondary education how learning becomes linear and concentrated on presenting general knowledge as one gets older, which unfortunately doesn't work within everyone's interests. While this creates the fate of an informed, contributive citizen, the rhetoric of fate doesn't factor in other methods of achieving this, contrasting the exploratory nature that learning starts with.

Herein lies the controversy of using LEGO® as a tool for compositional instruction: college students are too old to still play with toys. As shown by Brian Sutton-Smith, this is false. Learning as a process is not limited to the institutional guaranteed methods. Learning comes from reworking structures, challenging the status quo, and questioning the world's ways. Utilizing objects such as toys is part of this process of learning, as toys reflect societal norms through their marketing, design, and quality. Harkening to Brougère's theories for educational toy value, an object can be used for learning so long as the individual is willing to both accept and reject what the object is or was. Other additional studies utilize LEGO® bricks to touch upon these concepts of writing pedagogy.

Dr. Ross Purves of University College London conducted the "Playful Learning, Serious LEGO® and Academic Writing " workshop to assist master's students in his MA Music Education program. Purves's workshop focused on building upon general, graduate writing skills such as critical thinking, synthesis, tone, audience, etc. He used a variety of pieces and activities to engage his students, such as having students build a prompted object on their own or having groups build models based on text interpretations. Purves argued that the solo, linking activities proved the most fruitful results, as he noted students reflected deeper in written feedback compared to reports

from the group exercises. He also realized his ground rules needed to work with what students were comfortable communicating, such as the potential for offensive or adult content (Purves, 2019). Purves' study demonstrates a starting ground for incorporating LEGO® bricks into postsecondary writing classrooms, while younger classrooms have seen similar success in other studies.

Naomi Wright of Coombabah State High School incorporated LEGO® bricks after observing her seventh-grade students not meeting writing expectations for their grade. Wright utilized LEGO® bricks as a medium to communicate narratives based on a given prompt. It allowed her students to engage with their ideas without worrying about writing syntax or mechanics (Wright 4). She prompted students to create narratives surrounding a subject. For example, students used pieces to communicate ideas regarding the Nile River's significance to ancient cultures (Wright 4). She concluded that LEGO® bricks enable middle-school students to craft multimodal texts, engage with current text, and write as a method of learning. She also notes that playing with ideas in a tangible manner enables students to engage with their ideas to reinforce their sense of self (Wright vii). This is similar to Brougère and Sutton-Smith's emphasis on the individual controlling what the learning process provides.

Dr. Lee Fallin proposed a theoretical approach to teaching students how to plan and write essays. Fallin proposed to teach students by using metaphor as a connector between ideas and the bricks. His TEAL model (Topic, Evidence, Analysis, and Link) also breaks down a paragraph into components that students may grasp easier than trying to write the paragraph's parts all at once (Fallin 2021). This is similar to how Purves encouraged his students to use bricks to represent their ongoing struggles with writing

their theses. When applying these ideas as a hands-on activity for students, Fallin recommends using small-post it notes for students to write down their ideas and to move around in the structural play that he describes. However, Fallin's study is based on metaphorical representation and theoretical approach without the students working directly with the LEGO® bricks.

The literature mentioned above theorized and utilized LEGO® bricks to reinforce general compositional practices for students. Fallin's study used the LEGO® bricks as a visual model for students without directly applying them in a lesson. Where Purves's study is centered around a workshop for students, Fitzpatrick and Barker only had a single activity at the beginning of the semester for their students. Purves had a larger range of activities that students worked on, reinforcing creativity, critical thinking, reflection, and communication. Wright's use of LEGO® bricks is incorporated as part of her seventh-grade writing and humanities classrooms, focusing on storytelling to assist with brainstorming and visualizing ideas before writing.

None of the studies currently published or recorded have incorporated lessons utilizing LEGO® bricks for a postsecondary, composition classroom. No current studies have examined potential for these types of activities within the classroom setting outside of special activities. Herein lies the situation, where this study can bridge the gap from novel exercises done once a semester to integrated lesson planning that other composition-style classes can adapt.

3 Methodology

Before starting my study, I researched Human Subject Studies through the Internal Review Board. In Fall 2023, I took the online course for human-subject studies and received my certification. Because the student artifacts were part of the normal classroom procedures and not a special activity, I could collect the artifacts before the IRB representative Mike Reave fully approved the study. We discussed over email revisions and clarifications needed for students to understand the study and to ethically conduct it. Ultimately, I received full approval for collecting consent from students to analyze their work anonymously through this study.

3.1 Material Preparations

At the start of the semester, I prepared twenty sandwich bags that consisted of a similar number of LEGO® parts (200). I ensured that there were at least two figures per bag, plus animal pieces, accessories, stickered and printed parts, a brick separator, and miscellaneous parts that could be worked with. All the bricks in this study were pulled from my collection and disinfected after every session for safety. I distributed the brick sandwich bags during class after going over the prompt, and I allowed students to exchange parts with neighbors to maximize their options.

3.2 Class Procedure[1]

Each class started with an agenda of the in-class discussions and activities. For CA1 and CA2, the activities were immediately started after the agenda slide to give

[1] This study was conducted as part of a UN1015 course section taught at Michigan Technological University. While there are standards as to grade weights, material to be covered, the assignments and vice versa, graduate teaching instructors had leeway as the curriculum was finalized by Fall 2024.

students as much time to work as possible. The prompt was displayed on the board for students to reference the entire hour, including an embedded video with lo-fi music as a background soundtrack. This was meant to create non-distracting background noise for students to work and function. I handed the sandwich bags of models after introducing the prompt in order to make sure students paid attention to the instructions before diving into the building.

After students built their models, they took pictures of their models and uploaded them onto Canvas, alongside a 150-words or more reflection that considered their part choices, the meaning and reasoning behind their part choices, how students felt during the process, how the final models responded to the prompt, and if there were modifications they would make, should they have additional time. The last two assignments had extra materials required, including a list of written instructions and a digital poster created on the web design platform Canva. All materials created for each assignment were collected together in their group exercise. Each activity was paired with one of the four major assignments as part of the course. This was meant to maximize the usage of these activities by connecting them to larger works that students would be required to complete for any section of Composition.

In regard to grading, the students received participation credit (4.5 out of 9 for the week) if they submitted the photos, reflection, and other required materials. This kept the work from being graded at the same weight as other assignments but fit within other in-class activities students already did for participation. These assignments weren't optional for students but supplemented the material they learned and gave a space to

implement their skills before delving into the larger class assignments with weighted grades.

3.3 Assignments and Tasks

For Core Assignment One, students selected a multimodal text to analyze and consider numerous aspects of its rhetorical situation, appeals, and modes of communication. The first LEGO® exercise asked them to take what they studied for the last three weeks and translate that into LEGO® models. It was switching the modes around and having students transfer their text into another form. It provided practice for students not just in thinking through their text's elements, but it also prepared them for translating a later paper they wrote into a multimodal text. The exercise is designed to both reinforce what the students already worked on and prepare them for a future assignment.

The Core Assignment Two lesson was split into two, twenty-minute parts. For the first part, students had to build a sculpture based on the following choices: a boat, a car, a building, a plane, a rocket, or an animal (real or fictitious). After twenty minutes, students were then asked to recontextualize that sculpture into their main research topic and the subtopics they were exploring. They could modify aspects of the sculpture, but the features of the original had to be visible. For help, the students were prompted to think about HOW their research is currently conducted. I gave them hints to think about webs, Venn diagrams, lines, or other organizational structures they use to help them consider the relationship between the subtopics and their research topic.

