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Collaboration, Dialogue, and Creativity as Instructional Strategies for Accredited Architectural Education Programs: A Mixed Methods Exploratory Investigation

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Abstract

The new National Architectural Accreditation Board (NAAB) 2022 accreditation requirements call for a redesign of accredited architectural education from solitary projects to collaborative group creative production. This mixed methods study conducted at the Massachusetts Institute of Technology School of Architecture and Planning (MITSAP) blended cross-sectional statistical analysis applied to quantitative data from the Reisman Diagnostic Creativity Assessment (RDCA) for creative assessment and self-efficacy, with grounded theory and axial coding matching the 11 creativity factors of the RDCA to qualitative semi-structured interviews. Both methods consisted of the same sample (n=20): architecture professors, and graduate MITSAP students to study perceptions on collaboration, dialogue, and creativity in architectural education.

Aim

The purpose of this study was to explore how the new NAAB accreditation requirements should be implemented, based on the perceptions of architecture professors and graduate students regarding collaboration, dialogue, and creativity in architectural design education.

Problem/Issue

The National Architectural Accreditation Board began requiring instruction in "Leadership and Collaboration" as a Program Criteria for accredited architectural degree (NCARB, 2020) programs in 2022, but did not provide specific guidance in how to meet the new requirements. Further, there has been only one dissertation on collaboration instruction within architectural education (McPeek, 2009) addressing the gap in scholarship on collaboration training in architecture degree programs. Furthermore, the growing innovation economy is placing pressure on architectural education to prepare students for the realities of professional architectural practice that is now almost entirely digital and collaborative. Hence, multidisciplinary approaches in design education are needed now more than ever (Mattessich et al., 2001) to encourage creativity and support innovation. Although resistance to collaborative design based on myths and misunderstandings in architectural education is a lingering problem (Rodriguez et al., 2018), scholars have shown that the profession of architecture must become increasingly collaborative to keep pace with the advancing innovation economy. Thus, the need to better understand collaborative design, dialogue, and creativity for accredited architectural education programs is significant, and urgent to meet the demands of contemporary architectural practice that is increasingly multidisciplinary.

Research Questions
1. How do architecture professors and graduate architecture students perceive "collaboration" in architectural design education?
2. How do architecture professors and graduate architecture students perceive "dialogue" in architectural design education?
3. How do architecture professors and graduate architecture students perceive "creativity" in architectural design education?

4. What are the self-perceptions of architecture professors and graduate architecture students of their "creative strengths" as measured by the RDCA?

