Reinterpreting Architectural Education: Exploring Methods for Incorporating Sustainability Themes

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ABSTRACT: This paper explores prospective means of incorporating sustainability and green building themes into formal architectural education. By unpacking and understanding the most common and perceived successful methods of including these themes in curriculum, suggestions can be made to steer and capitalize on the effective integration of sustainability and green building topics within the framework of architectural education.

Grounded theory methodology focuses on the generation or discovery of a theory to develop a framework for further research in a field where no strong, generally accepted theories exist (Strauss and Corbin 1998; Creswell 2007). The topic of integrating sustainability into formal architectural education is a prime candidate for this type of exploration, as it is a field of great interest, but without a substantial theory. Referencing constructivist grounded theory, this study was framed in how individual faculty members and their groups of peers interact to create their perceived social constructs, thereby establishing a reality of their own processes and the familiarity of colleagues' processes. Through purposeful sampling, a list of potential participants included eighteen faculty members from different architecture programs around North America. Twelve were interviewed before theoretical saturation was reached. The data sets were analyzed through an iterative coding process, and resulted in themed categories and clustered data addressing the primary topic of interest and other sub-research questions. Core categories of *Student Engagement* and *Repositioning the Worldview* emerge from exploring relationships within the gathered data. It is perceived by study participants that the most promising opportunities for leverage in this arena include establishing frameworks for student reference, defining levels of context for projects, addressing differences in sustainability terms, engaging studio courses, and integrating themes across support courses.

KEYWORDS: Design Education, Sustainability, Pedagogy, Student Engagement

INTRODUCTION

As emphasis increases on sustainable and high-performance building strategies across realms, formal architectural education is striving to incorporate new ways of embracing green design into an already overflowing curriculum. Currently, the methods for incorporating these themes vary, ranging from vernacular design to ecological thinking to building science and more. By understanding and disassembling some of the most common and seemingly successful methods of this integration, such as teaching style, internal and external conversations, or material covered, guidelines can be framed to steer the effective integration of sustainability and green building topics within the architectural education framework. Establishing this knowledge base will better enable educators to prepare future generations of architects, who can make successful contributions to the world they inhabit as professionals. This paper reviews the results of a grounded theory study addressing this complex issue.

The term "sustainability" is used broadly and in a wide variety of contexts, and is frequently seen as synonymous with green building, while at the same time viewed as a blanket term without meaning. This paper takes the position that green building is only one component of true sustainability, which by definition requires no resulting negative impacts on the environment. While the terms sustainability and green design may seem to be used interchangeably throughout this paper, please note the slight nuances of each application, and that both scopes are actually different.

A few select accredited architecture programs around the country have established themselves as leaders of the sustainability and green building movement by incorporating environmental education within their design programs; sustainability and green building issues are arguably viewed as integral to every course and not as a separate concentration for study. Other programs have begun to offer select courses as electives, but have not reached a level of full integration. The methods of incorporation vary, and have corresponding results. This exploration provides insight into how sustainability and green building themes can be productively and strategically integrated into formal architectural curricula by individual faculty members and peer groups, and suggests avenues for further exploration.

1.0 LITERATURE REVIEW

Given that the audience of this work is familiar with the development of architectural education standards and methods, this topic will not be reviewed in depth here. Nor will the associated topics of ecological literacy, architectural education assessment, environmental education, or environmental rhetoric, though they were all reviewed as a part of the original scope of this study. Instead, the focus of this paper will be on applicable literature in the field of Curriculum Design. One of the main topics addressed within education literature concerning curriculum evaluation is the question of what particular qualities are being evaluated during curricular reviews. In the humanities, it has been proposed that the importance is placed on the content of courses, rather than on the application of skills when the program is complete (Helm 2000). Literature also notes that is important to look at the true goals of the curriculum, rather than the particular content and topics covered in courses (Ibid). This curricular approach favors the creation of core values and foundational training instead of catering to upper level applied skills on a weaker foundation, and does not place value on the regurgitation of facts and skills in the absence of critical thinking.

