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Analysis of Construction Study Abroad Programs Viewed from a Global Perspective

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The objective of this paper is to evaluate differences and similarities of construction programs across various countries in order to encourage international cooperation of construction training and study abroad programs. The information illustrated in this paper was collected through a survey that was administered to construction programs from 11 different countries. The survey was divided into the following four categories: Program Structure, Curriculum, Industry Involvement and General Program. The study identified challenges and opportunities for students in construction programs to study abroad, with specific reference to financial funding at institutions, funding support from industry, lack of understanding around international articulation platforms, wide variation across internship requirements, and the importance of industry recognized certifications. The study demonstrated that 64% of the surveyed programs receive industry support and that all the surveyed programs are engaged and familiar with articulation agreements. In addition, besides programs in Australia and Portugal, internships are a requirement in all other countries surveyed. Also, among all surveyed countries, only Malaysia and South Africa require students to obtain industry certificates during the course of the program.

Key Words: Study Abroad, Construction Program, Program Structure, Curriculum, and Industry Involvement.

Introduction

The objective of this paper is to evaluate differences and similarities of construction programs across various countries in order to encourage the cooperation of construction training and student study abroad programs among universities around the world. Despite the importance of construction to the global economy, many countries seem to lack proper construction training to support the need and growth of professionals in this sector. In many countries, construction education is viewed as sub-discipline to Engineering or Business majors or regarded as a research field to be developed only after the undergraduate level. Not valuing the importance of this field of study, the knowledge pool of future construction professionals will be identified as potential industry risks. Due to globalization

and increasing market competition in the construction sector, modern-day construction firms are no longer limited to domestic markets but also possess different projects in the international market (Pheng and Leong, 2000).

Globalization has made a significant impact on the political, cultural, environmental, and economical arenas over the past decades (Low et al., 2020). The construction sector has thrived the most among the listed sectors with reference to construction materials and products; suppliers and producers; building services manufacturers; providers and installers; contractors, subcontractors, construction clients; and organizations that are relevant to the design, building, operation, and refurbishment of buildings (Ikpe et al., 2012). Roads, bridges, tunnels, dams, hospitals, and schools are examples of physical structures on which development efforts and improved living standards are established (Trigunarsyah, 2004). Therefore, construction education should provide a platform that supports learning collaboration among construction training programs across international borders.

Literature Review

In the United States, construction programs are designed as an interdisciplinary program that involves courses not only in construction and engineering but also business and general education. To assure the quality of the construction programs, many institutions are accredited which guarantees that the knowledge delivered to students conforms to the expectations of the professional market (Arneson and Ozbek, 2020). Accredited Construction Management programs in the United States are accredited by either the American Council of Construction Education (ACCE) or by the Accreditation Board for Engineering and Technology (ABET). The accreditation frameworks are outcome-based learning, which allows construction programs the freedom to contour their curricula to the specific needs of the industry, which recruits and hires students from their programs. Despite the freedom to contour program curricula, very few construction programs in the United States have a well-established international exchange platform that allows students to articulate course credits with construction programs abroad or vice versa.

Due to the significant impact and growth of globalization in the construction sector and economies, constant interaction with people from different cultures and backgrounds calls upon future professionals to develop effective skills of communication, leadership, and adaptability (Pheng and Leong, 2000). Although all these abilities can be built in the workplace, individuals who participate in study abroad programs may already have the intercultural competence and expertise to be successful in the international market (Petzold and Moog, 2018). Opportunities of studying-abroad for construction students seem to be lacking. As a result, construction graduates who feel prepared to undertake the challenges faced in the international construction market are far from what the workforce needs.