Conceptual Framework
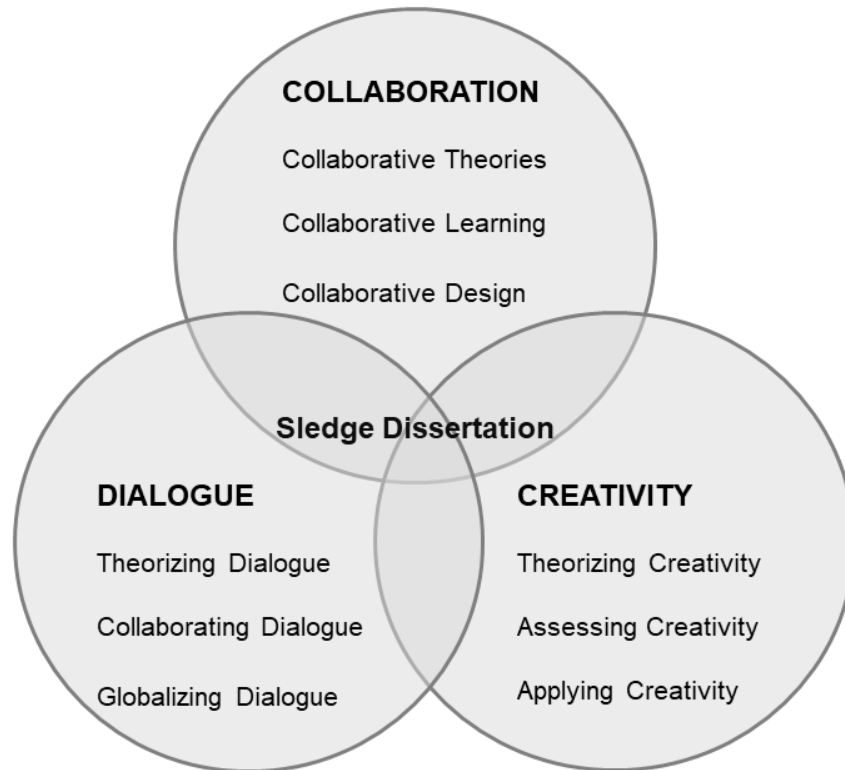
Research Findings

Seeking to generate theory for phenomena where none previously existed, grounded theory guided a research design that relied upon recursive data analysis from semi-structured interviews and creativity self-assessments in a mixed methods study. Scholars of qualitative research designs, Bloomberg and Volpe (2016) state, "Grounded theory is most appropriately employed in studies where little is known about a phenomenon of interest. The purpose of grounded theory is to inductively generate theory that is grounded in, or emerges from, the data" (p. 49). To allow the formation of theory grounded in empirical data, this study tapped 20 participants representing a theoretical sampling of architecture faculty and graduate architecture students at accredited architecture programs.

A mixed methods approach examined how architecture professors and students perceived collaborative design instruction in accredited architecture programs. The researcher utilized grounded theory methodology to (a) generate hypotheses where none existed previously (b) provide qualitative data that is richly descriptive with quotes to convey how architecture professors and graduate architecture students perceive collaborative design instruction, and (c) complement the analysis of the quantitative evidence on the self-perceptions of creativity from the RDCA. Both qualitative and quantitative data were needed to fully understand and build a substantive-level theory centered on collaborative design instruction in architectural education. The rationale of this mixed methods study aligned with the researcher's intentions for "…theory

developed by the researcher is articulated toward the end of the study, and this theory hopefully has explanatory power to make a significant contribution in terms of knowledge building and potential practical application" (Bloomberg & Volpe, 2016, p. 50).

*Convergent Mixed Methods Data Processing Diagram*
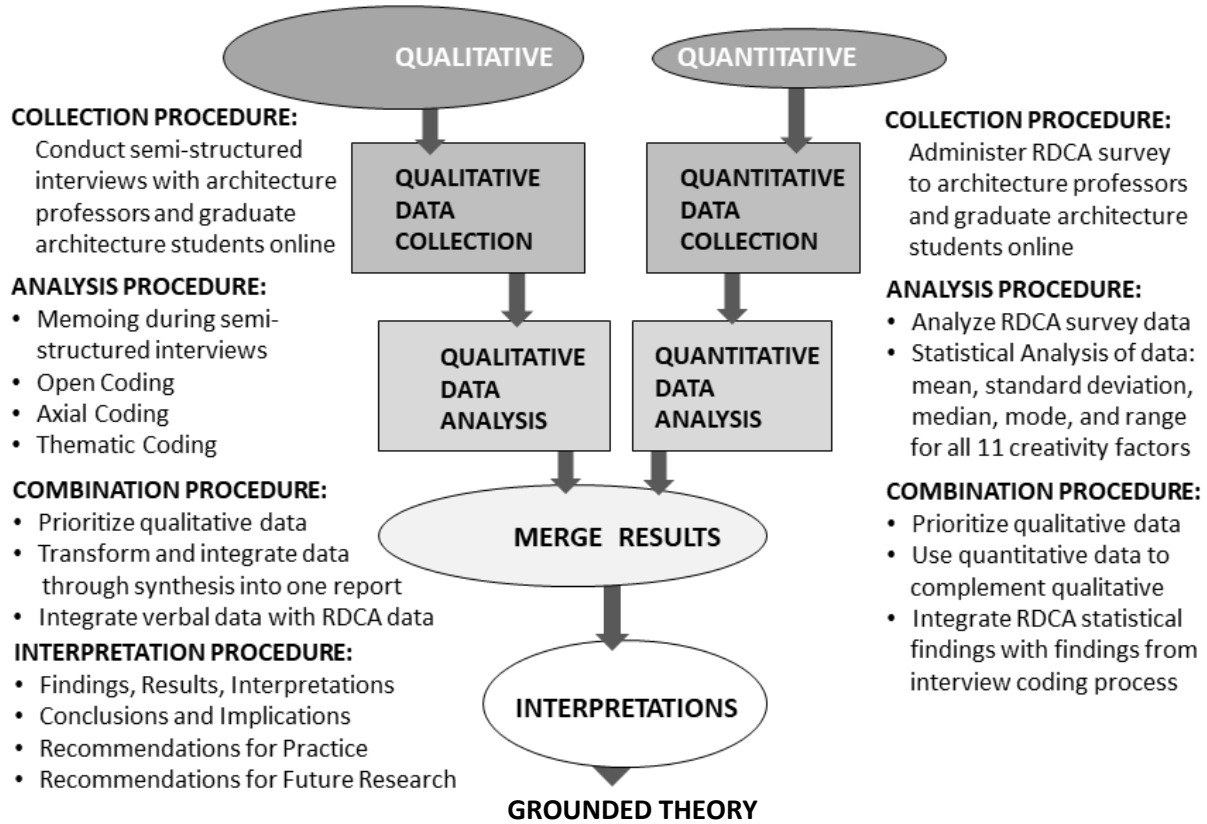
Note. Participants provided qualitative and quantitative data to the researcher concurrently and only online per Drexel University guidelines for Human Subjects Research during the COVID19 Pandemic of 2020-2021. Concurrent data collection and analysis "involving multiple recurrent stages of data collection and the refinement of abstract categories of information" and the "constant comparative method of data analysis" (Bloomberg & Volpe, 2016, p. 50) helped discover grounded theory this study.