The issue of quality management is also important in the evaluation of curricula and is well covered in education journals, outside of design and architecture. Some education experts separate curriculum issues into three specific aspects including *quality of design* (QD), *quality of conformance* (QC) and *quality of performance* (QP) (Mergen, Grant et al. 2000; Widrick, Mergen et al. 2002). The *quality of design* category relates to how well the curriculum addresses the consumer's requirements, which, for design, would be the professional field and potential employers. The *quality of conformance* addresses how curriculum satisfies design requirements and conventional touchstones, such as the employment rate and pay achieved upon graduation. And the *quality of performance* addresses the satisfaction of the end user, in this case the student's satisfaction with their education experience.

Similarly, Gilbert (2004) identifies three levels through which some research programs, such as doctorate programs, can be evaluated: quality of individual projects, as viewed by both the professors and the students; the quality of the field of study itself and contributions to that field; and the completion of particular indicated goals, as well as the intrinsic worth of those goals as a foundation. Both frameworks identify three major – and similar - criteria applicable to all educational fields: contributions to the profession, contributions and service to the field, and student satisfaction. Architecture and design are often viewed as non-traditional in higher education circles due to the role of studio in instruction, and the alternative culture that results. However, despite this uniqueness, architectural education can still be viewed through this established three-part framework of product, process, and experience.

In addition, three primary perspectives must be reflected when looking at curriculum: the final product, such as the final project in a studio course; the process of getting to that final product and the issue being explored; and the individual's experience through the journey. These three perspectives can also each be viewed through an *intrinsic* or *extrinsic* lens (Ibid). *Extrinsic* matters address the final "pay-off" of a program, such as achieving stated objectives and goals; *intrinsic* matters speak to "questions about the worth or value of the stated objectives themselves" and question other outcomes that may not be addressed in published objectives (Gilbert 2004).

Another framework helpful to establish a foundation for course development is Backward Design, described by Wiggins and McTighe (2005). This method identifies the goal of the

course first, and then ascertains what elements of the class can support the students reaching that goal, thereby boosting the students' level of true understanding of a core issue (Ibid). The concept of understanding content is central to the course development process and highlights 'big ideas' to prioritize learning, similar to the intrinsic issues noted earlier (Gilbert 2004). This also mirrors the *Quality of Design* categories reviewed by Mergen et.al (2000). Wiggins and McTighe's framework (2005) is similar in its emphasis on the importance of core values, as mentioned repeatedly in the literature (Helm 2000; Mergen, Grant et al. 2000; Widrick, Mergen et al. 2002; Gilbert 2004). The reviewed literature highlights the significance of the development of core values within curriculum, tiered information, and establishing larger goals within programs.

2.0 CONCEPTUAL FRAMEWORK & RESEARCH QUESTIONS

The conceptual framework for the original exploration scope can be seen in Figure 1. This illustration references the framework reviewed previously and outlined by Wiggins and McTighe (2005) in their Understanding By Design methodology in the three large boxes. Within that framework, relevant topics to the larger research scope are included: *Sustainability Themes in Design Education, Environmental Education, Current Program Review, Curriculum Design and Assessment, Architectural Education Assessment, Cultures of Architectural Education,* and *Environmental Rhetoric and Architectural Education*. It is proposed that programs successful at green building integration span effectively across these different zones of understanding, therefore integrating with the different topics. Particularly, the research explored where certain teaching practices fall within this continuum and how faculty engage this framework, illustrated by the lower dotted bar.

The primary research question of the larger study was: *What methods are being used to successfully incorporate sustainability and green building into architectural curricula?* This question was meant to explore how such themes are currently used in architectural education, and which approaches are perceived to be most successful by the participants (instructors). Because of the stringently prescribed course load for accredited architecture programs, a particular area of interest becomes how non-traditional threads such as sustainability and green building themes can be included.

A number of subquestions were included in the original study as well, but this paper will concentrate only on the first series of sub-questions: *What elements are necessary for a successful course? What type of instruction is most conducive to sustainability integration?* In other words, what are the "big ideas" identified by successful faculty members? What are their goals? Are participants working toward a true understanding of the information as defined by Wiggins and McTighe (2005) by uncovering big, transferable ideas with enduring value? Such questions look toward the core intent of the course, and the guiding principles by which it is designed.

