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An Initial Investigation of Student Experiences with the Elements of High Impact Educational Practices

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As Universities attempt to elevate the student experience, one approach has been the formalization of a series of effective educational practices, termed High Impact Educational Practices (HIEPs). This study considers one university in the Southeastern U.S. that measures the quantity and quality of HIEPs based on the experiences of graduating undergraduate construction management (CM) students. The study addresses four different types of HIEPS: study abroad, internships and co-ops, undergraduate research, and e-portfolios. 145 graduating students were surveyed based on their self-selected HIEPs for the 2019-20 academic year. Results indicate that internships and co-ops are the most selected HIEP while undergraduate research is seldom student selected. Students note few opportunities to make formal presentations of their experiences in HIEPs. Data points toward the second and third internship or co-op as providing a deeper educational experience than the first internship or co-op. Finally, study abroad seems to provide the greatest opportunity for students to have deep impactful engagement with others.

Key Words: Construction Education, Engaged Learning, High Impact Educational Practices, Internship, Study Abroad

Introduction

With the rising cost of college education coupled with declining enrollments and weakening support from state governments (plus COVID-19), many universities are feeling pressure to address the future of higher education. Universities that differentiate themselves in the years ahead will not only convey knowledge, but curate experiences through student engagement.

Over 20 years ago, the Boyer Commission recommended ten items for undergraduate education (*Reinventing Undergraduate Education: A Blueprint for America's Research Universities*, 1998). One of the specific items noted by the Boyer Commission was the failure to appropriately engage students with their education at institutions of higher learning. The report even questioned whether college graduates could "think logically, write clearly, or speak coherently" (*Reinventing Undergraduate Education: A Blueprint for America's Research Universities*, 1998, p. 15). Partially in response to the Boyer Commission Report, George Kuh suggested a group of educational practices (High Impact

Educational Practices-HIEPs) that attempted to elevate the educational impact for students (G.D. Kuh, 2008). Kuh's work identified the following practices:

- First-Year Experiences
- Common Intellectual Experiences
- Learning Communities
- Writing-Intensive Courses
- Collaborative Assignments/Projects
- Undergraduate Research
- Diversity/Global Learning
- ePortfolios
- Service Learning, Community-Based Learning
- Internships
- Capstone Courses and Projects

Kuh believed that if students engaged in one of these experiences, they would have appropriate opportunities for an enhanced learning experience. He wanted students to acquire knowledge, apply it, and reflect on the experience. Results have indicated that students who engage in HIEPs tend to have higher grades and retain, integrate, and transfer the information obtained at higher rates than students who do not participate in HIEPs (Nelson et al., 2008). Subsequent research has determined additional value from HIEPs. These include increased self-perception (on the part of the student); increased confidence; improved comfort level for unfamiliar communities; improved cultural competency; and enhanced confidence of applying knowledge and skills (Kramer et al., 2007; Peck et al., 2010).

Other researchers have insisted that HIEPs be intentional (McNair & Albertine, 2010). Instead of starting with HIEPs, institutions should first consider learning outcomes they seek to achieve paying particular attention to their audience and specific developmental needs. The specific culture and context of the academic experience also should factor into how HIEPs are implemented. Otherwise, HIEPs may be "a solution in search of a problem"(McNair & Albertine, 2010). By purposefully engaging HIEPs, universities have an opportunity to provide diverse experiences, force students to solve challenging problems, encourage independence and self-reliance, and stimulate students. Such an approach could provide a pathway for universities who execute HIEPs well to distinguish themselves from others who remain focused on the resulting student credential.

In the 2019 strategic plan of Auburn University, an emphasis was placed on "measurable outcomes". In the fall of 2019, the University began the Campus Engagement and Experience Survey (CEES) to measure HIEP participation and quality. The University elected to evaluate four specific HIEPs:

- Study abroad
- Internships and/or Co-ops (While both are work experiences, co-ops are students that participate in a formal program during the last few semesters of the construction program. Co-ops by definition work for the same company alternating semesters with school.)
- Undergraduate Research
- E-portfolios (purposeful collection of a student's work that showcases learning progression and achievement).

