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Review

Teaching creativity in art and design studio classes: A systematic literature review

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ABSTRACT

It is increasingly important for educators to help students develop as creative individuals, and to prepare graduates to think creatively at work, in personal life, and in society. Many countries are working to transform schooling to lead to creative learning outcomes. And yet, very little is known about how to teach for creativity. This review was motivated by the belief that effective models of creative teaching and learning would be found in art and design educational practice. The goal of this systematic review is to synthesize empirical studies of the pedagogy used in art and design studio classes, from early years to university. A keyword search, followed by a filter using inclusion criteria, identified 65 peer-reviewed journal articles. A grounded theory analysis of these 65 articles identified eleven themes characterizing art and design pedagogy, grouped in three clusters: Pedagogical practices (5 themes), learning outcomes (4 themes), and assessment (2 themes).

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1. Introduction

It is increasingly important for educators to help students develop as creative individuals, and to prepare graduates to think creatively at work, in personal life, and in society (Robinson, 2001; Trilling & Fadel, 2009). Many countries are working to transform schooling to lead to creative learning outcomes. The European Union designated 2009 "The European Year of Creativity and Innovation," proclaiming that "Europe's future depends on the imagination and creativity of its people (2009, p. 1). The OECD, with membership including 35 advanced economies, has concluded that creativity is increasingly necessary for individuals and for societies (OECD, 2008). In response to these trends, many countries are working to enhance creativity through schooling (OECD, 2008; Wagner, 2012). For example, governments in China (West-Knights, 2017) and South Korea (Ahn, 2012) have introduced policies calling for the formal encouragement of creativity in schools.

The pedagogical methods associated with formal schooling are widely believed to be inimical to creativity (e.g., Sawyer, 2015). These traditional methods, often referred to as *instructionism*, include lectures, textbook assignments, and standardized tests that are primarily designed to assess student memorization (Sawyer, 2015). Educators and policy makers have called for schools to move away from instructionist pedagogies toward new pedagogies that are more likely to result in creativity—in the United States (Council on Competitiveness, 2005; Wagner, 2012) and internationally (OECD, 2008). And yet, education researchers do not have a good answer to the question: What pedagogical practices lead to creative learning outcomes?

Several accounts of creative learning outcomes have been proposed; these proposals define creativity in very similar ways. The UK's Qualifications and Curriculum Authority defined creative learning outcomes to include questioning and challenging; making connections and seeing relationships; envisaging what might be; exploring ideas and keeping options open; and reflecting critically on ideas, actions, and outcomes (QCA, 2005). Cremin, Burnard, and Craft (2006) defined creativity as *possibility thinking*, which includes seven habits of mind: posing questions; play; immersion; innovation; risk-taking; being imaginative; and self determination. A U.K. report by the National Advisory Committee on Creative and Cultural Education (NACCCE, 1999) proposed that teaching for creativity involves encouraging beliefs and attitudes, motivation and risk taking; persistence; identifying across subjects; and fostering the experiential and experimental.

The goal of this meta study is to contribute to our understanding of teaching and learning for creativity, by analyzing and synthesizing empirical studies of the pedagogy used in art classes and design classes. Art and design classes are intended to provide students with the ability to generate creative works. The *studio* is the name commonly used for learning environment designs within which students actively engage in creative work under the guidance of an instructor.

Our research question is: What pedagogical practices are found in art and design studio classrooms? As Aveyard (2010) writes, "The aim of a literature review is to uncover new insights on a topic by reviewing the literature in a systematic way" (p. 21). A better understanding of studio pedagogy would potentially have implications for education more generally, specifically when the goal is deliver creative learning outcomes. This review includes empirical studies of both K-12 education and higher education[1] (HE), and empirical studies of both art disciplines and design disciplines. This broad scope of disciplines, and educational levels, was chosen because all of these studio classes are intended to lead to creative learning outcomes.

I have found only one literature review of empirical studies of studio pedagogy. In an unpublished doctoral dissertation, Salazar (2011) provided a narrative summary of arts education research in HE settings (her review did not include design education research or K-12 arts education research). She found that prior studies suggest that "the central purpose of a contemporary art school education is the development of the person as a creative, resourceful individual" (p. 26). She concluded that teachers engage in dialogue with students, they help students learn how to evaluate their own work and the work of their classmates, and class sessions focus on learning by doing (pp. 23–30). However, this review was a narrative summary, and did not use a rigorous methodology to identify relevant articles. For example, there were no keyword searches of databases, and many of the articles reviewed were not empirical studies. Emergent themes were not identified using recommended meta-study methodologies.

2. Methodology

I used a rigorous methodology recommended by literature review methodologists (Aveyard, 2010; Finfgeld, 2003; Light & Pillemer, 1984). A systematic review using a rigorous methodology can be contrasted with a narrative literature review in its

[1] K-12 is a U.S. convention indicating kindergarten through 12th grade, approximately years 5 through 18; in many other countries, these years are referred to as early years education, primary school, and secondary school. We use HE as an abbreviation for "higher education," which refers to post-secondary (college or university).

rationally documented and structured process. Due to its rigor and systematicity, it results in more reliable and validated conclusions (Littell, Corcoran, & Pillai, 2008; Pettigrew & Roberts, 2006, p. 10). As Aveyard (2010) writes: "In a literature review, all the available evidence on any given topic is retrieved and reviewed so that an overall picture of what is known about the topic is achieved" (p. 2).

This systematic review is a *meta study*, following the definition used by Paterson, Thorne, Canam, and Jillings (2001). A meta study reports the methodology of each paper, and uses a rigorous methodology to identify themes that emerge across the studies. According to Finfgeld (2003) the goal of a literature review is to "produce a new and integrative interpretation of findings that is more substantial than those resulting from individual investigation" (p. 894).