Their third lesson first consisted of a discussion about effective introductions and conclusions in essays. I wanted to study how incorporating the lesson's activities

amongst others would affect participation. Similar to the second lesson, students had twenty minutes to build a model that contained between twenty - twenty-five pieces. As they built their model, they also had an open Google document where they wrote instructions on assembling the model. After time was up, students disassembled their model and switched computers with another person. Next, the students that switched spots had to use just the written instructions to assemble the model. Afterwards, students compared finished models with pictures of the original one. This was an exercise in procedural rhetoric, which works with the reasoning they utilized for Core Assignment Three and is commonplace in technical communications.

Before starting the final lesson, I clarified to students that the LEGO®-based lessons they completed in class thus far were for this study, explaining how this was studying experimental pedagogy to engage students in compositional skills. Students received a consent form detailing how upon their consent, the pictures and reflections they originally submitted for participation would be redacted and analyzed to determine these lessons' effectiveness in writing developmental skills. They were instructed to hand their signed consent forms to the humanities office assistant to be held onto until final grades for the semester were submitted. This would eliminate any plausible bias questioning in terms of whether participants received benefits through higher grades.

For Core Assignment Four, the students reworked their journal article they wrote for Core Assignment Three into a tangible model. There was a time limit of fifteen minutes to work on the model; this limitation came from previous exercises where students got done quicker than originally anticipated. At the end of that fifteen minutes, the students were instructed to go onto the design website Canva and replicate their build

using what was available in the software. The fourth assignment was based on translating the main arguments and research into a multimodal text of the students' choice, and they worked on small "design prompts" throughout the semester to prepare them to use Canva if they desired. This assignment condensed this translation into a tangible activity that gave the students practice before doing the same process for a larger grade.

All four assignments either engaged students with the larger Core Assignment process or they replicated aspects of the Core Assignments as in-class practice. Because all the lessons were graded on participation only, the stakes were placed lower than if the assignments were graded properly.

3.4 Post-Course Survey

A final method for gathering input from students was a post-course survey. It was designed to gather additional information regarding the LEGO® brick activities and what could possibly be added for future studies. After the students left for summer and grades were finalized, I sent survey links to the participating students of this study. The survey asked about what students enjoyed or disliked about the activities. It also asked about the possible directions that similar studies to this one could take to appeal to students more.

The survey was an additional piece to gather quantitative data alongside the qualitative data from the students' assignments. It end capped the study by providing extra information regarding methods of improvement for future iterations.

3.5 Developing a Rubric for Analysis

To evaluate what composition concepts were demonstrated in each activity and how, I designed a rubric that could be applied on the students' work. Initially, I approached the topic of writing a rubric akin to how a writing assignment rubric was

designed. Based on my research question, I chose four criteria I could measure: Creative LEGO® Brick Representation, Critical Thinking Outline, Relevance to Composition, and Reflection. I wanted students to demonstrate how they approached rhetorical situations, especially how they decided on word choices or phrasing to communicate their ideas. I also wanted to see demonstrated reflection, where students showed consideration for elements and how to improve their materials' functionality. There was that need to also see how they would utilize the LEGO® bricks in unusual manners to represent their ideas, challenging what they're used to using the bricks for and reutilizing mediums in creative manners. I set each area on a scale of 1 to 5, with descriptive requirements for each area. This aligned with how I graded writing assignments within the last two years as a writing instructor, but it wasn't as practical for the purposes of a writing study. It was linear in how it assigned points, meaning some subjective areas such as areas between 4 and 5 ratings may complicate how the students include the desired demonstrations. In addition, the criteria Relevance to Composition was not necessary as a separate criteria, as Critical Thinking Outline could already demonstrate how relevant a student's work was to the class prompts.

When discussing the rubric with Dr. Hassel, we considered expanding the areas beyond measuring the effectiveness of the areas on a quantitative level and focusing on whether these criteria are included at all. Instead of rating the pieces like a writing assignment, I could instead analyze whether adequate data was included and how it represented the criteria. I had to rethink how I approached measuring student progress.

I read through all five student reflections and studied the submitted materials provided in surplus. Amongst resources I worked from, including Dr. Hassel's recent

Reaching All Writers: A Pedagogical Guide to the Evolving Writing Classroom, I dissected the research question to consider what aspects of the research question could be reasonably measured. I broke the question into three areas of consideration: audience and genre engagement, composition process, and composition reflection. Measuring how students worked within understood genre expectations required me to consider what keywords would insinuate this relationship. I also worked from the Threshold Concepts framework that Dr. Hassel built upon in *Reaching All Writers* by considering what truths students were confronting with these LEGO® brick in-class activities. A threshold concept is based upon a confronted truth that challenges one's perception of a particular subject, where the concept is not only central to understanding key ideas but changes the student's identity. Based on my introduction's experiences, I'm working with students that would push and engage with threshold concepts regarding writing. An example would be "Engineers must communicate their design principles in a coherent manner across multiple mediums", in which the stereotypical mindset of a hands-on engineering student may reject because hands-on experience is stressed in their education thus far. Students have traditionally been taught these subjects of engineering and writing separately; therefore, there exists a barrier preventing consideration of both fields' interactivity.

While writing the rubric, I established three aspects of assessment derived from my original research question: Audience and Genre Engagement, Composition Processes, and Composition Reflections.

Table 3.1: Two of the four rubric areas analyzed in each student piece.

Research Question Aspects	Threshold Concepts	Demonstration
Audience and Genre Engagement	Audiences for different texts have various expectations for what elements are included and how they are incorporated.	Student mentions assignment expectations. Student acknowledges how they may differ from similar assignments from other past assignments.
	Different text genres utilize mediums to convey ideas within the genre's tropes.	Student acknowledges how LEGO® bricks change the expectations set for their sculptures in meeting the assignment. They also compare how mediums from both texts are communicating their ideas, even if the expression is slightly altered for the assignment's purpose.

For the Engagement aspect, I focused on two threshold concepts that examine expectations of what elements are included and how, and how genres require different mediums to convey ideas within a genre's given conventions, such as formatting, word choice, diction, and tone.

Table 3.2. The Composition Process portion of the rubric used in analyzing student work

Composition Processes	Writing requires critical thinking and processing decisions in composition, which are demonstrated through activity involvement.	Student explains what decisions they took in selecting composition elements for an assignment, providing detail for others to understand the logic for including these elements.

The other two areas were established to focus on thoroughly describing processes and rationally explaining them for individuals. These are applicable skills that students in scientific and engineering-based fields will utilize in genres like reports, memos, and other technical writing for supervisors without their technical knowledge.

Table 3.3: Composition Reflections portion of the rubric used in analyzing student work.

Composition Reflections	Writers explain how they make certain choices regarding their composition in understandable terminology and rationality.	Student can rationally explain why they chose to engage with parts of a composite text

While there may be possible crossover between rationalizing the process and describing it, I see purpose in separating them as two skills due to how significant both are for students. According to the Council of Writing Program Administrators, composition processes are strategies for imagining, planning, and finishing composition projects that are nonlinear and flexible depending on the writer's needs (CWPA 2024). In addition, this taps into metacognition, which involves critical thinking in analyzing, synthesizing, interpreting, and evaluating rhetorical texts (CWPA 2024). In the two years I taught composition, both processes and metacognition, or reflection, are two areas I see students struggle in that a project like this could address.

3.6 Analysis Process

There were over fifty pieces of evidence included for analysis. These included nineteen written reflections, five instruction lists, five Canva posters, and thirty-one model photographs pulled from the four activities.