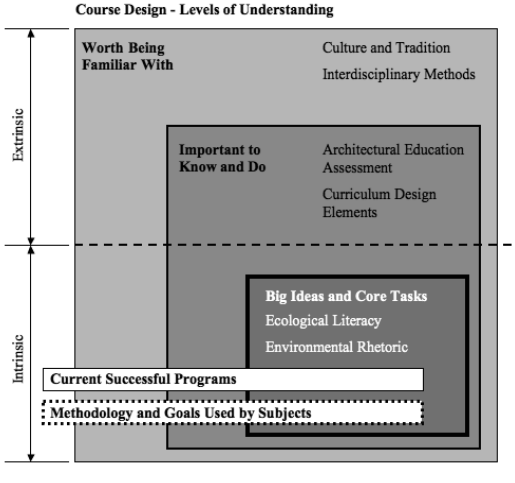

Figure 1: Conceptual Framework

3.0 METHODOLOGY

Qualitative research studies objects in their natural settings accounting for context and every-day life (Groat and Wang 2002), making this approach fitting for this exploration. In qualitative exploration, researchers concentrate on attempting to understand how the participants are making sense of their own experiences (Ibid). The value in this thread of research is in the capacity to establish a deep understanding of real-life situations and settings through "thick descriptions." (Ibid) This also requires the flexibility to alter the focus or collection methods, as new elements are uncovered throughout data gathering and analysis. However, because of this flexibility and responsiveness to unique circumstances, there are no firmly established procedures and protocols, requiring considerable adaptability from the researcher (Ibid).

3.1. Research Strategy: Grounded Theory

This exploration aimed to identify emergent theories pertaining to the integration of sustainability and green building themes within architectural curricula. The grounded theory methodology focuses on the generation or discovery of a theory to develop a framework for further research in a field where no strong, generally accepted theories exist (Strauss and Corbin 1998; Creswell 2007). The central phenomena of interest in this exploration are the experiences and perceptions of individual architectural faculty members as they strive to integrate sustainability and green building themes into their courses and curriculum. Research and literature addressing this type of integration are under-represented. Therefore, the topic of integrating sustainability into formal architectural education is a prime candidate for a grounded theory study.

The goal of this exploration was to extract each participant's individual perspectives about integration methods through in-depth interviews and personal narratives. By establishing a detailed understanding of participants' educational methods, patterns of experience may be unearthed to provide further understanding. Researchers undertaking grounded theory studies are frequently told to enter the field free of preconceived notions and motives (Groat and Wang 2002), though Charmaz (2006) encourages a social constructivist perspective, accepting the constructed realities of a particular group through common views and values. It is necessary to appreciate both the direct experiences of the participants (instructors), but also to comprehend hidden networks, situations, and relationships as understood from their perspectives, in addition to realizing hierarchies, opportunities, and communication (Creswell 2007). Because some of the lesser-discussed qualities of architectural education such as biases, leadership, and tradition are being addressed, it is appropriate that it be based on a social constructivist theory.

Grounded theory is iterative, permitting the initial open-ended data collection to guide the processes following; the data collection, data analysis, and theory building happen in unison (Groat and Wang 2002). By superimposing rigor and established processes onto a qualitative approach, Glaser and Strauss established a research methodology in grounded theory that closely fit with gathered data, was useful, had conceptual density, showed durability over time, was modifiable, and was explainable (Glaser and Strauss 1967; Glaser 1978; Glaser 1992; Charmaz 2006).

3.2. Participant Selection

For grounded theory studies, literature suggests that the participant sample is rooted on the participant's individual contribution to the development of a theory (Creswell 2007), or theoretical and purposive selection (Schwandt 2007). This bases the participant selection on relevance to the research question instead of population representation (Ibid). Given this, a purposeful sample was used to establish an initial pool, which included a number of faculty members within accredited architecture programs from around the United States popularly thought to be incorporating sustainability themes within their courses, and was not interested in representing specific populations such as race, gender, age, etc.

Because not many organizations are concentrating solely on the incorporation of sustainability and green building themes into architectural education, and the overall pool of engaged faculty members is comparatively shallow, two particular organizations were used establish an initial

participant pool that capitalized on both engagement and expertise. The populations of these leading organizations overlapped, and thereby established the foundation for approaching participants, and provided five names for initial contact. To increase the number of the initial pool, additional contacts were identified through participation in email listserves with postings specifically referencing the integration of sustainability within formal architectural education. Eighteen potential participants from different schools around North America were included on the final list. Suggestions for additional participants were requested at the end of their interview. This allowed for supplementary snowball sampling, and these suggestions were used as needed.