*Mixed-Methods Research Question Data Collection and Analysis Matrix.*

Research Questions	Design	Data Collection Methods	Data Analysis
Research question 1: How do graduate design students and professors describe how *dialogue* could enhance communication, understanding, innovation, and *collaboration* in higher education?	**Qualitative data** Provides descriptive and interpretive information from interviews with professors and graduate students	Semi-structured, individual interviews with professors and students Data recorded/transcribed with *REV.COM*- a voice to text online data analysis software	*NVivo* software program for coding data includes: - In Vivo - Process - Initial - Focused - Axial - Theoretical *Memoing:* notetaking
Research question 2: How do graduate design students and professors	**Qualitative data** Provides descriptive and interpretive	Semi-structured, individual interviews with professors and students	*NVivo* software program for coding data includes: In Vivo

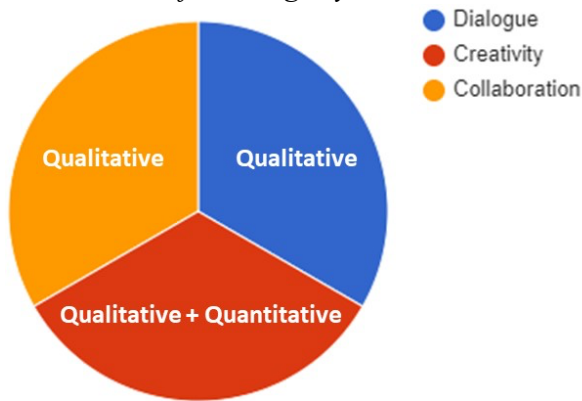|			
describe how *collaboration* could enhance innovation and *creativity* in higher education?	information from interviews with professors and graduate students	Data recorded/transcribed with *REV.COM*- a voice to text online data analysis software	• Process • Initial • Focused • Axial • Theoretical *Memoing:* notetaking
Research question 3: What are the self-perceptions of graduate design students and professors of their individual *creative* strengths, as measured by the RDCA in higher education?	**Quantitative data** Reisman Diagnostic Creativity Assessment (RDCA) is the Creativity Self-Assessment (CSA) used to provide scores for the sample. The RDCA provides nominal data based on factors validated to correlate to creative ability and potential, as perceived by the test-taker.	All participants tested on 11 aspects of creative thinking based on self-perceptions via the RDCA The RDCA online program collects data by posing a series of questions and uses the answers to generate a creativity profile. Profiles presented as raw numerical scores and percentages of total.	Quantitative Software for descriptive statistics- *Excel* for RDCA scores: • Frequencies • Means • Standard Deviations • Exclusive Range • Likert-type profile and numerical assessment in 11 categories
Research question 4: What are the self-perceptions of graduate design students and professors of their individual *creative* strengths, as measured by the RDCA in higher education?	**Quantitative data** Reisman Diagnostic Creativity Assessment (RDCA) is the Creativity Self-Assessment (CSA) used to provide scores for the sample. The RDCA provides nominal data based on factors validated to correlate to creative ability and potential, as perceived by the test-taker.	All participants tested on 11 aspects of creative thinking based on self-perceptions via the RDCA The RDCA online program collects data by posing a series of questions and uses the answers to generate a creativity profile. Profiles are presented as raw numerical scores and percentages of total score.	Quantitative Software for descriptive statistics- *Excel* for RDCA scores: • Frequencies • Means • Standard Deviations • Exclusive Range • Likert-type profile and numerical assessment in 11 categories