I initially planned on analyzing the written reflections, the photos, the steps, and the Canva poster as separate pieces of evidence. I was considering how each piece

demonstrated the student's grasp of the threshold concepts. However, upon reviewing the pieces, I realized how intertwined the artifacts were to one another. Photos may capture the ideas and forms the students communicated, but the written reflection confirms interpretation or elaborates further on choices made by the student and their rationality. The reflection for Core Assignment Three may discuss the importance of writing clear, concise instructions, but the actual steps written by the student apply this understanding or reinforce what the student learned in writing concisely. When aggregating the rubrics, I decided to combine the evidence columns into one per student, focusing primarily on the written reflections. Other results based upon the visual mediums were included with the final thesis. During the analysis and aggregation, I tracked my insights and intuitions onto a separate document, akin to a notebook.

Throughout my analysis of sorting the student reflection quotes into respective rubric categories, I utilized an iterative process to evaluate each aspect of student writing. While I was initially separating sentence segments based on what area of the rubric the student demonstrated, I realized that like the artifacts themselves, the sentence as a whole made more sense to keep together and evaluate. For example, I separated sentences that first described a process in the first clause from the reflective secondary clause to show both of these items being demonstrated. In doing this, I realized my error because both clauses worked together to demonstrate the concepts as a whole. Similar to how I segmented the data between the media of imagery and text, I separated supportive sentences that needed to remain together to effectively prove whether the threshold concept was proven or not.

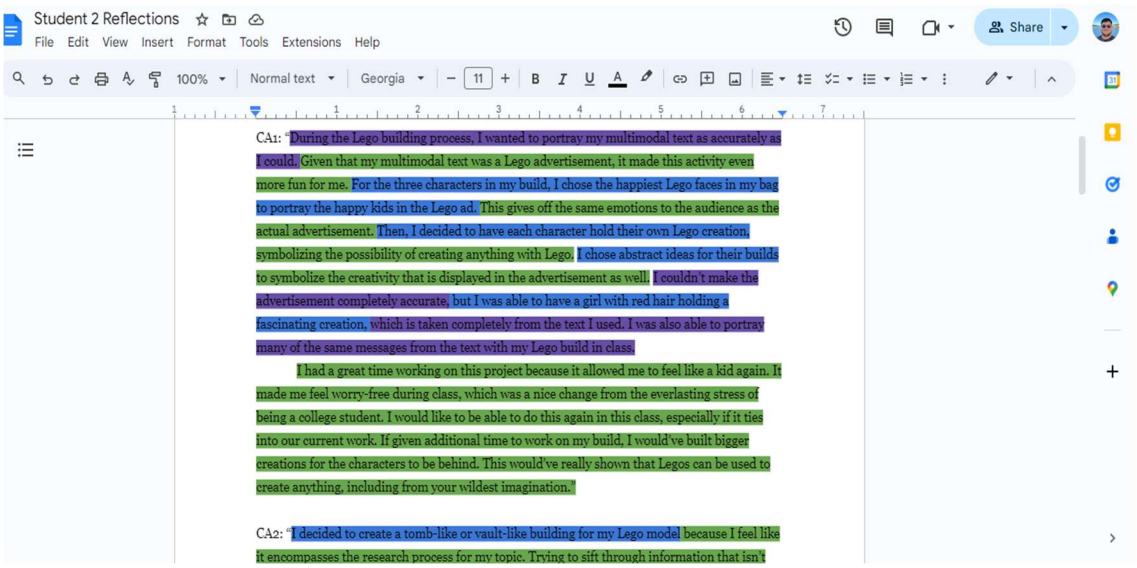


Figure 3.1: A screenshot of the collection of reflections for Student 2, with each sentence color coded to the featured rubric areas.

From this point, I reevaluated and reorganized sentences to identify how the student demonstrated multiple concepts. In the example I mentioned, I would reevaluate a sentence I separated between process and reflection to conclude how the student described their thought process as a whole across the concepts by thoroughly describing the work as well as reasoning why they presented it as is. This was crucial in my understanding for this project. It shifted from a singular perspective of finding evidence to collective evidence supporting more than one concept.

Towards the end of my analysis, I realized that I had initially marked no students demonstrating genre expectations because they hadn't gone into detail about transforming the LEGO® bricks into a communicative model. However, they did engage with genre expectations by creating concise language in their lists in order to fulfill the assignment's rhetorical situation. Their instructions were proof they understood and practiced the genre's expectations while expressing their procedures. Therefore, I decided that the Core

Assignment 3 activity had demonstrations of genre expectations, which changed the final data's structure.

4 Chapter 4: Results and Discussion

4.1 Participation

Out of the original twenty students invited to participate, 20% provided consent for their assignment responses to be used in this study. Each student submitted a reflection for at least three of the four assignments, totaling up to 19 written responses. In addition, 21 photos were submitted for analysis, five written steps were included for CA3 Activity, and 5 Canva graphics were included for CA4 Activity. In total, 50 student artifacts were collected and analyzed to determine if they demonstrated engagement to the criteria.

4.2 Scores

Table 4.1: Count of students per activity who were observed demonstrating criteria

	CA1 Activity	CA2 Activity	CA3 Activity	CA4 Activity
Audience Engagement	4	2	4	4
Genre Engagement	4	3	5	5
Composition Processes	4	4	4	5
Composition Reflections	4	5	5	5

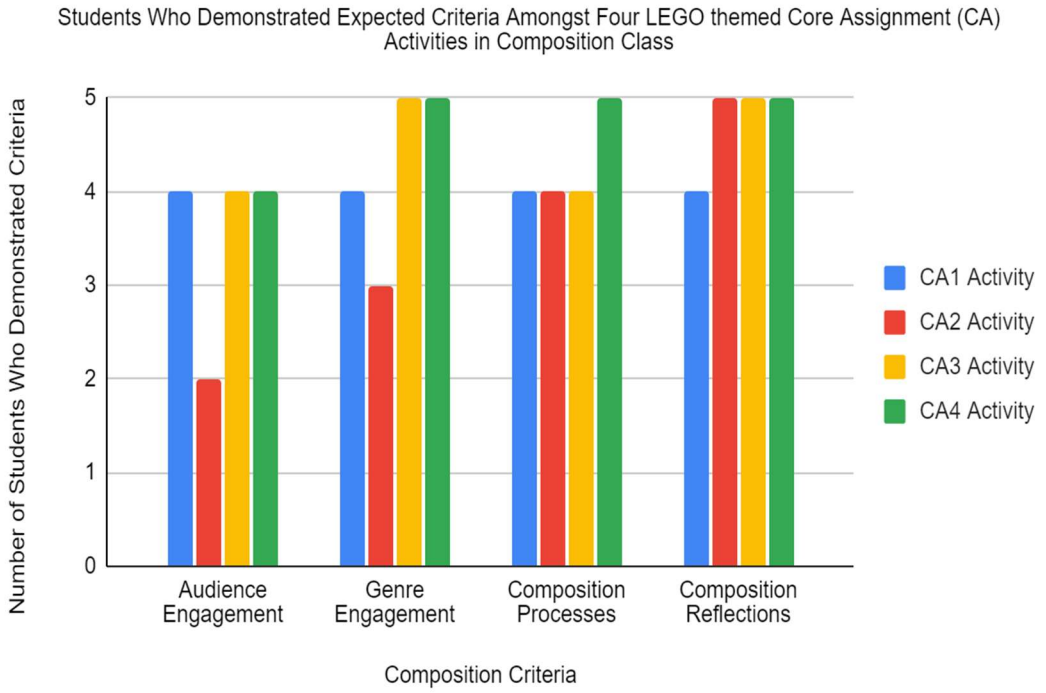


Figure 4.1: Aggregated count of students in which the artifacts of a given assignment demonstrated the expected learning criteria.