First, I used a two-stage comprehensive keyword search, and then filtered the resulting articles by comparing their abstracts against the inclusion criteria. I restricted the search to peer reviewed journal articles published in English. This procedure identified 65 empirical studies of studio pedagogy. Second, I conducted a content analysis of the 65 articles, using a grounded theory methodology to identify emergent themes that represent findings shared across multiple studies. As Patton (2015) recommends, this study "involves seeking patterns across and integrating different qualitative studies" (p. 303).

2.1. First keyword search stage: discipline-specific journal search

In the first stage, I searched seventeen journals associated with research on art education, design education, and architecture education (see Table 1). Narrowing the search to specialized journals in the field allowed for a broader set of search terms. In each journal's online database, the following search string was used in the "Title" field:

pedagogy OR teach OR project OR practice OR learn OR teaching OR learning OR projects

This was an intentionally broad search string, to ensure that all relevant studies would be identified. The number of articles returned by this search string, for each journal, appears in the "First pass" column of Table 1. For all 17 journals taken together, a total of 1488 articles were identified, suggesting that the broad set of search terms was successful at capturing a large proportion of the relevant articles.

A review of these 1488 articles revealed that the broad set of search terms had returned many articles that were not relevant to the research question and did not meet the inclusion criteria (see section 2.3, inclusion criteria). Hence, a second pass was required to filter and narrow the list. In this second stage, for the 1488 articles returned:

- I read the abstracts of all 1488 articles, to determine if the article met the inclusion criteria.
- If the abstract did not make it clear whether the study met the inclusion criteria, the full text of the article was reviewed.

The number of articles that met the inclusion criteria appear in the "Second pass" column of Table 1—a total of 48 peer-reviewed research articles. One can see that a large majority of the 1488 articles returned by the search string did not meet the inclusion criteria; they are not empirical studies of studio pedagogy.

Table 1
The 17 discipline-specific journals searched, with first pass citations identified using the keyword search, and second pass citations identified by reading the articles and using the inclusion criteria.

Journal	First pass	Second pass
iJADE	120	6
J of Art and Design Ed.	64	3
Intl J of Ed and the Arts	201	6
Studies in Art Ed.	215	5
Art Ed	188	1
J of Aesthetic Ed	0	0
J of Aesthetics and Art Criticism	13	0
Art Journal	110	0
Design Studies	105	2
Design Issues	37	0
The Design Journal	89	1
Art, Design, and Comm in HE	111	6
J of Arch Ed	54	0
Design & Tech Ed	68	5
Intl J of Tech & Design Ed	32	2
Intl J of Arts Ed	4	0
Intl J of Ed through the arts	77	2
Misc others		9
TOTALS	**1488**	**48**

2.2. Second keyword search stage: database search

The second stage was to search thirteen comprehensive databases that index all scholarly articles (see Table 2). The goal was to identify potentially relevant articles that did not appear in specialist journals in the field. This required a more focused search string, because the very broad string that was used for the specialized journal search returned millions of articles. I developed two almost identical search strings, one for art ("art teaching" and "art studio" and "art education") and one for design ("design teaching" and "design studio" and "design education"). These two keyword searches were applied to all database fields, including keywords, abstracts, titles, and full text. The number of articles that were identified in this search appear in the first column of Table 2 titled "First pass".

As with the specialized journal database search, I read the abstracts of all 1505 articles. If the abstract did not make it clear whether the article met the inclusion criteria, the initial pages of the article were read to make this determination. Seventeen journal articles met the inclusion criteria; the number of included articles found in each database appears in column 2 of Table 2, "Second pass".

Summing both keyword search stages, the total number of articles that I read and filtered using the inclusion criteria was 2,993, resulting in 65 journal articles that met the inclusion criteria (48 + 17).

2.3. Inclusion criteria

To be included in this study, the article had to be an empirical study of pedagogical practice in art or design studio classes. I used these inclusion criteria to identify relevant articles from those that resulted from the keyword searches:

- The publication must include an empirical study of art pedagogy or design pedagogy instructional practice in a studio classroom.
- K-12 and higher education are both included.
- All countries were included.
- Studies that were based on interviews with teachers or students are included, as long as the topic is what happens in a studio class, or perceptions about what is happening in the studio class.
- Articles about assessment of studio learning outcomes were included.

2.4. Content analysis methodology

I conducted two content analyses of the 65 articles. First, I conducted a quantitative inventory of the characteristics of the studies. In section 3, I provide the resulting descriptive statistics of the 65 article dataset.

Second, I conducted a thematic analysis of article findings. I used a grounded theory methodology to identify themes that emerged from the 65 articles (Aveyard, 2010, pp. 96–116, p. 130; Charmaz, 2014). For each article, I developed a short summary, assigned keywords, and composed a one-sentence statement of the findings. I then engaged in a process of constant comparative analysis. Articles with similar findings were grouped into tentative themes, and these themes were iteratively re-applied to the 65 articles. At each stage of iteration, pairs of themes were merged, as it was determined they were closely related. As Paterson et al. (2001) write, by using the constant comparative analysis associated with grounded theory, "the relationship of one study to another becomes apparent and there is continuous comparative analysis of the texts

Table 2
The 13 comprehensive journal article databases searched in the second stage, with first pass citations resulting from the keyword search, and second pass citations identified by reading abstracts to filter by the inclusion criteria.

Database	First pass	Second pass
Science Direct	40	3
Google Scholar	1275	8
Academic Search Premier	1	0
CINAHL	0	0
JSTOR	87	0
Project Muse	3	0
PsycInfo	0	0
PubMed	0	0
Scopus	10	0
Web of Science	30	2
ERIC	4	0
Proquest Education	38	2
Sage	17	1
Miscellaneous		1
TOTALS	**1505**	**17**

until a comprehensive understanding of the phenomena is reached" (p. 64). The iterative process concluded when the analysis reached *saturation* (Charmaz, 2014, pp. 212–213; Corbin & Strauss, 2008, pp. 143–149): at this point, all themes were distinct and no two could be further merged. This multistage comparative method resulted in the identification of eleven emergent themes in three clusters, and these findings appear in section 4.