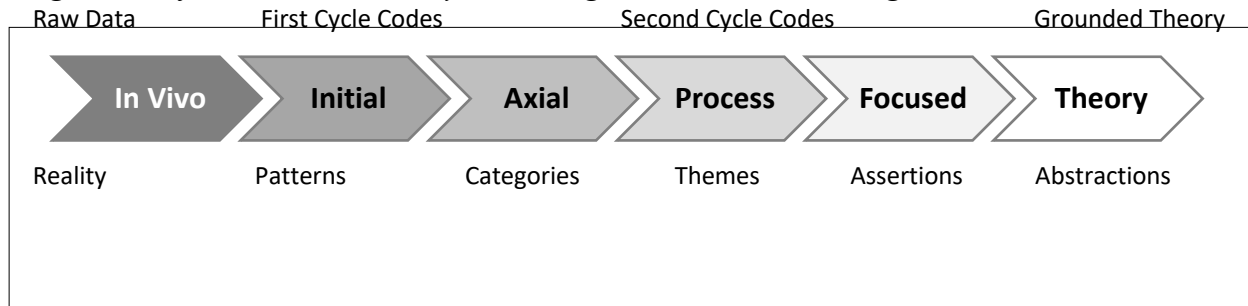*Distribution of Participants by Gender*
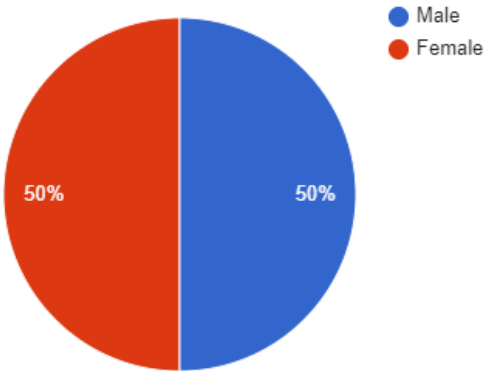
Figure 4.2
Distribution of Participants by Ethnicity
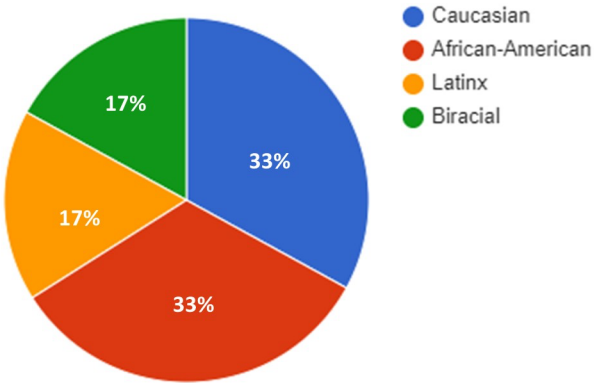
Figure 4.3
Distribution of Findings by Research Method

Progression of First and Second Cycle Coding Process with Memoing

Raw Data	First Cycle Codes		Second Cycle Codes		Grounded Theory
In Vivo	Initial	Axial	Process	Focused	Theory
Reality	Patterns	Categories	Themes	Assertions	Abstractions

Research Findings

This study explored the perceptions of architecture faculty and graduate architecture students on three aspects of contemporary architectural education: collaboration strategies, dialogue instruction, and creativity studies. The goal of the study was two-fold: first, investigate how the NAAB accredited architecture program requirement for instruction in collaboration could be conceived as part of a holistic curriculum, and second, explore how architectural education could be reconceived to meet the changing demands of the emerging innovation economy. To fully understand these interrelated topics, a mixed methods research design combined coding analysis of qualitative semi-structured individual interviews, with descriptive

