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Dynamic learning: A learner-centered paradigm in Art + Design

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Abstract: There is a critical need for training art + design education teacher candidates to think critically, creatively, and practically in collaborative ways. As agents of change in schools and society, programs in art + design in the U.S. that desire to prepare all students' integrated, self-directed, and dynamic learning require a more learner-centered paradigm more focused on *experiencing* connection making and deep inquiry, in order to develop depth and meaning. This is dynamic learning. From a systems-thinking approach, this article discusses the importance of learner-centered philosophy and the ways that it overlaps with design thinking as a methodology and collaborative practice. This study features an online graduate-level art + design education course using the T-H-I-N-K method that activated collaborative action research as human-centered design and a model for designing thinking in graduate-level art and design classrooms.

Keywords: learner-centered, art + design education, design thinking, inquiry-driven learning, dynamic learning

1. Introduction

There is a lot of discussion in 21st century education about the need for nurturing resilient thinkers who are independent and self-directed, able to take risks, collaborate effectively, and possess a balance of critical, creative, and practical skills (Ingalls Vanada 2013; Zhao 2009). Yet, opportunities for practicing these competencies as preservice and graduate-level teachers are often lost to more traditional practices in art + design education.

From the PreK-12 level to the university level, many students in the U.S. have been primarily exposed to linear ideas about learning that are intended to produce one right answer, yet life outside of school doesn't really work that way. Long before they enter college, many struggle with being self-directed problem solvers. This commonly observed phenomena of learned helplessness is especially noticeable in classes where more independent, active learning and focus on the process are required (as in art + design).

We need to question more traditional ways of teaching in which prescribed content, compliance, and excessive foci on external standards and standardized assessments are measures

of academic success, rather than innovation and creativity (Robinson 2006; Zhao 2012). School is thought of as a place to practice creativity, but is this what students experience?

Further, our students fear failure and are more comfortable with being told *what* to think to pass a test or satisfy what the teacher 'wants,' rather than *how* to think and trust their own abilities to make connections and solve complex—or heaven forbid, ambiguous—problems. Even back in 2006, Sir Ken Robinson stated in his "How Schools Kill Creativity" TED Talk, that modern education is training students out of mindsets necessary to innovation:

> What we do know is, if you're not prepared to be wrong, you'll never come up with anything original... And by the time they get to be adults, most kids have lost that capacity. They have become frightened of being wrong. And we run our companies like this. We stigmatize mistakes. And we're now running national education systems where mistakes are the worst thing you can make. And the result is that we are educating people out of their creative capacities (para. 6).

But students aren't the only ones who must be prepared to be wrong. Educators must also take risks to "depart from the ideas and pedagogies of yesterday and become bold advocates to develop the sorts of learning dispositions needed" to develop 21st century problem solvers, says Kwek (2011, 3). Instead of designing lessons that end in nice, predictable finished products where the teacher gives an assignment and students follow scripted directions that result in 'success,' dynamic risk-taking teachers envision and create learning investigations and cultures of thinking and learning that embrace the power of the process; they think of themselves as designers of students' thinking and dispositions who empower students to take charge of their own learning. It is suggested that this sort of shift might start in teacher training programs, especially in undergraduate and graduate art + design education (Ingalls Vanada 2013).

2. Developing dynamic learners and teachers

Notable education researchers, Dewey, Piaget, and Vygotsky, with more recent educational psychologists (Gardner 2007; Sternberg 2008) and cognitive scientists (Claxton 2008), have long challenged narrow views of intelligence and proposed that students should be self-directed and active learners. Knowledge, as defined by deep understanding, is not acquired by passively absorbing information; it is constructed through direct experience and making connections to prior learning and in multidisciplinary ways (Bransford, Brown & Cocking 2000). Doesn't it make sense that art + design educators, as leaders in fostering creative and critical thinking, should take time to practice the same type of active learning themselves?

This paper focuses on the need to adopt more learner-centered approaches that encourage the kind of out-of-the-box problem solving that can breed creative confidence, critical thinking, and connection-making abilities in our future and developing teachers. To accomplish this, it is proposed that more learner-centered approaches are needed in art + design education teacher training programs at the graduate level. Collaborative problem- and design-

based learning can serve as exemplars for empowering and training teachers who can become more learner-centered, creative, and inquiry-driven.