3. Quantitative results: inventory of article characteristics

Of the 65 articles, I calculated descriptive statistics capturing the general distribution of the articles by:

- Country and region
- Educational level (K-12 and post-secondary/higher education)
- Discipline: Art and design
- Year article was published
- Type of methodology and rigor of methodology

3.1. Country and region

The distribution of studies across geographic region appears in Table 3. All studies were of a single country, except for two: one that studied 3 countries, and one that studied 22 countries.

Empirical studies of studio pedagogy are distributed internationally, with publications from all global regions, with the exception of Africa and Central/South America. This suggests that the themes identified through the qualitative grounded theory analysis are likely to be general characteristics of studio pedagogy, rather than specific to one nation's pedagogical tradition.

3.2. Educational level

Forty-five papers studied higher education (45), with the remaining 18 studying K-12 (two studied both). The large majority of higher education studies may indicate that the studio approach is more common in higher education than in K-12 classrooms.

3.3. Discipline: art and design

I sorted the papers by their empirical focus: art studio pedagogy or design studio pedagogy. I also report these discipline counts by level (K-12 or HE). Twenty three studies were of art and 36 were of design; six studies examined both art and design.

K-12. Of the 18 K-12 studies, 13 were studies of art and 4 were studies of design (one studied both): three times as many studies in studio art pedagogy as in studio design pedagogy. This is perhaps because in many countries included in this study, art education is a part of the required national curriculum in K-12, whereas design is not. Notable exceptions include the UK and Scotland. In the U.K., design and technology (D&T) is included in the national curriculum; in Sweden, sloyd education (sloyd is similar to the word "craft" in English) is part of the national curriculum.

HE. With HE, the distribution of studies by discipline is inverted: There are three times as many studies of design as of art. Of the 45 studies, 30 were studies of design, and 10 were studies of arts (5 studied both). This suggests that design studio pedagogy is more common in HE than art studio pedagogy. In HE, art and design education take place in professional schools,

Table 3
Distribution of studies by geographic region.

	Total	K12	HE	Both	Art	Design	Both
USA	20	7	11	1	9	10	
UK	16	2	14		5	8	4
Scandinavia	8	3	3	1	3	4	
Middle East	7	2	5		2	5	
Australia	6		6		1	4	1
Asia	5	1	4		1	4	
Canada	1	1	1		1		
Netherlands	1	1			1		
More than 1	2	1	1			1	1
Totals	65	18	45	2 65	23	36	6 65

specifically chosen by students with the goal of pursuing creative careers. There are more career opportunities in design professions than in art, and this may explain the prevalence of design studio classes.

3.4. Year article was published

The database searches specified a year range from 1980 to 2016. The earliest study identified by the search was conducted in 1984. In Fig. 1, the summary year data is reported in five-year periods. For each five-year period, the number of art studio and design studio studies are separately presented.

We see a slow increase in research on studio pedagogy between 1984 and 2001, and then a rapid increase beginning in 2002. The growth in research was more pronounced for design education than art education. This is consistent with the art vs. design numbers presented in section 3.3, which show that design studio research is more prevalent than art studio research.

Future research might explore the reasons for this increasing focus on both art and design education, and in particular, the proportionally greater increase in design education.

3.5. Type of methodology and rigor of methodology

Patton (2015) points out that qualitative studies vary in rigor, and recommends "deciding which [studies] are of sufficient quality …. To include a qualitative research study in a synthesis requires determining what quality criteria must be met and how those criteria will be evaluated" (p. 303). In this review, I have included articles that matched the keywords and the inclusion criteria, and I chose not to exclude studies on the basis of their level of rigor. As a result of these broad inclusion criteria, following Patton (2015), I felt it necessary to report the rigor of each study, as shown in Table 4.

Seventy-eight percent of the studies used qualitative methods: 54 are qualitative, and 15 are quantitative (this totals to 69 because four publications included both quantitative and qualitative analyses). I grouped the studies into four levels of rigor, with level 1 the least rigorous.

- Level 1: A descriptive, narrative, or case study report; no methodology is named, and no methodology is demonstrated or described.
- Level 2: A methodology is named (e.g. grounded theory, semi-structured interviews). Qualitative data were not recorded or transcribed, but excerpts of field notes might be provided. Results are presented in the form of categories; the categories might be emergent, or they could also be predetermined by the chosen theoretical framework. Codes might be provided, but the coding methodology is not described.
- Level 3: A systematic methodology is described. Audio or video recordings were gathered and transcribed. Level 3 studies almost always used a grounded theory methodology (in some articles, this method is referred to as *phenomenographic*).
- Level 4: The study provides a detailed description of the methodology used. The emergent coding procedure is described, with the stopping point of *saturation* (Charmaz, 2014, pp. 212–213; Corbin & Strauss, 2008, pp. 143–149) being mentioned and described. Other signifiers of strong rigor include *member checking* (Corbin & Strauss, 2008, p. 113, 273; Saldana, 2013,