statistical analysis of quantitative data from the RDCA. A literature review also considered the same three topics as the conceptual framework for this study. A theoretical sample having the prerequisite education and lived experience to contribute knowledge on contemporary architectural education helped the researcher achieve data saturation. A substantive-level theory grounded in the data and findings of this study emerged: "Collaboration Strategies" should be linked to "Dialogue Instruction" and "Creativity Studies" as one curricular unit to reconceive architectural education holistically for the emerging innovation economy.
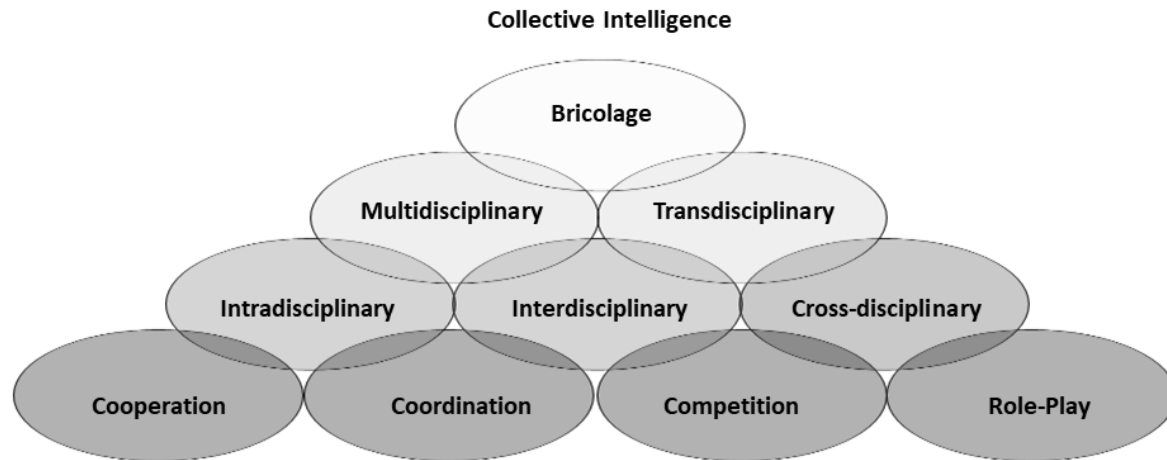
Relatedly, improved communication, transparency, equity, and peer-to-peer learning were repeatedly mentioned as integral components in need of change in architectural education. Participants expressed awareness of social, cultural, and racial issues affecting architectural education, and common misperceptions about collaborative design in architecture school and professional practice. "Creativity" was described as a defining aspect of architectural education, "dialogue" as necessary for teamwork, and "collaboration" as the reality of professional practice. The qualitative and quantitative findings of this research facilitated a deeper understanding of collaboration, dialogue, and creativity: three important topics germane to architectural education and professional architectural practice.

Collaboration Findings

Architecture professors and graduate architecture students perceived collaboration in architectural education as working relationships centered around varying degrees of formality. Collaboration was perceived to be necessary for successfully completing group tasks such as building class site models and compiling class research documents. These task-oriented applications of collaboration were seen as the base level of instruction, but other uses were mentioned, such as, exploring emerging issues in architecture, documenting a spectrum of interrelated topics within a subject, helping students generate more design ideas, producing more robust class discussion, managing complex projects, preparing for practice through "Role-Play," and complying with the NAAB requirements as well.

Participants described how collaboration strategies can foster peer-to-peer learning in architectural design education. Students described how collaboration helped them learn more from classmates within their cohort, and from others above and below them in matriculation. Professors echoed the benefits of collaboration raised by students and spoke at length advocating more collaboration among educators to enhance research and mentoring. Senior and junior professors critiqued how the structure of tenure and promotions in academia discourages open collaboration and collegiality among faculty by encouraging each individual to "claim credit" for as much work as possible, and trickles-down to students who resist collaborating in architecture design studios for individual credit and grades. Participants communicated that there is a lack of training among professors and students on how to teach and evaluate collaborative design work fairly, and how to best use collaboration to activate creativity for improved architectural designs. Instruction in collaboration tailored for architectural design education was perceived as lacking.
Hierarchy of Collaboration Strategies for Architectural Education

Collective Intelligence

Bricolage

Multidisciplinary — Transdisciplinary

Intradisciplinary — Interdisciplinary — Cross-disciplinary

Cooperation — Coordination — Competition — Role-Play

Dialogue Findings

Architecture professors and graduate architecture students perceived dialogue as a type of discussion that aids education in four important ways: (a) shared knowledge, (b) shared understanding, (c) shared exploration of broad topics, and (d) collaboration. Participants primarily described dialogue most often with the words "open" and "conversation" to convey a "sharing" knowledge both within and across disciplines. In this conception, dialogue was perceived as a running conversation spanning across related industries to construct knowledge. Yet, participants did not mention the "art of listening" and dialogue was not communicated as co-inquiry, co-creation, or collective intelligence, but as purposeful teamwork. Participants conveyed how dialogue can play a role in "collaborating to learn and learning to collaborate," foster peer-to-peer learning, achieve reality-based education, and activate learning in architectural education.