In a 7-week, intensive online Masters-level graduate course developed by the author focused on creative inquiry and critical thinking for artist/educators, students engaged with a design thinking process called the T-H-I-N-K model ©. THINK was developed by the author (Ingalls Vanada 2011) in order to immerse teacher candidates in investigate ways that art + design can be a source of social responsiveness and vision for social and educational change. Typical of problem- and design-based learning, students worked in groups to gain understanding and empathy, brainstorm, synthesize ideas, and develop prototypes toward real-world solutions related to art + design education systems and students. In the U.S. it is not typical for design thinking processes to be incorporated in art education training programs, nor is it as typical to work in groups towards designing educational or curricular change.

Examples of students' T-H-I-N-K projects are shared along with a summary of the collaborative, human-centered projects related to art + design education that graduate students' chose to research and how, within an online format. The following research questions serve as a guide:

- What are some of the human-centered issues investigated using the T-H-I-N-K model and what does that tell us about graduate students' concerns as artists, designers, and agents of social change?
- How might design thinking in an online graduate art + design education course prepare candidates for learner-centered inquiry and connection making
- How might graduate students navigate collaborative action research in an online format?

3. A systems view

The process of developing dynamic learners—defined as those who self-activate their creative, analytical, and practical skills and dispositions with depth and complexity (Ingalls Vanada 2011), can be thought of as a complex system much like Gilles Deleuze and Felix Guattari's 'rhizome' (1987). Rhizome is a term used to describe the relations and connectivity of things, as of certain root systems in nature that spread underground yet remain related and dependent upon one another, such as a grove of aspen trees.

From a systems-thinking approach, which looks beneath the surface for the interconnected factors and how all aspects of a system are interconnected, accessing students' dynamic learning or their "learning power" (Claxton 2008, ix) involves consideration of both the external and internal aspects of the learning process, similar to the visible and invisible (yet evident and active) action of the rhizomatic roots of aspens. Each tree is a growing entity, yet the interaction of the complex root system of the entire grove supports its growth and health. Every part of this system is connected to and depends on others, and each effects

another. Similarly, to foster every person's dynamic learning capacity requires a view of intelligence as a multifaceted process involving a complex interplay of skills and dispositions (Claxton 2007).

This study is supported by a philosophy of learner-centered teaching and an emergent Dynamic Learning Theory (Ingalls Vanada 2011) that situates more learner-centered/constructivist classrooms within the three pillars of LC environments: inquiry, connection making, and student self-direction. Dynamic learning theory aligns 'dynamic learning' with 'quality of thinking' research (Ingalls Vanada 2013). Figure 1 indicates how students' inquiries may be manifested creatively, ways that deep connections might be made, and what student self-direction can be shown. Of course, this list is not exhaustive.