As Figure 4.1 demonstrates, all four criteria were demonstrated by at least 4 out of five students by CA3 and CA4 activities. Composition processes and reflections were strongly demonstrated in all four activities, with the fourth activity showing all students demonstrating composition processes and reflections. It took another activity before all students reliably demonstrated composition processes effectively, but there is a clear trend in which criteria are observed and when.

In contrast, the audience and genre engagement show different levels of observation for their respective criteria for the core assignment activities. Surprisingly, only two students were observed addressing audience engagement for CA2 activity, returning to a larger majority by CA3 and CA4 activities. Genre engagement also saw a dip in quantity when analyzing the second assignment, going from four students to three.

Both criteria saw a two-student increase for the next two activities, demonstrating growth in how visible these demonstrations were.

All four activities showed a trend of increasing the number of students who demonstrated the criteria in engaging with composition threshold concept criteria. While there was an increase for the first two criteria, eventually all four had at least four out of five students in the pool of students successfully demonstrate their engagement and awareness of the criteria as part of the assignment.

After all the student artifacts were assessed within the aggregated rubric, their count demonstrated areas where the assignments didn't enable students to demonstrate all of the expected criteria. For audience expectations, all Core Assignment activities except for CA2 had four students identified to be addressing audience expectations in their writing, while CA2 only had two identified responses. Genre Engagement was demonstrated by all five students in CA3 and CA4 activities. Meanwhile, the CA1 activity had four students identified demonstrating genre expectations while CA2 only had three. The two criteria with the highest identified criteria were Composition Processes and Composition Reflection. All CA activities except for CA4 had four students identified as demonstrating composition procedure, while CA4 had all five students demonstrate the composition procedure. For composition reflection, all assignments except for CA1 were identified to contain evidence of composition reflection, while four out of five artifacts were identified as demonstrating this criteria in CA1.

4.3 Student 4's Case Study

One student from the pool of five I wanted to portray was Student Four. They demonstrated growth in how they approached the activities. Provided below are their color-coded reflections and the images they submitted per assignment. Within these reflections and images, one may see how transformative the bricks were in connecting the student to our in-class materials, their metacognition and processing, and understanding audience expectations.

4.3.1 CA1 Activity

In class today I built a model out of LEGO®s to represent the rhetorical text that I chose. My advertisement features a teenager with rubik's cube shaped hair, wearing stylish clothing, holding an abnormally large rubik's cube with a huge grin on their face. I feel that I did a good job representing this with LEGO®. I purposely selected a minifigure face that has a smiling facial expression. This shows gestural communication in the ad and portrays that the person is having fun. I also selected stylish minifigure clothing because this is something that is highlighted in the ad. The person in the ad has stylish clothing and this helps to relate to teenage audiences. For my build I placed my minifigure on a base and built the cube out of 2 by 4 bricks. I propped the cube up so that it looks like the minifigure is holding it and I made the rubik's cube shaped hair using 1 by 1 tiles. I had plenty of time to work on this and there are no changes that I would make (It's perfect :) This was a really fun class period! I'm glad activities like this didn't end in elementary school.

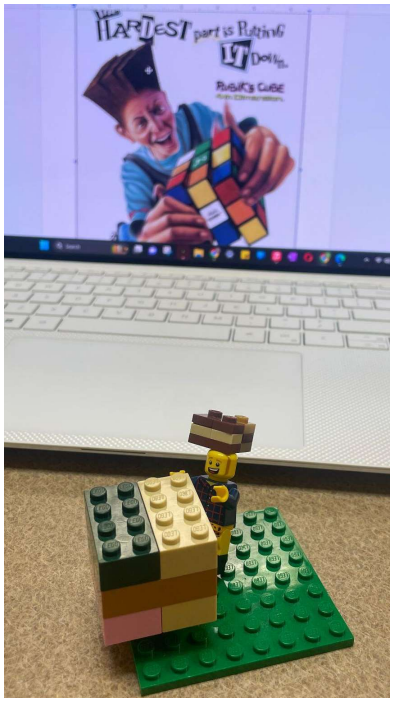


Figure 4.2. Image submitted by Student Four of their model in front of the rhetorical text they analyzed for Core Assignment One.

Student Four demonstrated their understanding of rhetorical purpose within their chosen rhetorical text. In this example, they noted how they replicated details from the original text, from a smiling face and stylish clothes to the cube shaped hair and the forced perspective of the Rubik's Cube in the figure's hand. The student explains how these changes show "gestural communication in the ad and portrays that the person is having fun" (Student Four, CA1 Reflection). Noting how stylish the clothes are demonstrating the awareness of gestural communication, the student is aware how hip the original ad is meant to communicate. The ad embodies the 1990s style with the outrageous characteristics in the wide grin and cubic hair. The student's mimicry of the ad and their rationale show how the student practices rhetorical analysis.

4.3.2 CA2 Activity

For our LEGO® research process today I spent my initial 40 minutes building a boat. With my given bag I designed and created the best boat that I could in the timeframe. My design featured three passengers on a boat with one driver, a snack table, steering wheel and speedometer, a light pole, and a propellor.The second half of this activity was to modify my boat to represent the topic of my research assignment which is the effect of technology on child development. My thought process for this was to incorporate the boat into some kind of technology. My idea for this was to take one of the minifigures from the boat and take another minifigure from my bag and have them play video games. In the bag I was given a sliding glass door and I used this as the screen that the two figures were looking at. My finished product represented two children playing a boat game on a tv. I felt that I had ample time for this project and felt that I did a good job with my build.

Figure 4.3: Student Four's boat model before they transformed it.

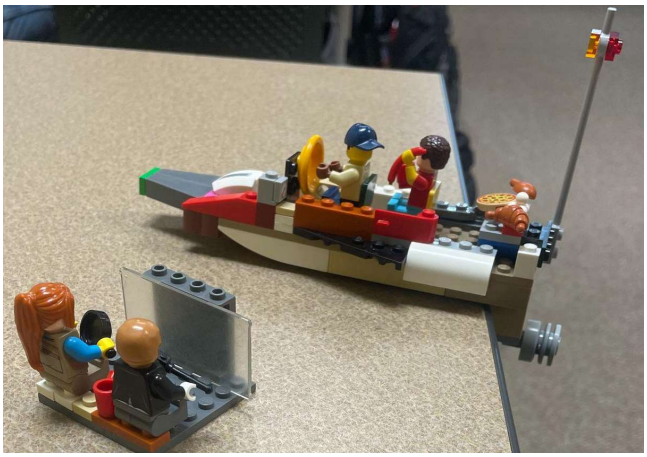


Figure 4.4: Student Four's boat model with the additional context of two people racing the boat in a video game.

The student chose to build a boat for Core Assignment Two's associated activity. When they needed to reimagine the model into how they approached their research topic, they decided to move one figure off the boat and place them in front of a simulated screen. The student described this as the boat being in a video game to show two simulated children engaging in a boat racing game. I will admit, this was not what I intended for the student to do because I wanted the student to translate a model through the lens of their research process. For example, I expected the student to add wings representing lines and dots like a diagram with the boat in the center, or the student could have added additional elements on top of the boat that place the boat as a base with external elements on top.

There were possibilities for students to visualize their thinking process in approaching research, yet the student interpreted the instructions as translating their model into their research topic. By placing the figure on the boat model in front of the simulated game, one could interpret this as that figure imagining themselves on that boat. The child (as considered based on Student Four's topic) is living out their life as they

imagine through the medium of video games instead of experiencing it around them. There is a separation of technology and reality demonstrated in the model that may tie into the student's research. While the student showed how they represented their topic from the chosen model, they didn't read into their choices as deeply as I hoped for.