The trajectory of globalization has no ultimate target, as countries and their economies continue to embrace its impact on their market growth and workforce skill attainment. Asia, Africa, and Latin America are undergoing tremendous expansion led by increasing urbanization of the population and development plans (Chang et al., 2018). Projections show that the world will have 1.5 billion new urban residents between 2015 and 2035, with nearly 90% of the increase in Asia and Africa (Duan et al., 2019). In China, the construction industry has been expanding at a high growth rate over the past 20 years. In 2017, China's construction industry reached a total output value of 21,395 billion yuan which is equivalent to a total added value of 6.7% of the national Gross Domestic Product (Wu et al., 2019). As a result, there is undoubtedly a demand for professionals with skills needed to successfully manage construction projects (Ahmed et al., 2014). Exploring the international market not only

provides sustainability to construction firms but can also increase their profit and establish a balanced growth in the industry (Han et al., 2010). In the international market, contractors and project management professionals are not only oppressed by the common problems related to expertise factors, costs, and time, but also need to venture overseas to interact with individuals from other cultures (Wong, 2007). As a result of these problems, more effort is required to develop collaboration across international construction program platforms.

Methodology

Through the review of literature, it is evident that very few construction programs have a well-established international exchange platform that allows students to articulate course credits with construction programs abroad. In this study, a survey questionnaire was developed and administered to full-time faculty (professors) at universities across 11 different countries in order to identify differences and similarities of construction education programs that support study abroad opportunities for students in those programs. The survey allowed the researchers to collect and analyze quantitative and qualitative research data. The design of the survey framework is demonstrated in Figure 1.

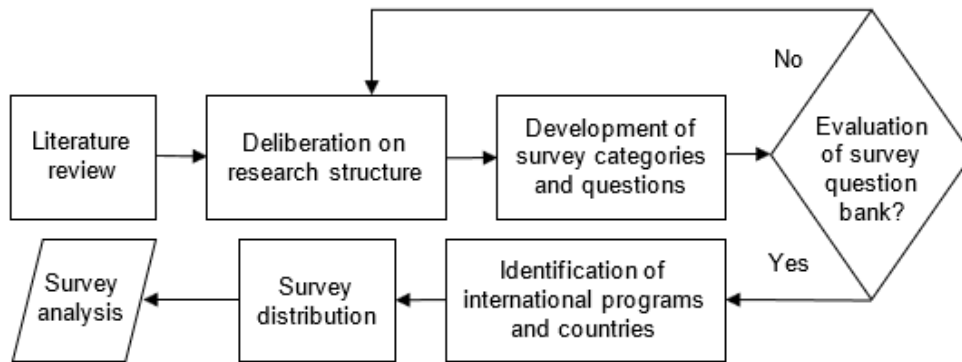


Figure 1. Methodology framework.

The research survey was developed around the following four core categories: Program Design, Construction Curriculum, Industry Involvement, and General Program Information. These categories directed the survey feedback from construction programs across 11 countries: Australia, China, India, Malaysia, Mexico, The Netherlands, New Zealand, Portugal, Russia, South Africa, and UK. The construction programs and countries that were selected through connections of ACCE, the Associated School of Construction (ASC), past research engagement as well as through personal connections and networking.

The survey was administered to at least one faculty members from different construction programs per country, and a total of 21 responses were collected. In this study, the results were assumed to be representative to similar construction programs in that country. The survey was not administered to faculty in the United States since the research focused on construction programs across borders for comparison to American construction training programs.

The survey was developed in @Qualtrics, a web-based survey tool that allows for the design of a professional survey database, evaluations, and other data survey utilities. The four survey categories provided a breakdown in support of the survey query to better understand the differences and similarities of construction program platforms across countries as stipulated in the Results and Discussion section. A list of the survey question is provided in the Appendix. The research findings are useful to construction training programs and their students in support of study abroad opportunities.

Results and Discussion

The survey consists of the following four core categories: Program Structure, Curriculum, Industry Involvement and General Program, and supported subcategories as stipulated in the Appendix of this study. The authors analyzed the following subcategories: Industry Support, Articulation Agreement, Internship Experience, and Construction Certification as it relates to the underpinning of study abroad opportunities.