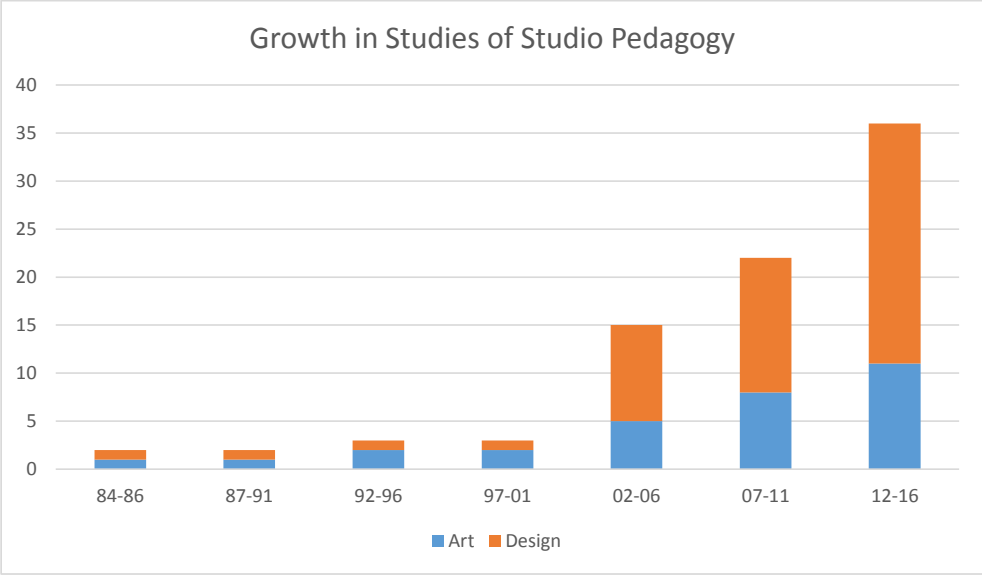

Fig. 1. Distribution of the 65 studies by year and by discipline.

Table 4
The 65 studies grouped by methodology and rigor.

Method	Total	1	2	3	4
Quant	15	7	8		
Qual	54	26	14	9	5

pp. 35–36) to indicate validity; *reliability measures*, when multiple researchers independently coded the data and a consensus was reported.

Overall, the rigor of the qualitative studies is weak, with twenty six of the 54 qualitative studies using the lowest level of rigor.

For the 15 quantitative studies, I identified three rigor levels.

- Level 1: Descriptive statistics were provided, either of data gathered through qualitative methods, or interviews and questionnaires where answers provided were quantitative, such as a 5-point Likert scale.
- Level 2: Descriptive statistics were presented, and statistical analyses are reported (e.g., correlations, regressions). In many cases, operationalization of variables was described; in other cases, a standard instrument was used (e.g., the TTCT to measure creativity).
- Level 3: An experimental design, with a control group and an experimental group, and *p* values used to evaluate statistical significance. None of the 65 studies was experimental in design.

The 15 quantitative studies were evenly split between levels 1 and 2.

4. Content analysis of findings: emergent themes

In analyzing the 65 papers, I followed Aveyard (2010) in that I "explain the differences and similarities in the different papers that you have, rather than to simply summarize them" (p. 124). To identify the shared, core findings across these studies, I used the grounded theory methodology described in section 2.4. The methodology allowed themes to emerge from the papers, rather than being predetermined through a hypothesis or a theoretical framework.

The 11 themes that emerged are grouped into three clusters:

- Pedagogical practices: 5 themes
- Learning outcomes: 4 themes
- Assessment: 2 themes

A study could be coded as addressing more than one theme.

The citations that appear here in section 4 are all to one of the 65 articles included in the study (in the reference section, the 65 studies are marked with an asterisk), except for those that appear in italics.

4.1. Pedagogical practices

36 papers

This first cluster contains five themes, and includes studies of strategies, techniques, actions, and beliefs of instructors. These studies either observed a studio class, or interviewed instructors about their pedagogy, or interviewed students to determine their perspective on the pedagogy they experienced.

The 5 pedagogical practice themes are:

- Theme 1. The pedagogy is flexible, open-ended, and improvisational
- Theme 2. Students are active and independent
- Theme 3. The classroom is a community of practice
- Theme 4. The pedagogies of professional creatives
- Theme 5. The tension between open-ended assignments and the need for structure

Theme 1. The pedagogy is flexible, open-ended, and improvised

20 papers

Studio art and design pedagogy is deeply constructivist (Hafeli, Stokrocki, & Zimmerman, 2005; Hall & Thomson, 2016), and instructors use a learner-centered approach rather than a teacher-centered approach (Hafeli et al., 2005; James, 1996; Vanada, 2016). The curriculum and subject matter are not "predefined, but rather develops along with the child's creative work" (Bachar & Glaubman, 2006, p. 8). Instructors respond creatively to the unfolding flow of the classroom (Adams & Forin, 2016; Hall & Thomson, 2016; Vanada, 2016); the interaction between instructor and student is "negotiated" (Hafeli et al., 2005, p. 247; Hall & Thomson, 2016, p. 6) and "improvisational" (Adams & Forin, 2016; Dannels, 2005, p. 148). Studio pedagogy is "open ended" (Boucharenc, 2006; Hall & Thomson, 2016, p. 6, p. 3). Students are presented with challenges that allow them to make creative choices about how to proceed, and instructors are "walking a line between driving students in a particular direction and encouraging students to act independently" (Adams & Forin, 2016, p. 61).

Instructors and students mutually determine the flow of the class session; these conversations are the most important element of art education (Svensson & Edström, 2011, p. 22). This pedagogy is found in all global regions; in a study of 22 countries, Boucharenc (2006) found "relatively free or open-ended design projects or assignments" (p. 17) in all countries.

This constructivist and open-ended approach is aligned with recent learning sciences research, which has found that such pedagogies are more effective at fostering higher-level learning outcomes (Nathan & Sawyer, 2014). As with constructivist pedagogy more generally, in studio pedagogy, the instructor acts as a guide and facilitator, rather than an authority figure who presents information as the expert (Vanada, 2016). Instructors say that they "lead, elicit, guide, encourage" (Billings & Akkach, 1992, p. 441).

Two studies compared this constructivist pedagogy with classes that used a more instructionist, teacher-centered approach (Andjomshoaa, Islami, & Mokhtabad-Amrei, 2011; Vanada, 2016). These two studies found that the constructivist, learner-centered approach was more effective. For example, Andjomshoaa et al. (2011) found that in constructivist classrooms, students had higher tacit knowledge and a reduced rate of mistakes. Vanada (2016) found that students performed better when the instructor used a learner-centered approach. Shreeve, Sims, and Trowler (2010) argued that this pedagogy is effective, in part, because it is aligned with "the uncertainty and open-ended nature of creative production" (p. 125). Gray and MacGregor (1991) likewise noted that art pedagogy was aligned with real world art making.