4.3.3 CA3 Activity

4.3.3.1 Written Steps

- Begin by locating your biggest base plate, we will use that as the bottom of our build.
- Next we will build a table.
- Place big bricks in the top center of your build plate.
- Use whatever bricks you need to make this table approximately 4 wide and 8 long(The longer section should be in the same direction as the longer part of the base)
- Aim to make the table two blocks tall and if you can locate a small base plate to put on top of it to resemble a tabletop, use that. (Mine was 4 X 8)
- This table is actually going to be a DJ table so our next step is to build a minifigure that looks like a DJ
- Place the DJ behind the table and we will now create turn tables. Look for two small circular objects and place them directly in front of the DJ.
- Use 6 1 by 1 tiles and place them on the table to resemble buttons and switches.
- Build a cop and put the loudspeaker in his hand and hat on and place him on the build plate.

- Build another person who is dancing and place them on the build plate with a drink in their hand.

4.3.3.2 Reflection:

I wrote these instructions with the original intent to be vague so that people with different kits could recreate it with their parts. I thought that this would make sense because it would require good instructions that are vague so people can recreate but I then realized that they would be using my parts. My instructions worked pretty well and my partner was able to pretty accurately recreate my build. There were definitely some things that I could have been more specific about seeing as they built some things differently than I did. More specifically I should have described what parts to use for the turntable.

Figure 4.5: Student Four's model as reconstructed by their partner.

In Core Assignment 3's activity, Student Four built a DJ model and wrote a guide that included an informal tone and surprising lack of concise language. For example, the student wrote that the table could be built with any bricks the reader had with the stipulation that it's "4 by 8". At first, these numbers make no sense without any attached units. However, by counting the knobs on the bricks, one could infer that the writer meant

4 knobs by 8 knobs. Other assumptions made were that the reader would know what a DJ looked like and the parts available to the reader could be configured exactly how the writer imagined the figure, despite no clear "place the black, hinged leg pieces into a specific patterned torso" or other steps. Fortunately, Student Four explained that the vagueness was intentional because "it would require good instructions that are vague so people can recreate but I then realized that they would be using my parts" (Student Four).

The student misinterpreted the prompt and made assumptions about how people would understand their instructions. This reveals the writer bias I wanted students to tackle by showing how audiences don't know everything a writer thinks. There needs to be clear audience expectations for writers to consider in a given genre. Student Four demonstrated this awareness when addressing their vagueness and reflection on improving their language. This activity proved most fruitful when considering the implications of the study.

4.3.4 CA4 Activity

My process for designing a LEGO® model to represent my research topic of screen time and the effect on children was to first determine what parts I had in my bag. I looked first for pieces that could represent phones, computers, or other devices. I found a way to design a computer and I also found a phone, perfect! Because I was trying to represent addiction towards technology I placed several dishes on the table. This helps to show that in addiction people disregard doing basic tasks.

For the canva poster my thought process was to find pictures of children playing video games, looking at their phones, and the dishes as mentioned above. I also found a video game theme which helped to bring my poster together.

My peer said that they thought my model was very good and they liked how I had made my computer.

I enjoyed this experience, I like playing with legos and this was a way to represent my project.

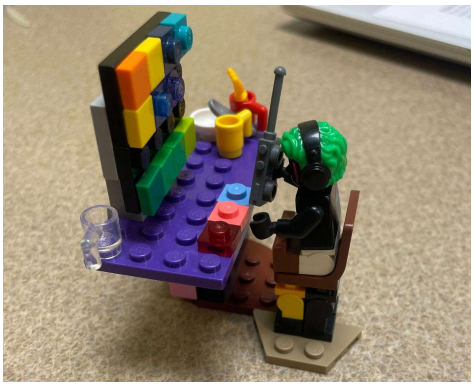


Figure 4.6: The student's initial model representing their argumentative essay topic.

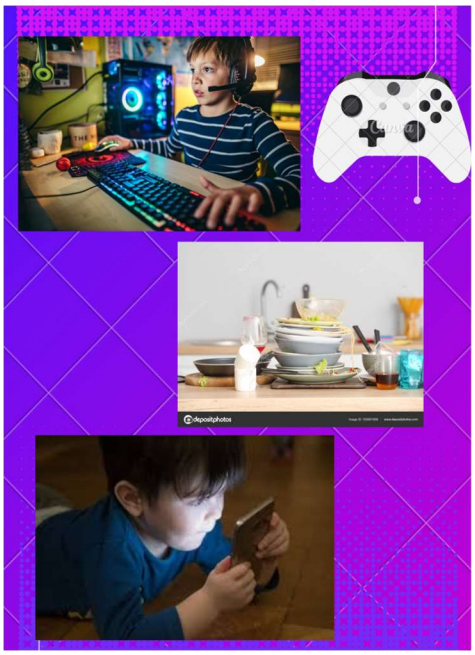


Figure 4.7: The student's Canva graphic they created as a reflection of their model.

Student Four focused on representing key features of their argument's topic, similar to how they worked on CA1's activity. The LEGO® model utilizes smooth and studded pieces that represent colorful digital displays and a keyboard; it creates an eye-catching display evoking the addictive nature Student Four wanted to capture. They also feature cups and bowls on the desk that their figure is sat at, which the student commented was directly representing addiction to technology. After all, someone addicted to technology may ignore other duties in life, such as cleaning used dishes. The student phrases this as "in addiction people disregard doing basic tasks" (Student Four). They communicate these ideas across their reflection in concise language and in the visual elements of their model.

The student was also required to translate their topic from the LEGO® model they built to a graphic using the online design program Canva. They kept to the eye-catching colorful display with the background with two children playing on different addictive technologies. The student encompassed more of their topic than what the LEGO® model originally offered them. They could use a child on a mobile phone to show another, familiar example of technological addiction to a 21st century audience. There's another facet brought in representing the student's topic of technology addiction to kids by portraying another technology. Alongside the dirty dishes featured on the poster, the two kids look engrossed in their screens, a facial expression that wasn't available in Student Four's brick selection. With Core Assignment Four requiring them to translate their research argumentative essay into multimodal text, Student Four practiced translating details across multiple genres.

4.4 Post-Course Survey

The post-course survey saw two of the five selected students respond. For the question “I felt engaged with the course on the days these activities were held”, the results were split between agree and strongly agree. Both students responded agree on “The activities varied from one another enough that they did not feel redundant”. In the instance of the question “The activities reinforced the topics we discussed in class”, there was a split between neutral and strongly agree. Both students also agreed on “These activities helped me understand the purposes of the Core Assignments and the skills needed for them”. For the final question “I can write effective [sic] for my other classes and outside academia”, the students responded with a neutral and an agreement. For the last two questions, one student responded with N/A for both questions.

However, the other student provided responses. In response to “What was your favorite lesson from the four completed in class this semester? Describe how this activity was your favorite”, the student answered, “I liked the activity using LEGO®s to describe the research process. I was able to easily connect my research process to a LEGO® build”. On the final question “How could the activities and/or their execution be modified for possible future classes,” they answered “You could put a minimum piece requirement for people’s creations”. The comments regarding how the CA2 activity enabled for connecting the research process to a LEGO® build was insightful for me. It showed some students may visualize their research process easier through activities like this. I also saw how a minimum piece requirement could help with creativity and prevent students from passively engaging with the activities. The post-course survey provided some helpful comments that point out both benefits and limitations with these activity designs. In other

words, these results are valuable for troubleshooting, which I understood how flawed some of these activities were.