A total of 49 potential subjects were identified; a total of 12 were interviewed. Though ten participants is typically on the lower end of acceptable sample numbers, the data gathering process indicated that ten participants achieved theoretical saturation. The final two participants provided no new information, so interviews stopped with ten individuals. The final sample was comprised of ten faculty interviews with an additional and unexpected two interviews: one of a professional in sustainable design, and one studio faculty member holding alternative design philosophies. These individual interviews were supplemented by assorted document reviews (journal articles, project outlines, curriculum structures, and syllabi). Participants were approached through email, and asked about their interest in participating anonymously. A pilot interview was also held so help streamline the interview process.

3.3. Data Analysis Procedures

Through the purposeful sampling and the interview process, descriptive data sets were collected to provide insight on the complex subject of incorporating of sustainability into architectural education. In grounded theory, the analysis of the collected data results in themed categories pertinent to both the central research question and the sub-research questions.

The data gathering process in grounded theory studies employs a constant comparative analysis. The initial stage is referred to as initial coding, or open coding, as outlined by Strauss and Corbin (1998). This step focuses on identifying emergent themes, categories, and concepts. After establishing primary categories, axial coding allows subcategories, properties, and dimensions of data to begin to link interactions to the primary categories and themes, establishing clusters of supporting evidence. Selective coding, the final phase, uses additional data to further detail the categories and relationships, creating an explanatory concept addressing the full range of perceptions and experiences surrounding the issue (Ibid).

The interviews were completed over a ten-week period, with the data gathered predominantly in the form of narratives. Interviews were digitally recorded and transcribed by a third-party service before the participants asked to review the content in an effort to maintain accuracy and the intention of quotes, words, context and thought processes. As the early discussions were examined and coded for initial themes, considerable unity emerged concerning the basic criteria and methods that participants used in integrating sustainable and green building themes in their courses. However, there was variability in personal experiences, factors, and feelings that were voiced in tandem with the approaches. This variability helped to form the interview prompts for subsequent interviews.

3.3.1. Open Coding: Understanding Context

Following the initial analysis process outlined by Strauss and Corbin (1998), the data that surfaced from the first interviews was gathered and then separated into detailed groups to better understand the complexities of the comments. The data were then compiled into associated groupings to establish a series of larger categories. The initial open coding process explores these emergent categories, as well as the properties and dimensions within each of these new categories. Tables were created to summarize the data, supporting the narratives and creating the thick description of the developing themes. Quotations were provided in support of these categories and themes as applicable. Throughout the analysis, and even in the first four interviews, the primary themes that emerged include *Cross-Campus Integration, Culture and Tradition, Framework Development, Student Activities, Faculty Involvement,* and *Integrated Curriculum*. Given this emergence of initial themes found early during open coding, detailed axial coding was conducted in light of the six initial categories. This paper will focus

solely on *Framework Development*, though even by only addressing this one theme, it is impossible to cover all the sub-content in-depth in this paper.

Table 1 illustrates the properties and dimensions found within the emergent category of ***Framework Development***. One popular point of discussion was how specific terms are used to discuss sustainability or green building methods. All participants were hesitant to use or discuss **specific terms** such as sustainability, green building, carbon neutral, or regenerative. When asked specifically about terminology, many participants said that they either do not think about terms or specifically try not to use any of the terms at all. One participant shares, "I don't teach about it, I teach the principles of it." The participant's point being that the larger movement is not defined by one term or another. Instead, there are underlying principles and values that define the subject better than any single term possibly could. Another participant supports this saying, "Basically, what we do in school is teach students the vocabulary of architecture." In other words, principles and strategies are emphasized over the delineation of terms. A different participant, however, is happy to use and embrace whatever terminology comes up.

> I love them all. It makes it interesting to talk about it because each one puts a little bit different filter on what you're trying to do, and I think all the terms are descriptive of good paths. Architecture is such that there's no right answer. I love the ambiguity of that.

Framework Development	
Property	**Dimensional Range**
Rhetoric	Specific terms, relationship of terms and knowledge
History	Not a new subject, static
Understanding context	History, priorities, financial
Complexity	Process, frameworks, creating priorities, research

Table 1: Category: Framework Development

Another distinct subject emerging throughout the interviews illustrates the conviction that sustainability themes are not new to architecture. These strategies have been included in designs throughout **history**. All participants felt strongly that sustainability is integral to design, and cannot be separated from what others may consider the subject of 'design.' To illustrate this, one participant relayed through a narrative timeline how sustainability concepts have been included in seminal pieces of design, often covered in history courses but without the mention of the sustainability elements, and how designers could in fact incorporate sustainable themes without compromising their elevated design intentions.