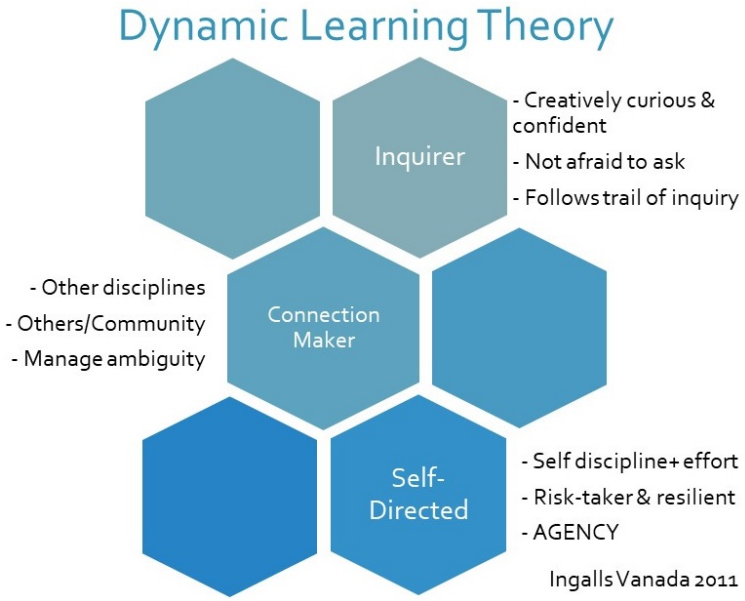

Figure 1. Dynamic Learning Theory

For this paper, we can think of the development of graduate students' learning power as a complex process that involves related catalysts or drivers. Some of these major drivers of dynamic learning are the learning culture, teacher pedagogy and beliefs, curricula, and students' own mindsets and self-beliefs. These factors are all critical components of students' capacity to learn as well as their motivation and resilience—their persistence in the face of setbacks (Claxton 2007). How students perceive their capacities—their "theories in action" (Argyris & Schön 1996), also affects their creative confidence. In this quest to make sense of the complex rhizomatic system that impacts student's individual capacities as learners, the learning culture and teacher pedagogy serve as our starting point.

4. Learner-centered philosophy

Ron Ritchhart (2002) claims that in order to have an impact on students' abilities to be dynamic learners and thinkers, teachers must be purposeful about the learning and thinking culture they create. Learning is defined as the construction of knowledge, and understanding

is the capacity to make connections and apply one's understanding in multiple settings. Covering course content doesn't assure that students 'learn' or develop deep understanding.

A learner-centered classroom (LC) is defined as inherently constructivist in theory, building on philosophies mentioned which contend that students should be actively involved in their learning process—rather than passively, in order to build knowledge. Learner-centered philosophy supported by a vast research base (Bransford *et al.* 2000, Cullen, Harris & Hill 2012, Dewey 1938, Weimer 2002). Students are often invited to follow self-directed, documented trails of inquiry, not often found in traditional classrooms (Marshall 2014). Teacher pedagogy also play an important role in students' self-efficacy, confidence, desire to learn, and motivation, factors which are known to further predict and affect levels of learning and achievement (Bransford *et al.* 2000).

LC classrooms build upon the three pillars of connection-making, inquiry, and self-direction (Ingalls Vanada 2011, 2013), which play an important role in students' self-efficacy, confidence, desire to learn, and motivation—factors known to further predict and affect levels of learning and achievement (Bransford *et al.* 2000). See Figure 2.

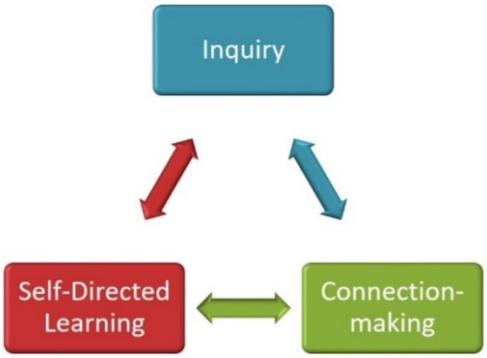

Figure 2. Learner-centered Goals

4.1 Paradigm shift in teaching and learning

Learner-centered curricula focuses less on the end products (typically the first step in more traditional teacher's planning), and more on the processes of thinking and learning. In this constructivist paradigm, responsibility for learning is shifted to the students (where LC teachers believe it belongs), and teachers become co-learners and guides (Dewey 1938). In an LC approach, shared power, or decentralization of power aligns with the LC mantra, "It is the one who does the work, who does the learning" (Doyle 2011, 7).

Research on LC instruction has aligned with higher levels of students' balanced thinking skills (creative, critical and practical) in visual art classrooms, as well as enhanced perceptions about themselves as learners (Ingalls Vanada 2011). Students' dispositions for self-direction, self-efficacy, creativity, and increased motivation are reportedly more positive in more learner-centered classrooms (Cullen *et al.* 2012; Ryan & Deci 2000). This is important because while students will push *back* because they are used to traditional student-teacher

roles and step-by-step instructions, students who push *through* may find new levels of creative confidence and agency because of taking risks and wrestling with the ambiguity of abstract concepts and independent thinking (Weimer 2002; Ryan *et al.* 2000).