Creativity Findings

Architecture professors and graduate architecture students perceived creativity as the bedrock of architectural education and the impetus for entering architecture school. The desire to express "limitless creativity" by designing distinct, original buildings was discussed. Of the attributes associated with creativity, "originality" was most highly regarded. But the presumption of unbounded freedom of expression in architectural education has created challenges that remain difficult to overcome, such as, the difficulty of evaluating original designs coupled with students' demands for more overall transparency and accountability. The more original the students' creations are (never seen before, breaks rules, unconventional), the more architecture professors viewed evaluating students' original designs as problematic.

Further, professors said evaluating students' creative work is inherently problematic, ineffective, and sometimes a futile undertaking. Both professors and students stated that grades are often irrelevant when evaluating creative work and that what really matters is how feedback is given to contribute to the flow of educational experience. Applying a number or letter grade in evaluating design students is difficult and sometimes useless. An instructive narrative that evaluates the work from agreed upon expectations, a rubric of sorts, may be a better solution.

Grading creative work was judged to be a conundrum in architectural education. On the one hand, professors and graduate students extolled the efficacy of their architecture education, their individual creative ability, their creative self-efficacy, and their narrative of exceptional creative expression. On the other hand, professors and students recognized the need for more

objectivity, transparency, accountability, and standardization to equitably grade creative work. These two aims need not be mutually exclusive according to architecture professors, especially when objective criteria are communicated before the creative design process begins.

Participants perceived "Flexibility" -the ability to generate many different categories of novel ideas, elaborate on ideas when speaking, evaluate viable solutions and then select the best option, as their least-strong creativity ability. Additionally, participants did not express awareness of how each creativity attribute can be individually targeted. Nonetheless, professors and architecture students perceived their creative strengths with great regard, suggesting their creative self-efficacy, or belief in one's creative ability, is "very high" overall.

Comparison of Quantitative and Qualitative Findings on Creativity Factors

| Creativity factors ranked by scores on the RDCA as percentage of total		Axial codes ranked by occurrence spoken when describing creativity
1. Fluency	Highest	1. Originality
2. Convergent Thinking		2. Resistance to Premature Closure
3. Risk Taking		3. Tolerance of Ambiguity
4. Extrinsic Motivation		4. Elaboration
5. Resistance to Premature Closure		5. Fluency
6. Divergent Thinking		6. Convergent Thinking
7. Originality		7. Intrinsic Motivation
8. Intrinsic Motivation		8. Divergent Thinking
9. Elaboration		9. Risk Taking
10. Tolerance of Ambiguity		10. Extrinsic Motivation
11. Flexibility	Lowest	11. Flexibility

Note. Quantitative data and qualitative data align on only one creativity factor: "Flexibility," indicating it is the least developed and the least understood/valued attribute correlated to creativity for this sample.