Participants supported an emphasis on interdisciplinary design by speaking about an increasing spectrum of considerations, and how they establish an understanding and **appreciation of context** in their students. One participant notes, "…they have to understand, 'Okay, this is where we're going. This is our goal.'" This illustrates the belief in presenting students with a possible path that addresses not only the decision making process and the considerations required, but also the end performance criteria of the building. In other words, there are opportunities, limits, and important context that must be considered in partnership with potential strategies.

Participants voiced varying opinions about the levels of **complexity** necessary to include in courses, as well as how to help students understand that complexity. One participant shares their take on how the educator and designer can manage layers of complexity and sustainability:

> You are involved in a management process of getting control over complexity. You have to be very thorough in laying out the framework issues that you're going to engage, and you have to be very articulate in presenting how you're thinking about those issues as you develop your strategies and your transformations, so it's a different approach.

This participant also addresses the issue of awareness:

> We create our own problems the minute we make a gesture, make a choice, the minute we choose a material, a placement on the site, an attitude about the sun. Whatever attitudes we bring to the design, we are constraining, and influencing what next comes as design decision opportunities. So we create problems in the process as much as we're solving any problems.

Organizing complex problems is a strong theme articulated by each participant, often addressed by creating frameworks for establishing design priorities. Some participants establish the importance of energy from the beginning. As one participant states:

> I would guess 95% percent of studio faculty do not understand solar geometry or solar responsive design. By sustainable, we mean buildings that don't use much energy. Everything else is immaterial. If we don't solve that, nothing else is going to count.

Similarly, another participant tells students that the focus is on carbon neutrality. "I'd say it's the most important issue we're facing right now." Establishing this prioritization initially helps students understand appropriate and meaningful implementations. Similar narratives from other participants show that, as a group, participants believe that the current design process, and the education of that process, does not address the current complex problems found in the profession.

3.3.2. Axial Coding: Categorizing

The open coding process examined and reorganized the data, and established six related themed categories. The axial coding stage more deeply explores the nuances and detail of the emergent data. As the axial coding phase advances, the individual data pieces are re-contextualized through a continuous process of constant comparison, synthesis, and re-categorization. The relationships between the emergent categories that develop through the open coding process are analyzed during axial coding by exploring *Causal Condition, Phenomenon, Context, Intervening Condition, Action/Interaction,* and *Consequence* as described by Strauss and Corbin (1998). The Intervening Conditions of each category answer the questions of *why, where, how come,* and *when*. Actions/interactions of categories look at *by whom* and *how*. Consequences then look at 'what happens' in light of these actions/interactions (Strauss and Corbin 1998). Charmaz (2006) notes that the point of axial coding is for researchers to develop a framework to apply to their data gathering.

The axial coding process for the phenomena *Framework Development* is illustrated in Table 2. Each of these phenomena is explored individually by looking at a number of developing themes (contexts), outlined in an initial table. Following each table, the contexts are investigated individually by looking at the intervening conditions, actions, and consequences. We will look in depth only at Context 3.1 and 3.2.

Phenomenon		Contexts	
3	*Framework Development*	3.1	**Simplified view** of elements and considerations are involved in current studio design projects.
		3.2	Issues for consideration (climate, structure, materials, teammates, goals, resources, etc) are given to the students **void of context.**
		3.3	The **building is an object** unto itself that can pull from and contribute to its surroundings as needed.
		3.4	The **creative process is unable to be defined** or guided; it is without structure and 'magical.'
		3.5	The **design process is typically linear** progressing from programming, to adjacencies, through extrusion from the plan, manipulation of form, to the engineer, and into final documents.
		3.6	Subjective assessment of products and **unclear learning objective** are primarily implemented in courses.
		3.7	**Extensive terms** and methods for addressing sustainability are being used in both academia and the profession, and few of them have a concrete definition.
		3.8	**Legislation** regarding any energy efficiency measures or green building implements is not regularly included in courses.

Table 1: Category: Framework Development

Context 3.1: Simplified view of elements and considerations are involved in current studio design projects.