4.2 Learner-centered practice in Art + Design

Rather than using the traditional elements and principles of art as the primary vehicle through which content is 'taught,' LC art + design teachers empower students to utilize inquiry methods that artists use (Marshall 2014). Through art practice-as-research methods and the creation of research workbooks, the elements and principles of art become tools for "inquiry into all things" (Marshall 2014, 15), rather than the focus.

LC curricula is often organized around problems or complex, big ideas: philosophical issues or theories of social concern that require multidisciplinary, authentic, real-life solutions (Constantino 2002; Cullen *et al.* 2012). In these problem-based, big-idea classrooms, art + design students determine the concerns they want to address. They make connections across disciplines and from disparate sources to develop art-based solutions and ideas that draw upon what Howard Gardner (2007, 45) calls, "a synthesizing mind."

A learner-centered approach also holds conceptually close ties to design thinking— a problem-based process and mindset that relies on collaborative inquiry or open-ended questioning to understand and solve real-world problems (Carroll, Goldman, Britos, Koh, Royalty & Hornstein 2010).

5. Design thinking as methodology

Design thinking (DT) is used as a methodology that is philosophically constructivist and practice-based, therefore has emergent characteristics—an artistic model of inquiry that crosses over design and art and involves both practice and research (Carroll et al. 2010). DT is essentially qualitative, reflective, reflexive, interdisciplinary and collaborative. The process of design thinking is very important because it activates empathy, intuition, connection making, and problem solving that can lead to ideas and solutions that are human-centered, emotionally meaningful and purposeful (Kelley & Kelley 2013).

When used in the training of art + design educators, DT is a type of qualitative research with close ties to collaborative action research (Sagor 1992), emphasizing opportunities to approach research as an exchange of understanding and active construction of knowledge. According to Sagor (1992, 10), collaborative action research is situational in that it seeks to find and address specific real-world issues as a form of social action using a five-step process: (a) problem finding; (b) deeper research into the issue; (c) analysis; (d) envisioning results; and (e) making a plan of action. Collaborative action research supports the notion that active learning aids creative identities, as they are "complete only in the experience of others" (Dewey 1934, 106).

Typical phases of the design thinking process include: (a) developing understanding and empathy through observation and need finding, (b) problem solving, (c) generating multiple possibilities, (d) prototyping, then (e) testing solutions (Hasso Plattner Institute of Design or "d.school," as cited in Carroll *et al.* 2010). See Figure 3.

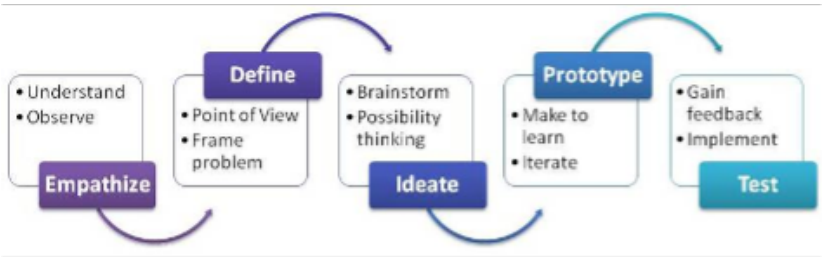

Figure 3. Typical design thinking process

5.1 Design thinking in Art + Design education

Design thinking aligns with LC philosophy and has long focused on the posing of a problem which is open-ended with some constraints, prodding participants to practice dealing with ambiguity (Kellogg 2006). DT engages active inquiry to identify societal dilemmas with empathy to meet human needs; it fosters a bias toward action, activates collaboration, encourages ideation, and supports reflection (Carroll *et al.* 2010, Kwek 2011, Razzouk & Shute 2012). Lutnæs (2020, 12) reminds us that transformative design thinking requires ethical and creative responsibilities and focuses on "problems that are worth solving."

DT requires inductive and deductive reasoning skills along with abductive thinking—a sort of possibility thinking linked to intuition (Ingalls Vanada 2014b, Kolko 2010). Students who engage in the DT process cross over all these ways of thinking (Kellogg 2006). Such integrative thinking deepens understanding and is what design thinkers call 'sensemaking.'