Six studies found that instructors modify their pedagogy to align with each student's unique needs, level of understanding, or learning style; they are "highly adaptive to the student" (Adams & Forin, 2016, p. 40). Good instructors are able to modify their conversational approach to match each student's needs; "goals and content are left very open, and are assumed to emerge through the work of the student …. it cannot be decided beforehand by anyone else or even by the student" (Svensson & Edström, 2011, p. 23). Students' needs can change from week to week, and across different project assignments (Goldschmidt, Hochman, & Dafni, 2010).

Theme 2. Students are active and independent

6 papers

A study was coded as theme 2 if it addressed the active, independent nature of student work, or when students take risks and experiment. Students are granted substantial autonomy in these learner-centered classrooms, in the belief that they will learn more effectively if they experiment and take risks (Boucharenc, 2006; Graham & Zwirn, 2010; Vanada, 2016). Graham and Zwirn (2010) found that instructors want students to make mistakes, take risks, play, and experiment, as they "construct meaning" (p. 223). A comparative study of 22 countries found that one of the most common themes was to foster student experimentation (Boucharenc, 2006). Experimentation brings with it the possibility, even the likelihood, that students will fail. Because of the risk of failure, instructors create a classroom environment where students can feel safe (Salazar, 2013).

Theme 3. The classroom is a community of practice

9 papers

To support the open-ended, active, participatory nature of the pedagogy, instructors work to bring students into a "community of practice" (Shreeve et al., 2010, p. 128). A core element of the community of practice approach is that instructors create a classroom environment where students and instructor are peers, and attempt to avoid a traditional classroom dynamic where the teacher is an authority figure (Dannels, 2005; Goldschmidt et al., 2010; Salazar, 2013; Vanada, 2016).

Lave and Wenger (1991) associate communities of practice with *apprenticeship* settings. In apprenticeship settings, the more experienced and less experienced members of the community participate jointly in situated practices (Rogoff, 1990). Although the instructor and students are peers, working together, they all realize that the instructor is a more experienced peer whose goal is to help and guide students. Students want instructors to offer assistance and enthusiasm, to understand the problem from the student's perspective, to accept the student's ideas, and to help develop their ideas (Svensson & Edström, 2011, pp. 11–12; Webster, 2004, p. 109).

Studies of apprenticeship demonstrate the importance of an instructor modeling a desired behavior for the learners; several of these studies found modeling in studio pedagogy. At the younger ages, instructors model how to perform a technical skill, so that students can replicate it (Cox, Cooke, & Griffin, 1995). In higher education, rather than modeling a technical skill, instructors are more likely to model how to perform a role as a professional creative (Budge, 2016)—for example, "how to think and work like an architect" (Murphy, 2012, p. 553), including learning to communicate about one's work; to respond to feedback and alter one's practice; to cope with pressure; and to sustain career momentum through a career.

Theme 4. The pedagogies of professional creatives

4 papers

In secondary education, there is some evidence that instructors who are professional, practicing artists teach differently than arts educators who are not practicing artists. The artist/teachers were more likely to use a studio approach, with a focus on generating art, than educators who were not artists. The latter were more likely to engage students in talking about art—art criticism, the history of art, and art's place in society (Bachar & Glaubman, 2006; *also see*; Efland, 1990). Graham and Zwirn (2010) found that very few secondary arts educators are practicing artists. Perhaps as a result, their classes are less likely to use studio pedagogy, and this may be why only 18 of the 65 articles focus on K-12 studio pedagogy.

In higher education, in contrast, almost all of the instructors are professional artists or designers, and their pedagogy is aligned with studio practice among professionals (Goldschmidt et al., 2010). Their personal identity is closely aligned with their role as professional creatives; they tend not to think of themselves as educators first (Shreeve et al., 2010). No studies identified different pedagogies among HE instructors.

Theme 5. The tension between open-ended assignments and the need for structure

11 papers

Eleven articles discussed the tension between the importance of open-ended assignments to foster creativity, and the contrasting need for structure to effectively guide the learning process. Students have difficulty when the studio pedagogy is completely open-ended; they don't know how to solve ill-defined problems (Chen, 2016), and they become confused (Cornock, 1984). The more creative and conceptual assignments are the most challenging for students (Chen, 2016). Osmond and Tovey (2015) found that some students chose to leave the program because it did not have enough structure for them; they "struggled to be creative" (p. 54). Instructors expect students "to experiment and explore" and yet, "This creates a culture of ambiguity in the learning environment and is something students have to learn to negotiate" (Shreeve et al., 2010, p. 130). "This free character also makes great demand on the students" (Svensson & Edström, 2011, p. 24) and they don't always get the instructor support they need. In the face of open-ended assignments, some studies found that students ask for more structure (Cornock, 1984; James, 1996).

And yet, other studies found that many students were able to overcome the initial challenges of an open-ended curriculum, and were eventually able to thrive (e.g., Osmond & Tovey, 2015). Svensson and Edström (2011) found that although some students need more structure, others prefer less. These apparently contradictory findings represent a more general tension inherent in constructivist pedagogies. Sawyer (2011) referred to this as *the teaching paradox*—the difficulty fostering creative learning through open-ended, constructivist methods, while at the same time providing the appropriate level of structure and scaffolding. This emergent theme indicates that the teaching paradox is commonly faced by art and design instructors.