- Intervening Condition: Experienced the actual building process, overlaid with holistic concerns of sustainability
- Intervening Action/Interaction:
  - As their interest in sustainability themes grew, faculty each actively sought to better understand an acceptable process and factors necessary for sustainable design.
  - Participants felt that by eliminating and simplifying so many issues into glossed-over issues in the studio, students would perpetuate these methods in practice and create additional environmental problems from built form.
  - As various and seemingly endless considerations were perceived to be needed for inclusion into the design process, the complexity of the problems became apparent.
- Consequence:
  - Broadening the scope of information provided to enable students to understand the enlarged scope of influences and impacts of their decisions.
  - Provide an understanding of the major systems at a global scale.

Context 3.2: Issues for consideration (climate, structure, materials, teammates, goals, resources, etc) are given to the students void of context.

- Intervening Condition: Experienced the actual building process, overlaid with holistic concerns of sustainability
- Action/Interaction:
  - Participants began to understand the complexity of the problem and sought to expose students to various established models and frameworks to help organize the issues in a coherent manner.
  - Through various categorization methods, participants felt students needed to better understand which methods and goals might be easiest to achieve.
  - Students needed additional organization and information.
- Consequence:
  - Faculty developed frameworks and reference points for students to use in their current design process and modify as they moved forward.

- Students were provided with various frameworks and alternatives for personal assessment and greater control of their design.
- Faculty began to prioritize and focus on selected strategies within courses.

3.3.3. Selective Coding: A Holistic View

Selective coding, the third and final coding phase, re-examines emergent categories from the first two phases, resulting in a core category explaining relationships between the established sub-categories. In narrative form, this progression explores the complexities of internal relationships between the categories and concepts. Explained by Strauss and Corbin (1998) as a final process to outline the "variation as well as the main point made by the data," this final step creates a viewpoint from which to comprehensively view the data. During this process, the established narrative is repeatedly reviewed for logic and internal consistency. Linkages in the narrative address all outliers and variability within category dimensions, establishing logical connections between the dimensions and the developing explanatory narrative (Ibid). This reasoning and connectivity establishes credibility, as outlined by Eisner (1991), who posits that creating clear theoretical connections with strong coherence is important to grounded theory studies. The following narrative links together the themes relating to this paper's question about implementation.

To begin to incorporate the **added complexity** inherent in sustainability, participants create **different frameworks** to provide necessary context in their courses. These frameworks are structured at different levels, from **overarching paradigms and philosophical stances to strategy matrices** for understanding design implements and their impacts. Participants believe that **various levels of context** are missing in existing educational methods, and as a result important topics are omitted. Understanding sustainability at a philosophical level allows students to **frame decisions** in all stages of their processes. Establishing an environmental context requires **connections, references and linkages** that are not obvious when the project is otherwise **viewed as an object** placed within a landscape.

Studio is the most important venue for sustainability themes, but the perceived divide between 'champion' faculty members and customarily **uninterested design studio faculty** is a massive hurdle. Traditional design faculty often do not address green building themes, **viewing the issues as additive and separate**; green-friendly faculty members are often approached to give a "sustainability spiel" instead of presenting the themes as **integral to the design process**. Programs in which multiple **building science faculty also teach studio** are often seen as being very strong in integration. **Support courses**, or other courses intended to complement studio through specific topics, are not the focal point of integration but are also important. Every course taught can have **sustainability feathered into its content**. While studio provides the most opportunity to holistically address sustainability themes, the support courses are equally as important in establishing the **foundational knowledge** to be used in studio. Architecture is a field of **ambiguous terms and subjectivity**, and the realm of sustainability follows suit. Participants do not readily use terms such as *sustainability, green architecture, carbon neutral,* and *regenerative design*, or others. Instead, the **principles of these themes** are the focus of instruction.

3.3.4. Emergent Core Categories

The analysis of the associations between categories and subcategories resulted in the recognition of two primary themes. Though Grounded Theory customarily tries to establish one core category, the larger exploration revealed two consistent themes as core categories, at two different levels: *Student Engagement* as a teaching method used by participants; and *Repositioning the Worldview* in relation to the culture, tradition, approach, and community. This paper predominantly addresses the second, *Repositioning the Worldview*, which works in concert with individual faculty methods for integrating sustainability themes into courses. Participants believe that crafting a holistic curricular response to the environmental demand for a new worldview in architecture is important. Recurring themes within the data relate to issues including a division of faculty, modified approaches to traditional subjects, changing demands of the profession, and the place of studio in the educational process. The *Repositioning the Worldview* core category mediates other emergent categories by identifying areas for possible

action regarding curricular and philosophical development. While many participants do not reside in programs exemplifying this holistic shift, their perceptions regarding such a transition are consistent. Participants believe that an architecture program would excel at sustainability integration by including elements such as: a level of respect and acceptance of sustainability themes by the faculty; increased communication about environmental issues; established standards by which to assess sustainability efforts; and increased engagement with other discipline. In this context, participants believe that programs have a better chance of becoming successful by critically assessing the position of their programs in light of these larger issues.