For art + design teacher programs, design requires a pedagogical shift that is: (1) human-centered; (2) action oriented; and (3) process-oriented (Carroll et al. 2010). In the case of incorporating DT into online graduate curricula means helping students manage uncertainty and the ambiguity that comes with problem-solving in a collaborative, online space. Students must constantly utilize ever-changing technologies.

The use of DT models in art + design education classrooms may be a key to unlocking a balance of students' thinking skills and dispositions (creative, critical, and practical) that foster their creative confidence. DT clearly supports the three main pillars of learner-centered theory: inquiry, connection-making, and student self-direction. Additionally, design thinking can bring awareness to the supportive role of critical thinking to creativity and creativity to critical thinking—processes that are always interconnected (Ingalls Vanada 2011).

6. The T-H-I-N-K Framework

The T-H-I-N-K model (Figure 4) was developed by the researcher (Ingalls Vanada 2011, revised 2014a, 2014b) through extensive best-practice literature reviews related to constructivist and cognitive science research (Bransford *et al.* 2000; Gardner 2007; Sternberg 2008) and complexity of thinking as informed by Blooms revised taxonomy (Anderson & Krathwohl 2001).

The acronym, "THINK" was used to label and define each process dimension, assigning higher levels of complexity of students' thinking with each phase of the design thinking process, although it is not necessarily linear:

T: engage thinking (to recall, define, and observe)

H: have a plan (set learning goals and organize)

I: investigate (make connections and explore)

N: generate new ideas (create and attach meaning)

K: know or understand (synthesize, elaborate, and reason with evidence).

The T-H-I-N-K process is intended to advance students' complexity of thinking while being involved in collaborative, inquiry-driven, and integrative research (Ingalls Vanada 2011). The process provides structure in wrestling with complex issues of socio-political, community, or educational injustice. The T-H-I-N-K model has been widely shared, used, and tested in undergraduate and graduate teacher training courses in art + design education, middle and high school classrooms, and in professional development for teachers (Ingalls Vanada 2013, 2014a, 2014b).

Figure 4. T-H-I-N-K Design Thinking Model

6.1 T-H-I-N-K Model Applied

In an online, graduate-level "Creative and Critical Thinking" course developed by the author, candidates engaged with the T-H-I-N-K model from 2018-2020 in collaborative, inquiry-based research projects that guided them to identify problems they observed in their personal lives, as teachers or in their schools, communities, and society. They developed empathy for those affected by the issues through interviews or research, brainstormed, created prototypes toward solutions, and reflected to promote deeper understanding—typical of design-based learning (Ingalls Vanada 2011; Marshall 2014).

Since art education and design-based learning in the U.S. are generally kept more separate in the curriculum, many students in art education programs are less familiar with design thinking practices. To help in the process, students worked from a "T-H-I-N-K Tank Project Guide" created by the instructor/researcher that aligns with each of the phases of the process (Figure 5 shows one group's thinking for "Investigate" in the T-H-I-N-K project guide). Students also reflected on the process throughout their investigations and created a final paper that summarized and shared their process through each design thinking phase, along with their findings and final projects.