This introductory research effort analyzed the data over the first year of the CEES specifically for the CM program. All of the HIEPs considered were student selected as none were credit-bearing nor required. If the relationship between the HIEPs students participate in during undergraduate careers and the perceived educational value of the HIEP could be better understood, refinements could be made to enhance HIEPs within CM. Specifically, the following research questions were addressed:

- Which of the HIEPs evaluated by the University are the most commonly selected by the (CM) students?

- Which of the eight HIEP elements are indicated to be most strongly included across all HIEP experiences evaluated?
- For each of the elements of HIEPs, which specific HIEP was indicated as being most strongly inclusive of all eight elements?

Although the results are confined to a single university, the process employed could be applied to other programs. And, the strengths and weaknesses identified for the specific university may give insight to other programs as to opportunities and challenges that may exist.

Literature Review

Elements of High Impact Educational Practices

Kuh and O'Donnel (2013) found that the eleven practices share eight key elements:

- Performance expectations set at appropriately high levels
- Significant investment of time and effort by students over an extended period of time
- Interactions with faculty and peers about substantive matters
- Experiences with diversity, wherein students are exposed to and must contend with people and circumstances that differ from those which students are familiar
- Frequent, timely, and constructive feedback
- Periodic, structured opportunities to reflect and integrate learning
- Opportunities to discover relevance of learning through real-world applications
- Public demonstration of competence

These elements can be used as guidance for the design and delivery of almost every learning experience. If employed, deep learning and student engagement is possible. Kuh argued:

> Needed now are inquiries guided by a more advanced logic model that will allow us to document the relative importance and influence of the structural and programmatic characteristics of HIPs in terms of inducing student effort and other desirable outcomes. It would be most helpful to learn to what extent these features are associated with conditional effects (do some types of students benefit more than others?) (2008, p. 8)

Undergraduate Research

Learning outcomes for students who do undergraduate research include critical thinking, quantitative reasoning, and improved communication skills (Seymour et al., 2004). Other reported outcomes associated with this type of research include improved ability in data collection, the ability to synthesize information, and improvement in describing research results (Lopatto, 2006). Issues that impact quality include the degree with which faculty and students interact and the degree to which timely, constructive feedback is provided (Elgren & Hensel, 2006). Faculty expectations and the degree of rigor in the student work are proportional to student benefits (Buckley et al., 2008).

Internships and Co-ops

Thiry et al. (2011) found that student internships within STEM fields improved student confidence and communication skills. Further, students identified having more independence, being better prepared for their career, and positive relationships built in the workplace. Within CM, Wasserman (2008) linked outcomes of the American Council of Construction Education (ACCE) with student

perceptions of their internships. Students reported perceived outcomes of increased knowledge in safety, construction graphics, and estimating. Plugge (2018) added that if students had technology experience in college, they reported outcomes of increased technology engagement within the internship allowing the student to better engage with the construction team. Kuh and O'Donnel (2013) identified that public displays of competence may or may not be included in an internship. Internship experiences can also vary significantly based on a variety of factors including the degree of real-world application and time invested by the student.

Study Abroad

Study abroad allows students to explore cultures, increase the diversity of life experiences, and challenge established worldviews. Students report improved intercultural skills, improved flexibility/adaptability, increased self-awareness, and enhanced confidence (Lu et al., 2009; *Study Abroad and beyond: Effects of Global Learning on Career Outcomes and Skill Development*, 2017). In some cases, outcomes include experiential learning opportunities within the country visited. Quality in study abroad experiences rely on opportunities for student to interact with those within the country they visit, appropriate opportunities for students to reflect on their experience, and opportunities for students to integrate their experiences with real-world applications.

E-Portfolios

E-portfolios assist students in organizing and reflecting on their learning (*EPortfolios*, n.d.). The e-portfolio also provides an opportunity for timely and constructive feedback on student work. In CM education, Liu and Burt (2015) addressed e-Portfolios as a means toward improved student communication. They also address improved critical thinking skills and increased competitiveness for the job market at graduation. From a quality standpoint, Liu and Burt note that faculty are challenged to provide meaningful feedback in some areas reflected by the e-Portfolio. Further, faculty may not have strong motivation to engage with students on meaningful discussions regarding the e-portfolio.