4.0 FINDINGS

Studio courses invite the most attention as the staple of architectural curriculum, and also provide the academic and creative space where students are engaged with the breadth of design concerns. Ideally, the knowledge that is established in other lecture and seminar courses is assimilated into a coherent design process within the studio setting. In agreement with the historical importance of studio instruction, participant narratives reiterate the significance, applicability, and effectiveness of the studio as a teaching space.

Beyond studio, no other course structures are favored regarding sustainability themes. While many of the participants were involved with environmental control (ECS) courses, they feel that these courses are often seen as token courses for sustainability. Though participants agree that sustainability should be addressed in ECS courses, they also feel that more is needed to address these topics. Ninety percent (90%) of study participants have been involved with ECS courses in their programs. Similarly, all noted that the faculty members typically most interested in sustainability are those most interested in building science. Participants feel that most faculty members actively interested in sustainability do not serve as studio faculty. In this exploration, despite 80% of the participants regularly teaching studios, they view their sustainability interests to be in the minority of studio instructors, and feel strongly that there is a perceived divide between studio and non-studio faculty, or – in schools where all faculty teach studio – design and non-design faculty. Faculty members interviewed believe design instructors share this view of a segmented faculty, distinguishing between “us” (designers) and “them” (others). This perception of faculty division is supported by the negative case interview, which regularly insinuated the existence of distinct “sides” or conflicting philosophies within architecture programs.

Relating successful studio experiences, participants frequently establish conceptual frameworks in studio courses to create context for students. Participants will relay an ordering methodology to students by identifying and prioritizing issues. These constructs serve multiple purposes: (1) to provide context in which students can work; (2) to help students manage the complexity of various issues; and (3) to establish a process for students to reference throughout their education and into practice. Some frameworks are abstract, created by the participants themselves, while others are tools established by others that participants feel are valuable. Many frameworks are geared at instilling foundational knowledge in the students; they are also predominantly process-oriented. Prioritizing real-world considerations, in partnership with formal design elements, guide the faculty in formulating instructional methods. There is a perceived dichotomy between the traditional product-oriented studio courses and the development of a design process. The former have traditionally resulted in problem-solving techniques related to adjacencies, site constrictions and constructability, while the latter critically reflects on the decision making process.

CONCLUSION

This exploration supports the view that including sustainability themes within architectural education is complex and multi-faceted. Interested faculty members are exploring ways to provide substantial, holistic information to students, while still working within the constructed boundaries of the architecture and design culture. The identified issues vary for each program, and are highly modifiable depending on context, faculty, university setting, initiatives, and student body. However, when looking at the incorporation of sustainability themes, integration should be explored at two levels: individual methods used in courses and the philosophical approach of the program and profession. In partnership, these two perspectives provide the most promising opportunity for the integration of sustainability themes within architectural

education. Specifically, interested faculty should explore opportunities in studio courses, establishing reference frameworks, defining context, and addressing differences in terms. Through the exploration of leading architectural educators in the field, this research has identified a number of areas as fundamental to a curricular shift. Areas of further research include: understanding negative cases and opposing viewpoints within architectural education; investigating the myriad of terms in the field, connotations and popular uses, including how they are shaped and perceived; exploring potential boundaries and considerations for developing a faculty identity within the context of architectural education; and communication patterns within architectural education and the profession, and how they differ depending on various participants.

ACKNOWLEDGEMENTS

This document was adopted from dissertation research submitted to the North Carolina State University in partial fulfillment of the requirements for the Degree of Doctor of Philosophy of Design under the advisement of Dr. Wayne Place (NCSU), Dr. Perver Baran (NCSU), Professor Meredith Davis (NCSU), and Dr. Madeleine Grumet (UNC-CH). Special thanks goes to these committee members and study participants.

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