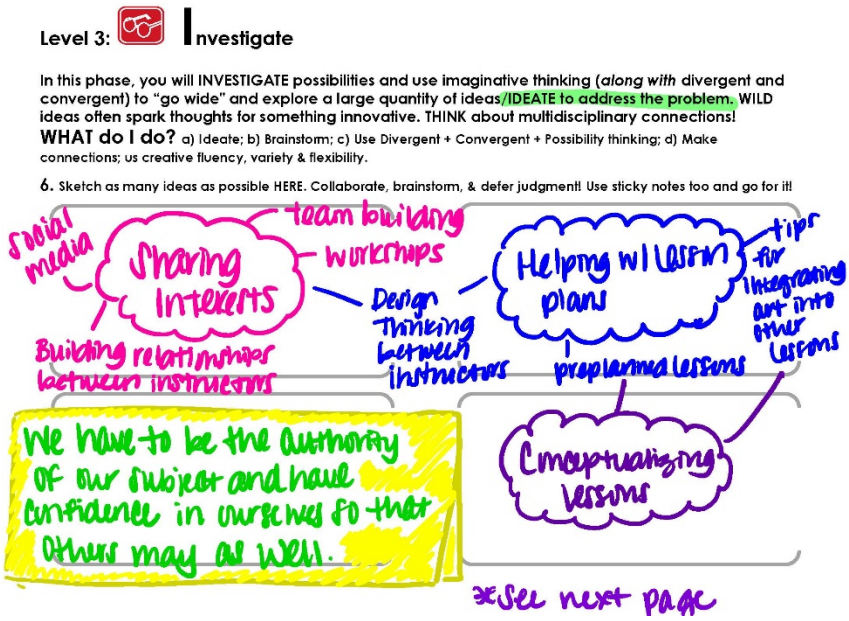

Figure 5. Example from Level 3 T-H-I-N-K Project Guide

The project guide was provided to students in a PDF and Word © document format. Sometimes graduate student group typed directly into the project guide pages, but more who used this guide found creative ways to utilize technology to write by hand more like students using this project guide tended to do. It seemed the since online students were more limited to the use of online collaborative methods of communication, which is ever changing, they constantly discovered new ways to collaborate. Some of the platforms included Padlet ©,

Google Hangouts ©, Canva ©, Stormboard ©, Big Blue Button ©, and Prezi © to name a few. Refer to Figure 6.

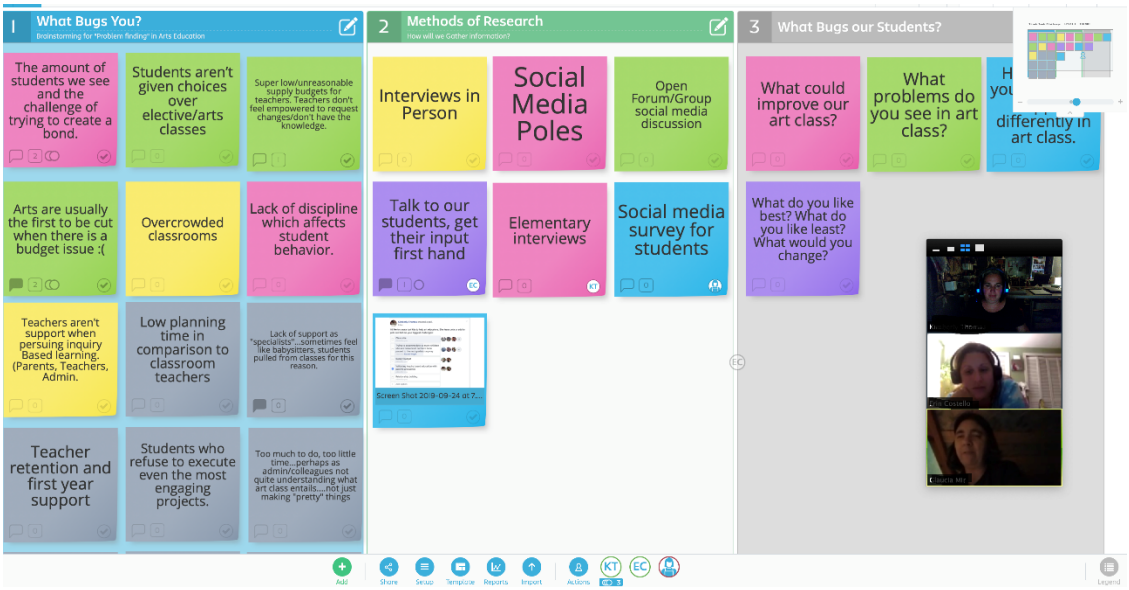

Figure 6. Students' Level 1 online collaborations using Stormboard ©

This same group reported:

> Throughout this process, we grew so much as a team. Stormboard.com was a great way to collaborate from a distance. It allowed us to work together in a genuine way, pushing through obvious ideas instead of settling for a mediocre solution. We generated an idea that has brought us great excitement. …We now know how to communicate in a variety of ways.