Method

The data for this research was collected via a questionnaire survey (CEES) targeted at graduating CM students during the 2019-20 academic year (3 semesters-fall, spring, and summer). The CEES sought to measure participation and quality of specific HIEPs at Auburn University. "Participation" was measured by the number of students participating in a HIEP. "Quality" was measured by the degree to which students believe they have achieved the eight elements that make up all HIEPs. Graduating undergraduate students participated in the CEES during their last semester of school as part of the expectations within the required zero-credit graduation course, UNIV-4AA0.

The survey included a series of questions regarding the student's experience at Auburn University, including their experience with HIEPs. The HIEPs considered for each student included: study abroad, undergraduate research, e-Portfolio, Internship (1^{st}), Internship (2^{nd}), Internship (3^{rd}), Co-op (1^{st}), and Co-op (2^{nd}). Since HIEPs are mostly self-selected by the student, it is possible that a student could have participated in a range of 0 to 6 of the identified HIEPs during their time at the University. It would not be possible for CM students to participate in all 8 HIEP options because students cannot select both an internship and a co-op. For each HIEP a student identified completing, they were asked to rate the 8 HIEP elements by indicating their level of agreement with the statements listed below on a Likert scale of 1 (strongly disagree) to 5 (strongly agree). The survey was structured to insert the name of the selected HIEP into the appropriate place in the statements. This is indicated below by using the phrase (selected HIEP).

- Q1 (Expectations) -There were appropriately high expectations during the (selected HIEP).
- Q2 (Effort) -Effort was required over an extended period of time.
- Q3 (Interaction) -I interacted with faculty and peers while (selected HIEP).
- Q4 (Diversity) -I was exposed to people and/or settings that were unfamiliar to me.
- Q5 (Feedback) -I was provided with constructive feedback during my (selected HIEP).
- Q6 (Reflection) -There were structured opportunities to reflect on my learning.
- Q7 (Application) -There was real-world application to my (selected HIEP) experience.
- Q8 (Presentation) -I orally presented about my (selected HIEP) experience.

Student response data was summarized by the Office of Assessment and conveyed via spreadsheet to each college across the University. That data was filtered by the researchers to obtain program specific data, and analyzed to identify Mean, Standard Deviation, and Range for the HIEP responses provided. As an introductory study examining multiple HIEPs and a series of elements, it was critical to identify central tendency and variability of this data in order to identify which elements are addressed and which call for deeper study.

Results

For the semesters Fall 2019, Spring 2020, and Summer 2020, the CM program had 145 graduates. All completed the survey on HIEPs.

Which of the HIEPs evaluated are the most commonly selected by the (CM) students?

Table 1 indicates the number and percentage of students participating in each of the five different types of HIEPs evaluated by the University. Among the 145 graduates, students indicated participating in a total of 326 HIEP experiences (2.2 HIEPs per student over full college experience). The top HIEPs as selected by students were internships, study abroad, and co-ops. Only 2 students elected to do undergraduate research. In the program where this data was collected, internships can happen in any term students are not in school. In contrast, co-ops represent a formal, selected path work experience by the student as they begin their junior year.

Table 1

Descriptive Statistics of Number of Students Participating in Identified HIEP

HIEP	Total Students (N=145)[1]	Percentage of Students
Study Abroad	40[2]	27.6%[2]
Undergraduate Research	18	12.4%
e-Portfolio	2	1.4%
Internship (1st)	112	77.2%
Internship (2nd)	78	53.8%
Internship (3rd)	28	19.3%
Co-op (1st)	39	26.9%
Co-op (2nd)	9	6.2%

[1] Many of the 145 students participated in multiple HIEP experiences, which is why the number of participants across all HIEPs totals 326 instead of 145

[2] Numbers likely impacted by COVID with no study abroad for spring or summer, 2020

Which of the eight HIEP elements are indicated to be most strongly included across all HIEP experiences evaluated?

Student responses about each HIEP experience were aggregated to look at how the eight HIEP elements are included across all the HIEPs identified by graduating students. Mean and standard deviation were analyzed. Q2 – "Effort Over an Extended Period of Time" was the most strongly included HIEP element (*M*=4.47, *SD*=1.03) with 89% of students agreeing or strongly agreeing that this element was part of their HIEP experiences. HIEP elements "Application" (*M*=4.45, *SD*=1.09), "Diversity" (*M*=4.39, *SD*=1.01), and "Expectations" (*M*=4.32, *SD*=1.05) followed very closely behind "Effort". Inclusion of a "Presentation" component was the only HIEP element that scored below a four (*M*=3.41, *SD*=1.84) in the survey.