4.5 Discussion

Circling back to the original questions I crafted for this study, I want to know how might LEGO® bricks aid in teaching and reinforcing composition concepts. There was an imbalance between which criteria were demonstrated clearer than others. In particular, composition processes and composition reflections were apparent in student works more so than audience and genre expectations. Assignments related to Core Assignments 1, 3, and 4 held the highest amounts of measured student demonstration, while the assignment related to Core Assignment 2 lacked the quantity of identifiable evidence across the student population. Both composition process and composition reflections were more consistent in occurrence across the core assignment activities.

4.5.1 How the LEGO® Bricks were Used

In some instances, the LEGO® Bricks were creatively used to convey students' problem solving and critical thinking. For the first activity, Student One used their limited selection of LEGO® bricks to construct a football game. Their rhetorical text they analyzed for class was an NFL commercial, but the model itself wasn't as reflective to the original material: "Although this scene that I built does not reflect the scene in the commercial it reflects the product that is being advertised which is the football games". The student subverted expectations of a one-to-one translation of the rhetorical text to instead convey the ideas and message the text communicated. They noted that this process was fun in how they could use pieces to represent different objects, "such as the drumstick for the football and the different types of helmets for the players". The reddish-

brown hue of the chicken drumstick piece and its oblong shape cued the student to utilize it as an American football for their model, which I observed in their submitted picture.

4.5.2 CA 3 Activity's Steps

Most students approached the instructions with visual and tactile descriptions of parts. For Student Two's list, there were a few steps worth discussing. For step 6, the student specifies the following: "Now, grab Harry Potter's head, the black suit torso, the brown pants, and Indiana Jones' brown hat". The step holds an assumption that the reader would immediately know who the listed characters are, and which parts identify them. There could have been a more thorough description, such as "grab the head with printed round glasses and a lightning marking on the top left of its face" or "and the reddish-brown fedora shaped piece to place atop the rounded piece". Yet there was a reaction to utilize what the student themself identified versus what the reader might not know. This demonstrates a lack of audience awareness because the student's assumption is placed frontmost before what the reader might have in terms of gapping knowledge.

Another observation is that the student assigned roles to the figure that the audience was making. In step 8, the student notes "Give this guy a little flame piece to hold onto, as he's about to go into a cave". While the term "guy" may be gender neutral in some nomenclatures, the pronoun "he" connotes that the student has personalized the figure as a "he", most likely based off of the licensed recognizability of some of the parts, such as the head and hat pieces. The student's specified role of the figure's approach to a cave places the figure into an explorer role. There is no expected work from the audience to decide on these roles themselves; in fact, the work is stripped down from creating the realm imaginatively to following the build instructions representing the student's imagination.

In deep readings for the steps students included for the CA3 activity, I parsed what was demonstrated based on the in-class materials we discussed and their expectations for the upcoming assignments.

4.5.3 Students' Thoughts on the Activities

The students in this study not only enjoyed these types of activities, but they wanted them included amongst their classes. In their CA2 reflection, Student 2 rationalized that they enjoyed this activity because "it allowed me to feel like a kid again. It made me feel worry-free during class, which was a nice change from the everlasting stress of being a college student". They acknowledged that this play enabled a distinctive blend of traditional classroom activity and this study. In fact, the student concluded their reflection by stating, "I would like to be able to do this again in this class, especially if it ties into our current work" (Student 2). This statement acknowledges how enjoyable the activity is with the word like, but it also notes how the student would do activities like this if they connected directly with the in-class material. There is an indicated interest in learning the material through the lens of similar activities.

Student 4 noted their pleasure with CA1 with ample time to complete the task, stating that "there are no changes that I would make (It's perfect :)". They also added how "This was a really fun class period! I'm glad activities like this didn't end in elementary school" (Student 4, CA1). Not only did the student find the activity concept fun and perfect as a class activity, but they expressed their gratitude in opportunities offering play alongside learning. In expressing activities like this continue past elementary school, Student 4 demonstrated how there may be desire in students to engage

in learning beyond studying materials and regurgitating them through verbal and tactile means.

5 Chapter 5: Conclusion

Postsecondary writing pedagogy is fueled by play. Jacques Derrida and Maurice Merleau-Ponty demonstrated the fluidity of systems in general and the kinesthetic connections to development. Brian Sutton-Smith addressed that despite play's central role in development, it's dismissed once a person reaches adulthood. From the chapters in *LEGO and Philosophy,* authors such as Ellen Miller noted how experiences shape one's life development (Miller, 81). These authors collectively illustrate how kinesthetic play is influential for developing composition skills.

Conducting this study required me to consider what I've learned as a composition instructor and experiment. In this experimentation, there have been issues uncovered with the study; in particular, I received a smaller population than I had expected from my classroom. The low participation rate for students to have their work used in this study could be explained in a few ways. First off, students were instructed to turn in their physical paper forms to the administrative assistant Katy on the third floor, which meant students would need to travel up to the third floor and directly hand the form to Katy. If Katy wasn't in her office, students may have felt confused and simply walked away, forgetting to turn the form in later.

There may have also been a fear of students being judged on their work. While I stressed how the responses would only be evaluated to see how the activity functioned, there may have been hesitation if the student thought they would be judged for what they wrote. In addition, there were no clear benefits provided to students regarding their participation. This was due to how integrated the activities were to the classroom already, and I was simply reviewing their work beyond the participation credit they were awarded.

Sure, they were built with LEGO® bricks during class time, but I realized that may not be enough incentive for students to join a study like this. While some students understand the ramifications of this type of compositional work, other students may not see the same.

Not all the activities successfully enabled students to build upon or demonstrate their understanding of the criteria. CA1 and CA2 activities were weak in what they asked students to do. CA2's prompt was unclear enough that students like Student 4 may misinterpret what was expected of them. Sometimes, this tolerance in what exactly is demonstrated enables creativity, but it can also misinterpret the expectations laid down. CA2 Activity was meant to visualize student thinking and processing in how they approached research, but it instead had students think about their topics directly. While important, it wasn't my original intent as a researcher and educator. Therefore, the in-class activity showed limitations in the activity design and materials.

Despite the limitations that prevented the lessons from functioning as I intended (perfectly representing students' abilities), there was still potential for students to apply creative and critical thinking. How the pieces are shaped enable students to think outside the box, such as Student One's use of a drumstick piece for an American football. How the prompts were structured enabled additional interpretation, such as Student Four's transformation of their boat model into a video game on display. Other tactile materials such as popsicle sticks or marshmallows could also enable a similar creativity, if not enhanced further due to the non-specific nature of the parts.

In a surprising twist, the reuse of parts and unconventional demonstrations of composition skills revealed a larger play at hand. Similar to what Kathleen Fitzpatrick and Megan Barker uncovered in their in-class activity, I observed students not only

enjoying themselves with this activity, but they addressed how challenging these prompts could be through the communicative problems they posed. I also noticed how students enjoyed when they interacted with one another after building and reflecting on their works together, contrasting Ross Purves' observation of solo, building activities being deeply reflective in his study. While there could be individual work encouraged amongst students, I've observed deep reflections in the CA3 and CA4 activities where students communicated and worked together. These studies and the additional work I came across were helpful in figuring out for myself how kinesthetic learning would assist with postsecondary composition and engagement in these spaces.