Many studies explored how this tension is addressed. James (1996) observed that the instructor was "non-directive" and yet "carefully structured," in an attempt to resolve the teaching paradox. Lee (2009) identified projects that balanced the tension in three different ways, from relatively unstructured to a high degree of structure. Osmond and Tovey (2015) found that adding more constraints and scaffolding resulted in increased experimentation as well as increased confidence in students. Adams and Forin (2016) observed that instructors are "walking a line between driving students in a particular direction and encouraging students to act independently (p. 61). The majority of studies found that instructors successfully accomplished their goal of avoiding an authoritarian style. Oak (2012) found that although the overall process is guided by the instructor, it is still collaborative, and the instructor is not overly authoritative.

Some instructors find it difficult to balance an open-ended approach with the need for some degree of structure. Goldschmidt et al. (2010) found that instructors engage in a range of behaviors, with assertiveness and domination varying across instructors, and concluded that "coaching seems to be the most fruitful strategy" and yet, "a tamed demonstration of authority and expertise seems to be of value" (p. 33). Managing this balance is difficult for instructors; some students perceive their instructors to be authoritarian. Webster (2004) called this an "overlord" style (p. 108), and interviewed some students who said their instructors were "excessively coercive" (p. 110). Morton (2012) found that some studio interactions were hierarchical.

But many students value interactions where the instructor provides advice and provides expert feedback and guidance. Overall, these articles find that students understand that there is a need for both open-endedness and structure, and most are happy with how the balance was addressed. In Salazar (2014), 90 students completed a survey, and overall they preferred an open-ended approach. Orr, Yorke, and Blair (2014) found that students rejected an instructionist pedagogy, instead preferring to share responsibility for learning with their instructor. The majority of studies report that students prefer a constructivist approach, and they are happy with how their instructors balance structure and freedom (Blaikie, Schönau, & Steers, 2004; Salazar, 2014; Soini-Salomaa, 2012).

4.2. Learning outcomes

21 papers

There are four themes in cluster 2:

- Theme 6. The creative process of making
- Theme 7. The tension between technical skills and creativity
- Theme 8. Non-academic personality outcomes
- Theme 9. Student confusion about the learning outcomes

Theme 6. The creative process of making

11 papers

The creative process is the primary learning outcome in both art education (Cornock, 1984; Edström, 2008; Graham & Zwirn, 2010; Hafeli et al., 2005; Salazar, 2013) and design education (Chen, 2016; Dannels, 2005; Lee, 2009; McDonnell, 2016; Orr & Bloxham, 2012; Shreeve et al., 2010). Instructor interviews and studio observations found that instructors focus "on the process as well as the finished artefact" (Shreeve et al., 2010, p. 133; also; Lee, 2009; Salazar, 2013).

Students prefer that instructors focus on process rather than on the final work, particularly when they are experimenting and taking risks that do not immediately lead to a completed product (Cornock, 1984). When instructors are focused on the quality of the final product, they often neglect students whose work is incomplete and who are still engaged in the work process. Because the process is an important learning outcome, "attention should shift away from the student's products" (Cornock, 1984, pp. 145–146) and toward the student's developing process.

A successful path through the creative process requires students to reflect on and articulate their process. Students' intentions should be clear in the work, and students should be articulate about the meaning. Instructors ask students to "Explain process, not just the product" (Dannels, 2005, p. 149). Instructors evaluate students on their ability "to tell a story about the arc of learning. One might describe this as the narrative of the learning" (Orr & Bloxham, 2012, p. 241). In a study of an MFA program (Edström, 2008), students were observed to become better at self regulation, and better at critically reflecting on their art. Students gradually attain this learning outcome when the instructor "moves fluidly beyond direct critique of any particular design to encourage students to step back, to reflect on their designs" (McDonnell, 2016, p. 12).

Ten of the 12 studies coded as theme 6 are studies of higher education settings, suggesting that K-12 arts education focuses primarily on learning outcomes other than the creative process. This is consistent with a questionnaire study of K-12 teachers by Seidel, Tishman, Winner, Hetland, and Palmer (2009), which found that making and creating art was only one of many intended learning outcomes.

Theme 7. The tension between technical skills and creativity

2 papers

The two studies that addressed this tension were both of K-12 education. This reflects the findings in theme 6: HE instructors are more likely than K-12 instructors to focus on the creative process. In K-12 studio classes, students learn discipline-specific skills and techniques, but they also engage in a creative process of making. As a result, there is a tension between the need for students to acquire technical skills, and at the same time, to master higher-level abilities such as creativity.

Hafeli et al. (2005) found an emphasis on technical skills as a desired learning outcome in middle school; Ronkko, Mommo, & Aerila (2016) identified two types of secondary teachers, some that emphasized technique and others that emphasized the ability to design. Those teachers who were technique oriented believed that asking students to create and design was unnecessary, and that it distracted students from the need to acquire craft techniques.

Theme 8. Non-cognitive and personality outcomes

6 papers

A study was coded as theme 8 if it concerned general abilities as learning outcomes, not specific to art or design. These include the ability to work independently (Logan, 2013), persistence and confidence (Burton, Horowitz, & Abeles, 2000), learning to express oneself (Hafeli et al., 2005), and developing as individuals (Shreeve et al., 2010). For example, Lam and Kember (2004) found that secondary teachers wanted students to learn "expression and therapy through art" (p. 252). These learning outcomes are intended to transfer to other subject areas, or to life outside of school. Burton et al. (2000) found evidence of transfer: students who took art education classes scored higher on these abilities than those who did not.

Instructors help students develop their own personal identity (Hafeli et al, 2005; Logan, 2013; Patton, 2013; Reid & Solomonides, 2007). Reid and Solomonides (2007) found that for HE students, their creativity was closely related to their own self image and identity. For example, a game concepts class (Patton, 2013) helped students connect their personal world to the games, and these connections helped students understand basic game design concepts.