The T-H-I-N-K process seemed to promote students' abilities to deal with ambiguity and orchestrate learning processes that put student self-direction, thinking skills, and inquiry at the forefront. By teaching graduate-level art educators to use this creative process method and its focus on inquiry, they were encouraged in ways of designing thinking (Ingalls Vanada, 2011) in their future classrooms, as well as being designers of more innovative, student-centered learning investigations.

Through trusting the process, one group designed and started a social media campaign called #itsneverjustart and designed Instagram © posts (see Figure 7). They wrote in their final support paper about their excitement:

> The overarching theme came from a lack of understanding about the importance of the arts… It was clear that the common misconception was that our classes were "just art." While we could have been disheartened, we instead became excited. The solution was to share with the world that "it's never just art." We embarked on a mission to help educate students, parents, other teachers and administration through an ad campaign.

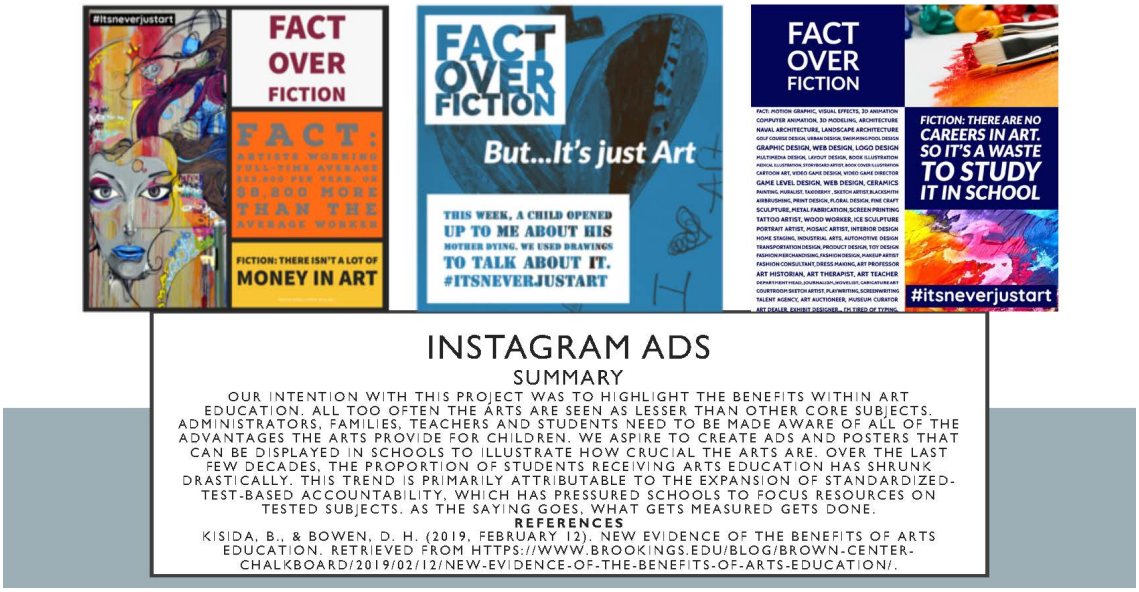

Figure 7. One group's final T-H-I-N-K product: Social media campaign ads

6.2 Student investigations and findings

In the case of this class, graduate students' projects focused on design thinking to solve observed and experienced issues in art + design education. A summary of groups' projects during two years using the design thinking process indicated that graduate-level art + design education candidates using this model were thinking more about:

- Advocacy for art education as an essential discipline
- Developing students' process-oriented skills and dispositions
- Learner-centered teaching in community art
- Incorporating design thinking into the art + design classroom
- Building students' creative confidence through art + design
- Art educators as leaders and managers of art integration

A few of the manifestations of T-H-I-N-K collaborations were products and ideas such as (a) plans for art integration and collaboration with classroom teachers; (b) innovative art gallery displays that help viewers see students' process skills; (c) research workbook designs; (d) social media campaigns and posters. Figure 8 shows a summary of students' collaborative action projects.