My hope with this study was to explore and build upon new engagement methods that recontextualize how postsecondary writing education is taught in order to demonstrate for students how intuitive and versatile writing is beyond the classroom. This kind of work is not limited to just postsecondary writing classes. Educators already experiment and play around with their classrooms to figure out what works best for their students. For me, this type of work is merely a continuation point for other curious educators to work from. These lessons I crafted from my class are not concrete in their methodology and may not apply to every student. However, the students that would benefit from practices such as this one are plentiful.

A concept that I and other educators picked up upon is unexpected results. There were aspects of this study that functioned as expected, yet other activities did not demonstrate as clearly as I hoped for. In this instance, I don't blame students in how they approach the prompts. After all, this encourages growth in figuring out solutions to communication problems through practice and creative thinking with language. My

students taught me how activities and lessons can be modified and built upon by the students themselves in how they approach these activities. They hold some authority in how they demonstrate their knowledge, even if how the knowledge is demonstrated was not anticipated by the instructor. This dynamic is where I see learning occur, in observing how changing a prompt could yield different results or if providing different materials would lead to other solutions. Observing and encouraging this dynamic is where I see success in my work, the success stemming from how students are learning and practicing composition skills in communication.

Students of all disciplines need communicative skills to enhance their technical knowledge and background. Based on how engineering and soft skills have been portrayed within the last century, there is an issue of these skills not being taught with an even weight of significance. I argue that pedagogies based on tactile activities could open possibilities for stressing how embedded soft skills are in science courses. While report writing may be featured already in some STEM courses, there may not be direct instruction or practice for students on how to write within the genre. In writing courses, there may be discussions on writing argumentative works, but the isolation from the other work students already perform could create disassociation and see the two fields as separate, when both are not just significant, but identical in principle.

The study did not discuss engineering itself nor the design principles students learned in engineering fundamentals courses. Yet the problems they were given, the limited resources they worked with, and the clear goal provided reflect that of everyday problems they face. When I took ENG1101, I learned principles of critical thinking to engineer a windmill generator out of pop cans. Students become aware of the principles

found in composition, but the issue is their understanding of these concepts from a composition point. They become The LEGO® bricks that students worked with provided familiarity as they challenged their notions of approaching a research organization or recontextualizing a text they produced for different audiences.

I initially approached this study from the lens of directly proposing modular solutions that could be implemented in postsecondary classrooms by any instructor. Researchers and educators can reduce the impact of stereotypes on students' success by subverting expectations in how the materials are utilized. LEGO® bricks in a writing classroom seem counterintuitive, especially amongst university students. Yet they are a bridging material between communication skills and scientific approaches. Future studies that seek to incorporate methods like these four lessons can perhaps build upon meaningful engagement within postsecondary education spaces.

6 Works Cited

Bacharach, Sondra and Roy T. Cook, editors. *LEGO® and Philosophy: Constructing Reality Brick by Brick*. E-Book. Wiley Blackwell, 2017.

Derrida, Jacque. "Structure, Sign, and Play in the Discourse of the Human Sciences." *Writing and Difference* (1970). Print. http://www2.csudh.edu/ccauthen/576f13/drrdassp.pdf.

Fitzpatrick, Katherine, & Megan K. Barker. "Better Writing, Brick by Brick: a Student-Centered Writing Exercise Using LEGO®." *Journal of Microbiology & Biology Education*, vol. 24, no. 2, 2023, https://doi.org/10.1128/jmbe.00029-23. Accessed 2023.

Gay, Roxane. *Subverting the subject position: toward a new discourse about students as writers and engineering students as technical communicators*. 2010. Michigan Technological University, PhD dissertation.

Heinrich, Paul. *When Role-Play Comes Alive: A Theory and Practice.* Palgrave Macmillan, 2018. https://link.springer.com/book/10.1007/978-981-10-5969-8

Henricks, Thomas S. "Play Studies: A Brief History." *American Journal of Play* 12. 2 (2020): 117 - 55. https://files.eric.ed.gov/fulltext/EJ1255272.pdf

Huizinga, Johan. "The Play-Concept as Expressed in Language". *Homo Ludens: A Study of the Play-Element in Culture*. E-Book, Routledge & Kegan Paul, 1949, republished in 1980, pp. 28 – 45.

Husserl, Edmund. *Ideas Pertaining to a Pure Phenomenology*. Translated by F. Kersten, Kluwer Academic, 1983, pp.62.

Merleau-Ponty, Maurice. *Phenomenology of Perception*. E-book, 1945, translated by Donald A. Landes, Routledge, 2012, pp.179 – 205.

Meyer, Erik and Ray Land. *Threshold Concepts: Undergraduate Teaching, Postgraduate Training, Professional Development and School Education: A Short Introduction and a Bibliography from 2003 to 2018*. https://www.ee.ucl.ac.uk/mflanaga/thresholds.html

Purves, Ross. *Using LEGO® to teach academic writing skills*. University College of London, 2019. https://www.ucl.ac.uk/teaching-learning/case-studies/2019/dec/using-lego-teach-academic-writing-skills.

Shores, Tyler. "Building Blocks of Thought: LEGO® and the Philosophy of Play". Bacharach and Cook, pp. 17-26.

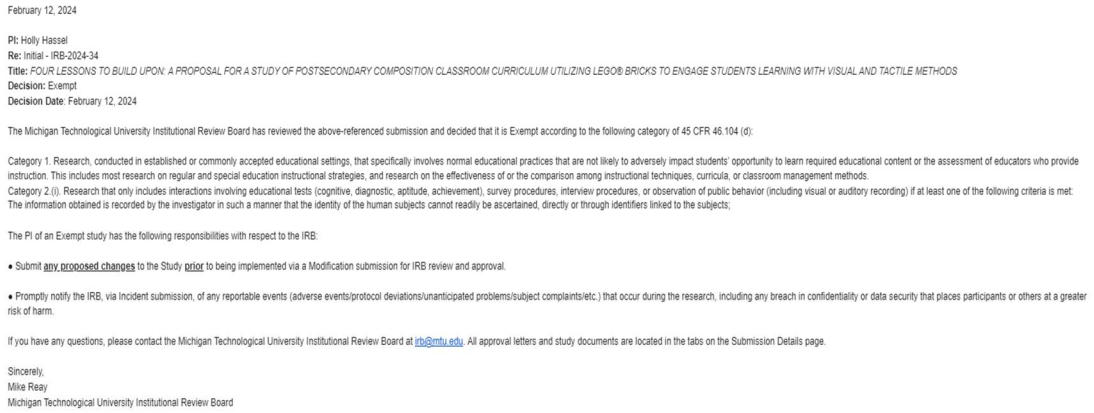
West, Travis. "Kinesthetic Language Learning: How an Accident Led to a Revelation." Teaching Theology & Religion, 19: 378-384. doi: 10.1111/teth.12349., vol. 19, no. 4, 2016, pp. 378–84, https://doi.org/10.1111/teth.12349.

Willard, Mary Beth. "Constructing Creativity". Bacharach and Cook pp. 7-16.

Wittgenstein, Ludwig. *Philosophical Investigations*. 1953. Translated by G. E. M. Anscombe, Basil Blackwater, 1986.

Wright, Naomi, and Lisbeth Kitson. "A Way into Writing: Using LEGO® as a Stimulus." 2020. Literacy Learning: The Middle Years, vol. 28, no. 2, Australian Literacy Educators' Association, 2020, pp. i–viii, https://search.informit.org/doi/10.3316/informit.163504341417157.