Theme 9. Student confusion about the learning outcomes

5 papers

Many students have trouble figuring out what they are supposed to learn. Instructors believe that their interactions with students help the students to learn how to manage conversations about their work, and to articulate how their design evolved and their intent behind the work. However, these intended learning outcomes are rarely stated or taught explicitly; they are

communicated implicitly, often through the flow of the critique encounter. As a result, students have trouble understanding what they are supposed to learn (Dannels, Gaffney, & Martin, 2008; El-Amri, 2011).

Salazar (2013) identified a contrast between what HE instructors intended students to learn and what students thought they should be learning. Instructors said that they wanted students to learn higher-level abilities such as critical thinking and exploration; students thought that technical skills were the focus of the class (p. 255). Also in HE, Lee and Lee (2015) found the opposite: Students thought their pedagogy was focused on higher-level learning outcomes. This confusion is aligned with theme 5: students have trouble solving ill-defined problems; they have different opinions whether the pedagogy is open-ended or not; and they perceive a tension between higher-level outcomes and technical outcomes.

4.3. Assessment

9 papers

There are two themes related to assessment in studio classes.

Theme 10. Assessment through feedback and critique

6 papers

Six articles focused on the formative assessment observed in classroom interactions between an instructor and a student, sometimes referred to as *critique* (see Dannels, 2005). Rather than a formal evaluation resulting in a course grade, these interactions are designed with a pedagogical intent; the instructor guides students along their own path. These findings are consistent with those reported in de la Harpe et al. (2009), a literature review of assessment in HE studio pedagogy. Using a comprehensive keyword search, they identified 118 articles on assessment practices in art, design, or architecture. They found that "While most educators acknowledge that a core component of creative practice is the product (object or event) of creative thinking, many are also proposing that the process of developing or making (including art and design thinking) is an equally valued outcome of art and design education" (p. 39).

Many students consider critiques to be stressful, competitive, and unsafe (Dannels, 2011). A critique conversation is more stressful when assessment criteria are not articulated explicitly, when they are "metaphorical and allusive" (Logan, 2007, p. 15; also see theme 9). Because the critique is an environment of disclosure (Dannels, 2011, pp. 104–105), it is stressful but can also exciting. Students want feedback to be relevant to their design; suggestive of where they might go next; considerate; not to critique them personally; and helpful to their ongoing creative process.

Two studies examined the high-stakes summative assessment format known as a *jury critique*—when a panel of outside experts visit the class, and students give formal presentations on their work. Students said that the jury critique was valuable, and yet that it was stressful (Webster, 2006). Some students had very bad experiences, saying that the experience was "a public humiliation" (p. 15). Salama and El-Attar (2010) interviewed students who said that they didn't learn from the critique; they viewed it as stressful, competitive, and evaluative. They experience defensiveness; hostility; anxiety; fear of failure; emotional tension; frustration; embarrassment; and humiliation. But even so, Webster (2006) found that the majority of students received comments that were "encouraging and supportive" (p. 16) and found the jury critique to be "profoundly stimulating" (p. 17). Most students think that critiques are collaborative and supportive (Logan, 2007).

Theme 11. Use of rubrics

2 papers

A *rubric* is a list of criteria that a student work and/or process is expected to meet, with performance on each criterion being numerically ranked, for example from one to five, with the final grade determined by summing the scores on all of the criteria.

Instructors have complex feelings about rubrics; they can be useful in demonstrating objectivity, but they don't capture the richness of a student's work (Orr, 2010). They prefer to assess in a team with other instructors rather than alone; they think that makes assessment less subjective. Hafeli et al. (2005) found that in middle school, instructors used rubrics as well as critique sessions, allowing them to blend the structure of a rubric with the open-ended and conversational nature of the critique (p. 251).

5. Discussion

My research question is: What pedagogical practices are found in art and design studio classes? My meta study of 65 peer-reviewed journal articles identified eleven themes grouped into three clusters. The primary finding is that studio pedagogy is constructivist, active, hands-on, and participatory. Studio pedagogy is designed to help students learn how to engage in a creative process, and assessment is primarily formative feedback during the process of learning, rather than summative evaluation of the final work. The instructor creates an open-ended environment, where students are encouraged to make decisions, experiment, take risks, and occasionally to fail. Students have difficulty learning in a completely unstructured environment. Instructors realize this, so they guide student learning by providing scaffolding and structure.

A broader goal of the study was to explore how pedagogy in all subjects might be modified to lead to creative learning outcomes. These eleven themes are closely related to the creative learning outcomes that should be fostered in all subjects (as proposed by: NACCCE, 1999; QCA, 2005): questioning and challenging; envisaging what might be; exploring ideas and

keeping options open; and reflecting critically on ideas, actions, and outcomes. Many of the eleven emergent themes, particularly the five themes in the pedagogical practices cluster, seem to be adaptable to non-arts subjects. And yet, this review shows that there is no easy path to creative teaching and learning. There are several challenges associated with studio pedagogy, and these are likely to be faced by instructors in other subjects as they modify their pedagogy to lead to creative learning outcomes. Familiarity with these challenges can be helpful to educators in non-arts subjects who wish to transform their curriculum and pedagogy so that students learn the subject matter in ways that support creativity.

The first challenge is managing *the teaching paradox* faced by instructors: the need to provide an open-ended and exploratory environment for learners, while at the same time providing guidance and structure (Sawyer, 2011). Several of these studies observed instructors who effectively resolved this tension, but to do so, they had to constantly manage the balance between improvisation and structure. Some studies observed classrooms in which the balance fell too far toward structure, thus preventing students from engaging in a decision making, experimental creative process. Other studies observed classes where the instructor did not provide enough structure, causing students to feel confused and frustrated, and to fail to attain the desired learning outcomes.

A second challenge facing studio pedagogy is that students are often confused by it—whether about the reasons it's being used, or the intended learning outcomes, or how they will be assessed. In studio classrooms, students engage in an open-ended process, and they are expected to experiment and occasionally to fail. To foster experimentation through an open-ended process, ambiguity is necessary—otherwise the students would not engage in an authentic creative process. Thus some degree of student confusion may be a necessary part of the studio experience. But for this ambiguity and confusion to be effective, rather than simply frustrating to students, instructors must create a safe environment where students are not punished for failure.