Master's Students' T-H-I-N-K Projects			
Group/ Year	Title	Research Topic / Question	End Art + Design Product or Idea
#1 - 2018	Credibility for Creativity	Advocacy / Creativity in Art Education	Art teachers as integration project managers in their schools
#2	Process over Product: Emphasizing the Art Making Process in Art Ed	Valuing students' process + products in art classes	Displaying students' process alongside the finished product + QR codes
#3	Contemporary, Collaborative, and Creative Art Education	Contemporary teaching methods in non-traditional learning environments	Online resource/website for teachers with curricular support for art educators in non-traditional settings
#4	Contemporary, Collaborative, and Creative Art Education	Designing lessons to build promote design thinking and creative confidence	Lesson plans and idea for a job-shadowing art program for young art students
#1 - 2019	Teaching Ambiguity and Positive mindsets	Teaching ambiguity to improve students' creative and critical thinking	Series of motivational posters to foster "growth mindset" in students
#2	Collaborating To Achieve Creativity	Integrating art with other core subjects to foster deep student learning	Creative research workbook templates for students to make connections between art and other subjects
#3	Integrating Arts into Core Curriculum	Art educators as leaders in art integration with general classroom teachers for deeper creativity + inquiry	Community school garden design to engage students, teachers, and curriculum in core classrooms
#4 *	It's Just Art: #itsneverjustart	Advocacy / Improving the view of arts education to parents, teachers, and administrators	Downloadable posters for teachers + Instagram campaign: #itsneverjustart.

Figure 8. Summary of Collaborative Action DT projects

Graduate student groups often focused on process as being just as important as the final product. They focused on students' needs, expanded their abilities to empathize and motivate students, and thought more deeply about personalizing student learning (personal communication, November 2019). In joining student groups in real time during some of their T-H-I-N-K collaborations, it was apparent that often art studio classes do not often prepare them for thinking inductively, deductively and abductively. They have reported that in studio classes they rarely push themselves to create multiple solutions to problems, and that design thinking forced them to think both divergently to come up with never-before-thought of solutions, then to move back into convergence (Lee & Breitenberg 2010). They are certainly not as used to a deep dive of information gathering and brainstorming with a group that DT requires.

Candidates also expressed difficulty with dealing with the ambiguity of inquiry-driven research and planning, being more used determining an end product as the first thing in meeting requirements for a project. At the same time, one student commented on the impact of the design thinking process (personal communication, December 2019):

> It was energizing and invigorating to know that I can have a hand in change! This process definitely helped me to think outside the box in everyday problems. It also gave me a chance to work with different personalities in a corroborative setting. …The skills

> of thinking, creating, listening and evolving will be used throughout the rest of my career as well as in my personal life.

Rather than foster consumerism in art + design education where teachers find lesson ideas or products on Pinterest © and their students recreate them, the design thinking process *as a practice* reinforces needed 21st century ideals of the importance of integrating collaboration along with critical reflection and thinking about, as Lutnæs (2020, 11) reminds, "what situations are worth changing?"

7. Changing paradigms in Art + Design education

In order to build students' agency as learners and creators, art + design education programs at every level must push against the idea that students are passive receptacles and replace process-driven, learner-centered models that foster students' abilities for connection making, independent thinking, and meaning making. Traditional art education programs with predictable methods for problem solving will produce predictable results; they are missing opportunities for developing the capacities of our teachers in training and graduate-level candidates.

It is important to consider the ways that project- and design-based learning experiences might engage art + design education candidates in empathic inquiries into problems of social interest and support contemporary art integration (Marshall 2014). Design thinking processes such as the T-H-I-N-K model provide a structure that builds ways of creative action through brainstorming, collaboration, social ideation, and prototyping. Widening our view to prepare our teacher candidates for a world in which social-emotional skills and social creativity are vital. Likewise, there is a continued need for research regarding how problem- and design-based models might advance art + design students' nonlinear thinking, ability to manage ambiguity, and their skills for making connections to real world issues (Ingalls Vanada 2011; Lee *et al.* 2010). In the development of dynamic learners and teachers, a more learner-centered paradigm that incorporates collaborative design thinking projects in preservice and graduate art + design teacher preparation programs can provide needed change.

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