Table 2

Inclusion of HIEP elements across all HIEPS

	Ranking*						
HIEP Element	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree	M	SD
Q1 Expectations	16 (5%)	8 (2%)	25 (8%)	84 (26%)	193 (59%)	4.32	1.05
Q2 Effort	16 (5%)	3 (1%)	23 (7%)	54 (17%)	230 (71%)	4.47	1.03
Q3 Interaction	16 (5%)	20 (6%)	44 (13%)	78 (24%)	166 (51%)	4.10	1.17
Q4 Diversity	14 (4%)	7 (2%)	22 (7%)	78 (24%)	204 (63%)	4.39	1.01
Q5 Feedback	22 (7%)	10 (3%)	35 (11%)	64 (20%)	195 (60%)	4.23	1.18
Q6 Reflection	18 (6%)	17 (5%)	40 (12%)	72 (22%)	178 (55%)	4.15	1.18
Q7 Application	19 (6%)	5 (2%)	20 (6%)	48 (15%)	234 (73%)	4.45	1.09
Q8 Presentation	74 (23%)	28 (9%)	42 (13%)	55 (17%)	127 (39%)	3.41	1.84

* 326 responses from 145 students across all HIEPs because students participated in multiple HIEPs.

For each of the elements of HIEPs, which specific HIEP was indicated as being most strongly inclusive of all eight elements?

Overall, students indicated that second co-ops, third internships, and study abroad had the strongest inclusion of different HIEP elements (Table 3). Practices that dealt with "Interaction" (Q3) seemed to be most strongly experienced in study abroad programs (Table 4). Practices that dealt with "Expectations" (Q1), "Effort" (Q2), "Diversity" (Q4), "Feedback" (Q5), "Reflection" (Q6), "Application" (Q7), and "Presentation" (Q8) were all most strongly experienced during a work experience. More specifically, they were most strongly experienced in a second or third work experience. When evaluating each HIEP as an overall experience based on inclusion of all 8 elements, the third Internship was indicated as being the most inclusive (*M*=4.42, *SD* = 0.66). Undergraduate

Research (*M*=3.25, *SD* = 1.95) and e-portfolio (*M*=3.60, *SD* = 1.42) were indicated as being the least inclusive of HIEP elements.

Table 3

Most strongly included HIEP based on each element of HIEPs

Element of HIEPs	Top HIEP	Percentage of Students
Q1 Expectations	Third Internship	71%
Q2 Effort	Third Internship	86%
Q3 Interaction	Study Abroad	68%
Q4 Diversity	Study Abroad	80%
Q5 Feedback	Third Internship	68%
Q6 Reflection	Second Co-op	67%
Q7 Application	Third Internship	82%
Q8 Presentation	Second Co-op	56%

Table 4

HIEP Element Inclusion by Type (highest element for each practice in bold)