A IRB Approval Form



February 12, 2024

PI: Holly Hassel
Re: Initial - IRB-2024-34
Title: *FOUR LESSONS TO BUILD UPON: A PROPOSAL FOR A STUDY OF POSTSECONDARY COMPOSITION CLASSROOM CURRICULUM UTILIZING LEGO® BRICKS TO ENGAGE STUDENTS LEARNING WITH VISUAL AND TACTILE METHODS*
Decision: Exempt
Decision Date: February 12, 2024

The Michigan Technological University Institutional Review Board has reviewed the above-referenced submission and decided that it is Exempt according to the following category of 45 CFR 46.104 (d):

Category 1. Research, conducted in established or commonly accepted educational settings, that specifically involves normal educational practices that are not likely to adversely impact students' opportunity to learn required educational content or the assessment of educators who provide instruction. This includes most research on regular and special education instructional strategies, and research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
Category 2.(i). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met: The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects;

The PI of an Exempt study has the following responsibilities with respect to the IRB:

• Submit any proposed changes to the Study prior to being implemented via a Modification submission for IRB review and approval.

• Promptly notify the IRB, via Incident submission, of any reportable events (adverse events/protocol deviations/unanticipated problems/subject complaints/etc.) that occur during the research, including any breach in confidentiality or data security that places participants or others at a greater risk of harm.

If you have any questions, please contact the Michigan Technological University Institutional Review Board at irb@mtu.edu. All approval letters and study documents are located in the tabs on the Submission Details page.

Sincerely,
Mike Reay
Michigan Technological University Institutional Review Board

Figure A.1.: This email from Michigan Tech IRB Representative Mike Reaz confirms the study's exemption for working with human subjects in a classroom environment. Because I was a master's student at the time of this study, Dr. Hassel was listed as the Primary Investigator, or PI while I was considered a Co-Investigator.

B Classroom Slides

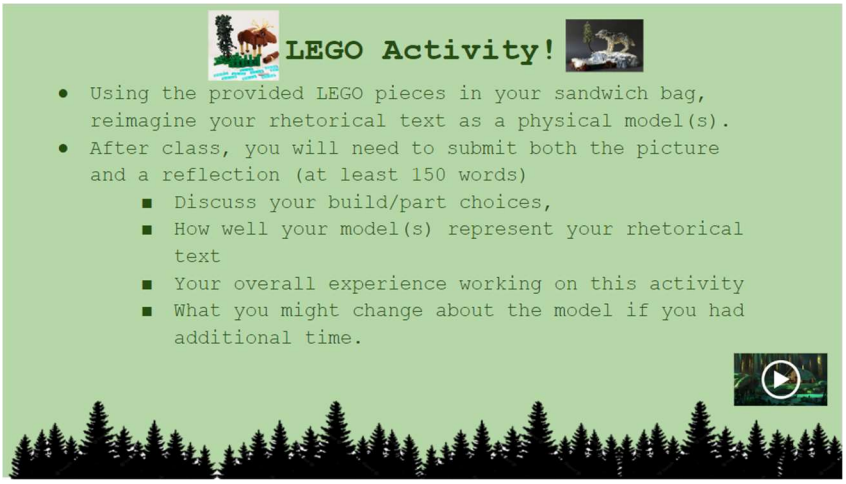


Figure B.1: Slide from the initial class activity. The video included at the bottom right was a nature themed lo-fi track that acted as a background stimulus for the students.

Figure B.2: Slide 1 of 3 from the second activity. The three images selected for this slide hinted at possible structures the students could utilize in their approach to the activity.

Figure B.3. Slide 2 of 3 from the second activity. I broke up the prompt into two slides for both a concentration on the task at hand and an element of surprise to keep the students' engaged.

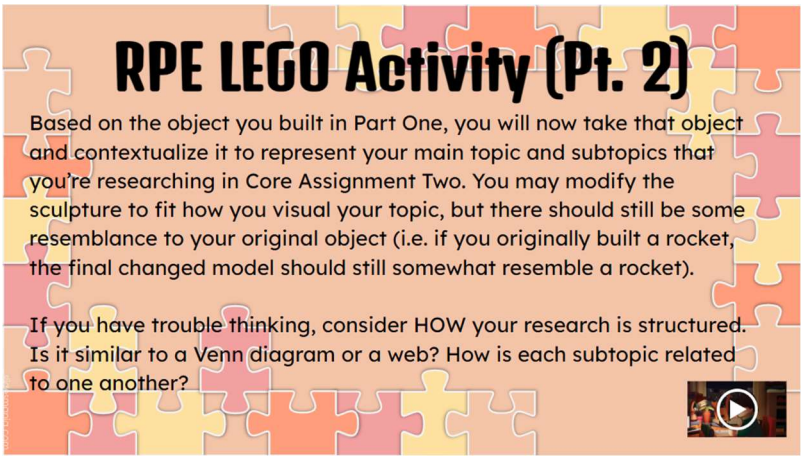


Figure B.4 Slide 3 of 3 from the second activity. This was the second aspect of the prompt where the students had to modify their chosen model based on the structure of their research. This is where the visuals featured on the title slide came into play, as students could reference those and other similar structures when considering how their research was organized.

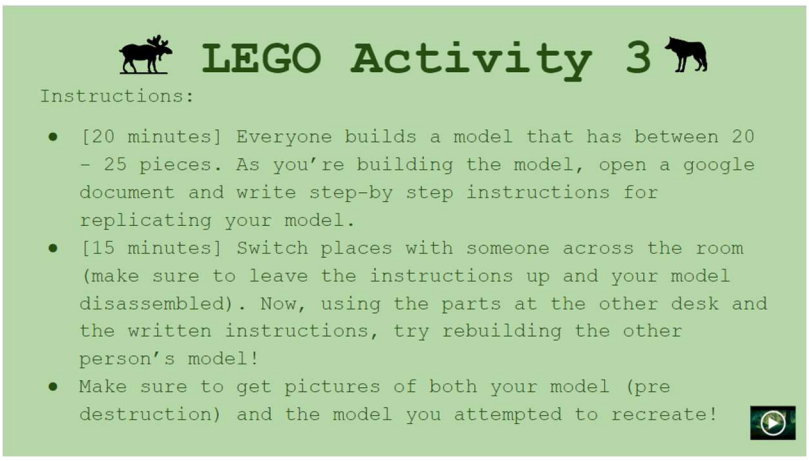


Figure B.5: Slide for third activity. Instead of two separate slides, I utilized transitions for each bullet to try out this type of pacing. It allows for the music to remain uninterrupted, but it blends into the background unless I talk up to address the students.

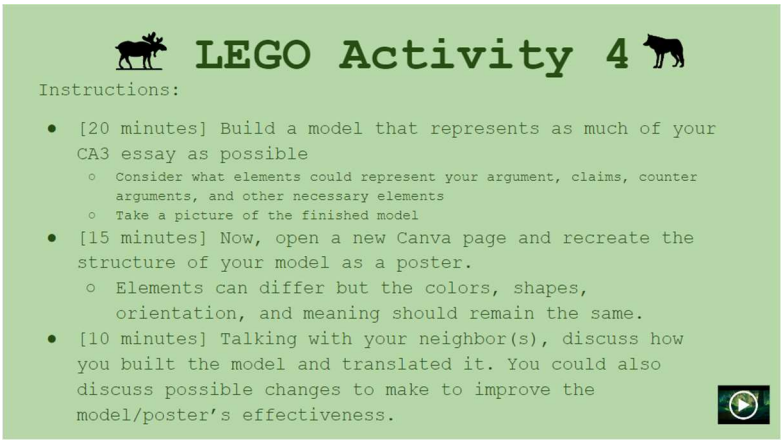


Figure B.6.: Slide for final LEGO® activity. I also used the same transitions as in Figure A.5 to deliver different aspects of the activity. Based on student feedback, I also included times for me and the students to track.