Conclusion/Discussion

The research findings revealed that the current system of evaluating and grading creative design work in architectural education is inadequate and out of touch. Although there was no recent data on the efficacy of learning in collaborative teams rather than in solitary design projects, this study concludes that collaboration produces better design projects in architecture school and more closely matches contemporary professional practice. Architectural education should go beyond simply meeting the NAAB 2022 Program Criteria requirements for accreditation to reconceive architectural design education holistically (NCARB, 2020). The profession of architecture is a multidisciplinary enterprise, as recognized by the new NAAB Program Criteria requirement for Leadership and Collaboration training. Although architectural practice is diverse, there are research gaps on how creative collaboration works among diverse students (ethnicity, gender, and orientation) in architectural education. Finally, can architectural education determine whether "creatively collaborating to learn" in school, is analogous to "learning to creatively collaborate" in the real world? The findings of this research recommend that Collaboration Strategies, Dialogue Instruction, and Creativity Studies become a curricular unit in architecture programs to prepare students for success in the innovation economy.
Conceptual Framework: Collaborative Architectural Education Curriculum
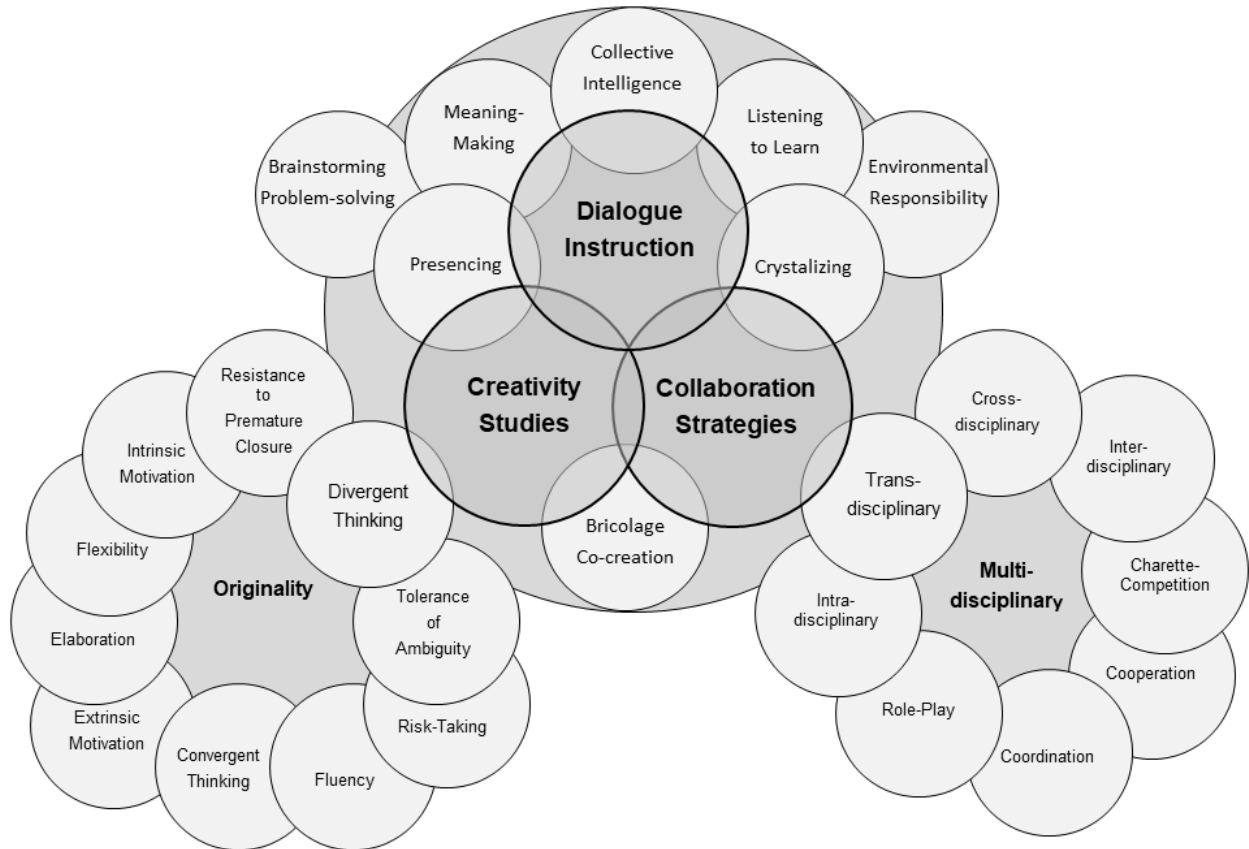
Grounded Theory: Building Curricula for Collaborative Architectural Education
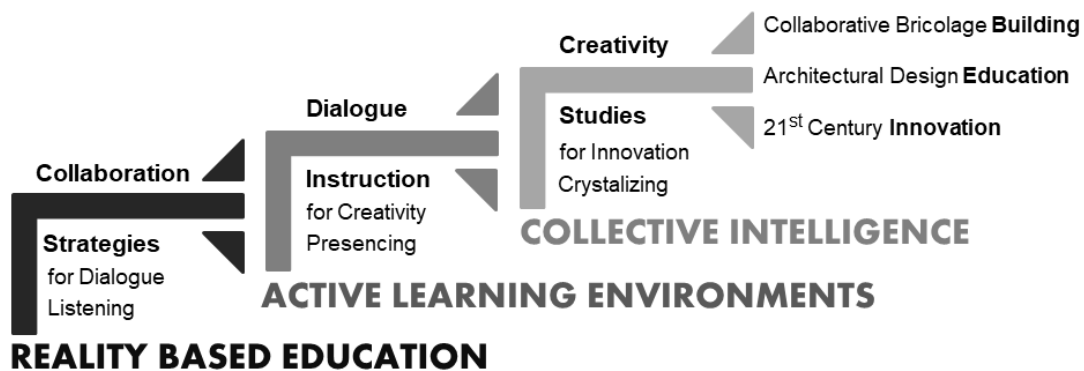
Practice Implications