A third challenge is the balance between higher-level abilities, such as creativity, and the lower-level technical skills associated with each discipline (e.g., sculpture, architecture, graphic design, painting, etc.). This review found that studio classes emphasize higher-level abilities; only two studies examined how art and design pedagogy leads to mastery of technical skill. These higher-level outcomes are often left unstated and implicit, and as a result, students often are not certain what the intended learning outcomes are, or how they will be assessed.

This meta study does not provide clear answers for how to resolve these challenges. Perhaps these challenges result from the nature of the creative process, and cannot be completely avoided without losing the potential for students to learn creativity. If so, then transforming pedagogies in other subjects, so that they foster creative learning outcomes, is likely to result in similar challenges for both instructors and students. These findings demonstrate the challenges that are likely to arise when pedagogies are transformed to lead to creative learning outcomes.

6. Limitations

Literature reviews are typically limited by publication bias: journals only publish research that shows positive effects or statistically significant effects, and negative findings are not published. However, this is primarily a problem facing quantitative experimental designs. Publication bias is likely to play a minimal role in this review, because almost 80% of the studies included are qualitative, and qualitative methodologies are not based in hypothesis testing and measures of statistical significance.

A second limitation is the low methodological rigor of many of the qualitative studies. Approximately half of the qualitative studies (27 of 55) were Level 1, the lowest level of rigor. Only 14 of the 55 qualitative studies attained rigor level 3 or 4. This may warrant caution regarding the validity of the themes that emerged from the grounded theory analysis.

A third limitation is that books are not included. It is standard practice to omit books from systematic literature reviews, and to include only peer-reviewed journal articles (as is common for reviews published in *Educational Research Review*). And yet, there are several books that address art and design education—many of them read by educators themselves. Although many of these books provide helpful insights about studio pedagogy, almost none are rigorous empirical studies. In the only book-length empirical study I am aware of, Hetland, Winner, Veenema, and Sheridan (2007) used the highest level of qualitative rigor, level 4. The findings reported in this book are aligned with the eleven themes that have emerged from this meta study. However, their study was limited to K-12 education, omitting HE education; and it was limited to arts education, omitting design education.

A fourth limitation is that I included only visual art and design. Other creative disciplines, such as writing and music, may use pedagogical methods that are different from the visual arts reviewed here. Some non-arts disciplines are beginning to use studio approaches, for example engineering (e.g., Adams & Siddiqui, 2015), and these were also excluded. Studies of pedagogy in other creative disciplines might provide additional insight into creative teaching and learning.

7. Recommendations for future research

These findings suggest a number of potential research studies.

- Future qualitative studies should strive for higher levels of rigor. Only 14 of the 55 qualitative studies attained the highest levels of rigor, level 3 or 4. For additional rigor, future qualitative studies should use a systematic coding methodology;

document the steps of the procedure used; use multiple coders for reliability; and validate the emergent themes using member checking.

- Only five articles present transcribed excerpts of studio interaction (Dannels et al., 2008; Goldschmidt et al., 2010; Logan, 2007; Murphy, 2012; Oak, 2012). Most studies were based on interviews with instructors or students. Additional analyses of studio transcripts would help to clarify the implicit and unstated aspects of studio pedagogy.
- Several of the studies described the importance of constraints that guide the open-ended learning process. Yet none of the studies described class assignments and their constraints; analyzed the logic of how and why these constraints were selected; or analyzed how assignment design is motivated by the intended learning outcomes. Analysis of these project assignments and constraints could provide additional insight into how these professors address the tension between open-endedness and structure.

8. Summary

Using a grounded theory methodology, this meta study identified the broad outlines of studio pedagogy. I began by using exhaustive keyword searches of a wide range of databases, resulting in 2993 articles. This was followed by a content analysis using the inclusion criteria, which resulted in 65 empirical studies of studio pedagogy, in both art and design, and at both the K-12 and higher education levels. I analyzed these 65 articles using a constant comparative methodology, which resulted in 11 emergent themes in three clusters: pedagogical practice, learning outcomes, and assessment. None of the 65 articles reported findings contrary to any of the 11 themes. Specifically, I did not find any studies that observed the use of instructionist pedagogical practices, such as lectures, readings, worksheets, or paper-based tests. This is consistent with prior research demonstrating that instructionism does not lead to creative learning outcomes (OECD, 2008; Sawyer, 2015).

The descriptive quantitative statistics reveal that these themes are found at both K-12 and HE educational levels, in both art and design, and in all countries and regions studied. This suggests that the studio pedagogy documented here is a nearly universal approach to creative teaching and learning. The majority of the articles, 45 of 65, studied HE. The majority of HE studies focus on design (30 of 45) and the majority of K-12 studies focused on art (13 of 18). This indicates that although art and design studio classes are studied at both levels, art education is the primary focus among K-12 researchers, and design education is the primary focus of HE researchers. The number of articles per year that study studio pedagogy has increased dramatically since 2001, with the majority of that growth being in design education.

Studio pedagogy is designed to result in mastery of the creative process. Studio pedagogy is constructivist, open ended, and student centered. The flow of a classroom session is flexible and improvised. Students are encouraged to experiment and take risks. Instructors do not grade students only by assessing their final work, but also by evaluating their ability to engage in the creative process. Instructors attempt to avoid acting as an authority figure; instead, they work to create a community of practice where instructor and students are peers.

The eleven themes identified in this review—the pedagogical practices, learning outcomes, and assessment methods—may be generalizable to non-arts subjects, when the goal is to educate for creativity. Studio pedagogy can serve as a model for teaching and learning in all school subjects, when educators wish for students to learn the material in ways that prepare them to build on that knowledge and create new knowledge—the key to a creative society in an age of innovation.

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