Industry Support

Industry support in the form of advisory engagement, financial, or other contributions to construction programs is a major factor in how construction programs align their teaching platforms to the needs of industry. Provided financial aid and industry support in the form of grants and scholarships can greatly contribute to student success in programs. Figure 2 illustrates the percentage (64%) of the surveyed countries where industry provides such support through grants and scholarships to students. The remaining (36%) of construction programs surveyed lack such support.

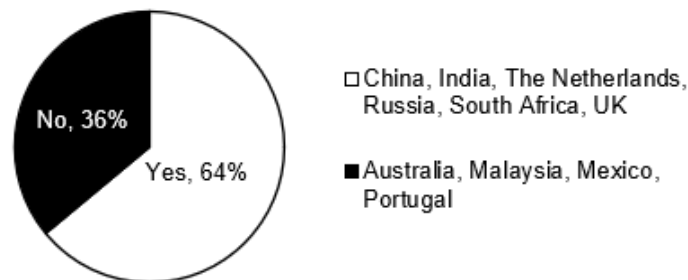


Figure 2. Percentage of surveyed countries with and without industry support.

Most construction management programs surveyed (China, India, The Netherlands, Russia, South Africa, and UK) receive financial support from their industries. The remaining portion of the programs surveyed (Australia, Malaysia, Mexico, and Portugal) do not receive or engage in industry support initiatives. A reason for the lack of such support might be rooted in the fact that in some countries like Portugal, tuition is immensely subsidized by the government. Government subsidies might not lend students the opportunities to engage in international exchange experiences. Therefore, industry support can greatly contribute to such experiences.

Articulation Agreement

Articulation agreements allow students to obtain and transfer academic credits across education platforms. Such agreements can exist between high schools, two-year institutions, four-year

institutions as well as industry. Table 1 illustrates the different articulations that each surveyed country and program have in place and are familiar with.

Table 1

Articulation agreements by country and program

Countries	High schools	Two-year institutions	Four-year universities or institutions	Industry (work credit)	Others
Australia	x	x	x	x	
China			x	x	
India			x	x	
Malaysia		x	x	x	
Mexico	x	x	x	x	
The Netherlands		x	x		
New Zealand	x			x	
Portugal		x	x	x	
Russia		x	x	x	Professional Schools
South Africa			x	x	
UK		x	x	x	

The prevalent articulation agreements between four-year institutions mostly refers to agreements in terms of program and curriculum similarities. As drawn from the study results, fewer countries have articulation agreements with two-year institutions (only Australia, Mexico, The Netherlands, Portugal, Russia, and UK). The smaller contribution is possibly due to discrepancies in program curriculum designs. Even fewer countries present articulation agreements with high schools (only Australia, Mexico, and New Zealand). It is also important to highlight that Russia has articulation agreements with professional schools, where courses taught in construction programs at universities may be useful to professional school students. The results show that most of the surveyed construction programs are familiar with articulation platforms. Therefore, the development of construction program articulation agreements across countries should be valued as an important program variable to encourage students to engage in study abroad programs without the fear of losing transferable credits. Nevertheless, the design of transferable articulation agreement platforms can be difficult due to differences in program designs like semester versus quarter credit hour equivalencies.

Internship Experience

Student internship experience is one of the most desired skill requirements the industry is looking for when hiring graduates. For that reason, students greatly value the importance of internships, since they can apply the knowledge acquired in their classes to the field. In some countries, program internships are required whereas in other countries, obtaining internship experience is viewed as a student driven initiative. Figure 3 illustrates the duration range for internships required in each of the surveyed countries.