There are several major implications for practice from this study.

1. Collaboration should occur among students both laterally on the same educational level and vertically in the various stages of matriculation for peer-to-peer learning.
2. Collaboration training should include "Role-Play" to help ease students' transition into the job market and promote "reality-based" education.
3. Training in dialogue is needed in architectural education to foster collaboration, peer-to-peer learning, stakeholder engagement, diversity, equity, inclusion, and decolonization.
4. Architecture students should be included in dialogues on complex global environmental issues such as climate change, disaster reduction, sustainability, and resiliency.

5. Strategic development of the individual abilities correlated to creativity in general, and "Flexibility" specifically, should be part of architectural design education and practice.
6. Architectural history/theory/criticism classes should include scholarship from the field of Creativity Studies to deepen understanding of "Big-C" architectural creative geniuses.
7. Active Learning Classrooms that encourage peer-to-peer collaborative learning with students facing one another in clusters should be the physical layout of design studios.
8. Rubrics, assessments, heuristics, and descriptive evaluations can address the perceived inequalities in grading design work often exacerbated by cultural differences, competing points of view, and misunderstandings between professors and students.
9. Collaboration strategies, dialogue instruction, and Creativity Studies should extend across the entire curriculum, from senior and junior faculty co-publishing research and teaching in teams, to architecture students on all levels of matriculation in a design school.
10. This study reveals that without further clarification that minimizes the ambiguity of what from the NAAB expects for the new collaboration requirement, architecture programs cannot be evaluated equitably to maintain the accreditation required for licensure.

Research Implications

1. Research should be conducted in all three accredited architecture degree programs: B. Arch, M. Arch, and D. Arch, to explore how the NAAB program criteria for collaboration training should be implemented in each degree program specifically.
2. This study should be replicated with a larger sample of architecture students to add the perspective of differential statistics and make inferences about the population.
3. A longitudinal study should examine the long-term impact of focused training in creativity with a "Paired samples t-test" to draw inferences from RDCA scores over time.
4. Research into heuristics specifically targeted for architectural design education should be undertaken to study the efficacy of different instruments to determine what works.
5. This study should be replicated across interrelated environmental design disciplines to compare perceptions of professors and students in each field to promote synergy.

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Author Biography

Dr. Sledge graduated *summa cum laude* with a Doctor of Education from Drexel University, *summa cum laude* from the Massachusetts Institute of Technology with a Masters degree in the history/theory/criticism of architecture, T*hird In Class With Honors* from Ecole

d'Art Americaines in Fountainbleau, France, and *magna cum laude* from North Carolina State University with a Bachelor of Architecture. Sledge is a member of Kappa Delta Pi International Honor Society in Education, and recipient of the *Fredricka K. Reisman Award for Outstanding Graduate Work in Creativity.* He had the honor of representing Drexel University in 2019 at the International Conference on Knowledge, Innovation, and Enterprise in Dubai, United Arab Emirates. His published conference paper was awarded Second Place in the Creativity Category. Sledge. EdD has published on topics ranging from creativity, history/theory/criticism, design, and architectural education. He has worked in architecture firms and taught architectural design and history/theory/criticism for over a decade. Professor Sledge has taught architecture at University of Knoxville- Tennessee, Georgia Institute of Technology, Ecole Nationale Superieure d'Architecture de Paris La Villette, Howard University, and Drexel University. Dr. Sledge was born at Duke University, which was designed by the famous Black Philadelphia architect Julian Abele (1881-1950), who was the designer of Philadelphia Central Library, and the Philadelphia Museum of Art located beside a "Rustic Pavilion" designed by Frank Furness in 1866. Sledge currently teaches architecture in Sacramento, CA.