HIEP Element	Study Abroad	Undergrad Research	e-Portfolio	Intern (1st)	Intern (2nd)	Intern (3rd)	Co-op (1st)	Co-op (2nd)
	n = 40	*n* = 18	*n* = 2	*n* = 112	*n* =78	*n* = 28	*n* = 39	*n* = 9
	M (SD)							
Q1 Expectations	3.95 (1.06)	**4.50 (0.71)**	**3.83 (1.20)**	4.43 (0.57)	4.41 (0.59)	4.61 (0.40)	4.26 (0.75)	4.11 (0.94)
Q2 Effort	4.35 (0.66)	4.00 (1.41)	**3.83 (1.20)**	4.63 (0.38)	4.50 (0.50)	4.71 (0.29)	4.31 (0.70)	4.11 (0.94)
Q3 Interaction	**4.35 (0.66)**	3.50 (2.12)	3.33 (1.71)	3.94 (1.06)	4.18 (0.82)	4.25 (0.76)	4.23 (0.78)	**4.22 (0.82)**
Q4 Diversity	4.53 (0.48)	3.50 (2.12)	3.72 (1.31)	4.37 (0.64)	4.53 (0.48)	4.57 (0.44)	4.23 (0.78)	4.00 (1.06)
Q5 Feedback	3.83 (1.19)	2.50 (3.54)	3.56 (1.49)	4.38 (0.62)	4.33 (0.67)	4.46 (0.55)	4.26 (0.75)	4.00 (1.06)
Q6 Reflection	4.08 (0.94)	2.50 (3.54)	**3.83 (1.20)**	4.13 (0.88)	4.27 (0.74)	4.32 (0.69)	4.13 (0.88)	4.00 (1.06)
Q7 Application	4.28 (0.73)	3.00 (2.83)	3.22 (1.83)	**4.65 (0.35)**	**4.54 (0.46)**	**4.71 (0.29)**	**4.44 (0.57)**	4.00 (1.06)
Q8 Presentation	2.93 (2.10)	2.50 (3.54)	3.50 (1.54)	3.12 (1.89)	3.55 (1.46)	3.71 (1.31)	4.15 (0.86)	3.78 (1.30)
Grand Mean (SD)	4.03 (1.08)	3.25 (1.95)	3.60 (1.42)	4.20 (0.92)	4.29 (0.77)	**4.42 (0.66)**	4.25 (0.76)	4.03 (0.99)

Note: Highest element for each HIEP bolded in table

Analysis and Conclusions

This introductory study sought to better understand the relationships between HIEPs in which students participate and the perceived educational value. Several items are evident.

First, it does not appear the department is providing a prominent way the students can present the results of the HIEPs identified. This may be an opportunity to leverage and enhance the value of some of the experiences especially in the area of internships and co-ops where it appears almost every student participates. These results match the literature by Kuh and O'Donnel (2013). Second, it appears that CM students enter these HIEPs without having an understanding of what the outcomes may be. By developing outcomes for construction students in each HIEP, the department may be able to promote engagement in the HIEP and set appropriately high expectations for each HIEP essentially elevating the value since expectations are part of the overall quality. Third, there is some evidence that second and third internship or co-op experiences yield deeper educational experiences. In some respects, this may be intuitive but may present an opportunity to further elevate the first internship experience. The department might consider a shared set of outcomes for the first internship, or they may work with employers to assure deep impact. Finally, the initial data seems to point to study abroad as a key opportunity for students to interact deeply with peers and with those different from themselves. Such findings match the intercultural opportunities identified in the literature review (Lu et al., 2009). As the program continues to explore HIEPs, this may provide an opportunity to leverage study abroad programs or perhaps enhance interaction with others through additional HIEPs.

The second and fourth items noted above may be more applicable to other programs of construction management than the first and third items. All CM programs should consider identifying the outcomes of any HIEP used to enhance the educational practice. CM study abroad programs should also consider how they can maximize the interaction fostered with peers and other diverse individuals.

One limitation of the research is the incongruency between the University's stated purpose to pursue and evaluate specific HIEPs and departmental goals. The University has named the HIEPs and established a means by which student perceptions of the value can be obtained. However, the department has no directive nor shared goals to complete the identified HIEPs beyond what has developed internally. Further, the surveys of student experiences are shared with departments but without direction or training on why the specific elements of HIEPs are evaluated. The experience could be enhanced with greater transparency and education on behalf of the University and deeper engagement by the unit. Additional questions that explore critical evaluation of student experiences in HIEPs would also be valuable.

Opportunities for further research are significant. One area is understanding how the design of each HIEP distinctly affects the outcomes of students. Another issue is that the HIEPs identified by Auburn University may not be the best for CM students. Additional research should address other important HIEPs like service learning and group learning so integral to the AEC industry. As the sample size increases for this data, a more robust statistical analysis on between group differences (i.e., study abroad vs. internship) could be studied. In addition, adding constructs like student expectations, effort, peer and faculty interaction, and other factors could be researched and may add reliability to the study to assure that student interpretations are aligned with the findings of the research. This paper provided a literature review focused on presenting an overview of HIEPs for a context to the study. However, future research should consider a critical review of the literature on HIEPs to highlight the current state of knowledge on the above referenced items, as well as other gaps for further study.

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