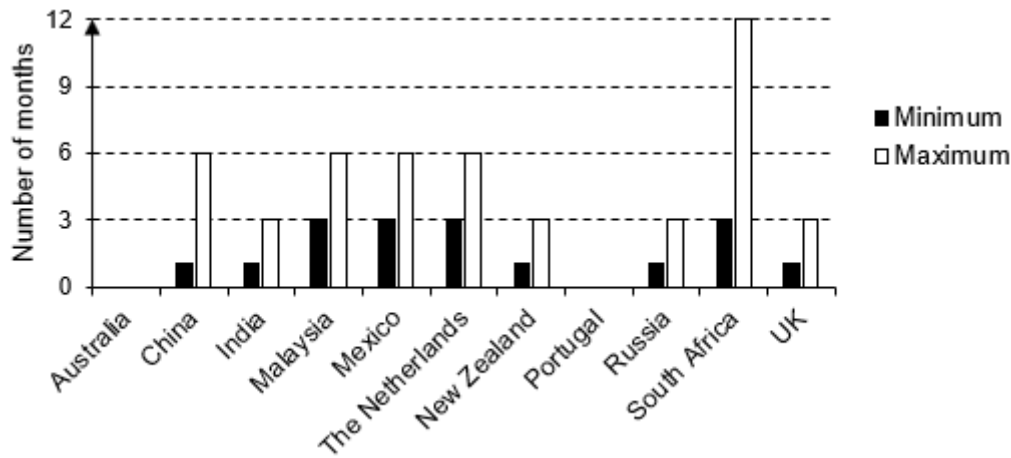


Figure 3. Duration range for internships required in each of the surveyed countries.

Most construction programs require students to engage in internships. Most internships vary between 3 and 6 months in countries like China, Malaysia, Mexico, The Netherlands, and New Zealand. The 3- to 6-month range supports semester, quarter, or summer academic cycles. Different programs in the same country can have different requirements. A brief internship experience of one month is required at construction programs in China, India, New Zealand, Russia, and UK. Longer internship experiences up to 12 months are required in construction programs in South Africa as an integrated degree requirement. In contrast, internships are not mandatory for students in Australia and Portugal. The survey results revealed no reference to any international internship structure currently in place. The lack of interest in international internship exchange opportunities is complicated by immigration requirements in most countries. Multinational construction companies should support the development of internship opportunities across borders to encourage construction students to interact with people from different cultures and backgrounds, and to develop effective skills of communication, leadership, and adaptability.

Construction Certification

Construction graduates who have obtained industry certificates during their academic journey are sought after by companies, as an assurance of obtained knowledge in certain areas. Therefore, industry certificates obtained during a program may attract prospective students to enroll at a specific university. In the United States, various industry certificates can be obtained like Occupational Safety and Health Administration (OSHA 30 hour) certificate which assures knowledge on basic health and safety measures to be applied in workplaces, Leadership in Energy and Environmental Design (LEED) which ensures sustainable understanding, and the Design-Build Institute of America (DBIA) which ensures knowledge in design-build project delivery systems.

Based on the results, it was concluded that only two construction programs in the countries surveyed (Malaysia and South Africa) have students obtain industry certificates during the program. Most of the construction programs surveyed consider industry certification as an optional feature for graduates to acquire independently, in addition to the essential coursework taken at the institution. The construction program in Malaysia requires students to obtain a BIM (Building Information Modeling) certificate; and in South Africa certifications by AUTODESK and SACPCMP (the South African Council for Project and Construction Management Professions). In China and Russia, construction

students are required to pass an English proficiency test in support of their graduation requirements that is not part of the construction program requirement. Allowing students to obtain industry certificates across countries during a semester abroad should be viewed as a valuable proposition to return to the original country with certification expertise.

Conclusion

The focus of this study was to evaluate differences and similarities of construction training platforms across various countries to encourage stronger cooperation for study abroad programs among construction programs around the world. A four-category survey was developed and administered to construction programs across 11 countries to evaluate their differences and similarities.

Based on the findings, approximately 60% of the construction programs in the surveyed countries received financial support from industry for students in their programs, which largely contributes to tuition and fees. The remaining 40% of programs did not receive any financial support from industry. In countries like Portugal, industry does not feel the need to support students in construction training programs, because tuition is highly subsidized by their government. In contrast, industry could support students who are interested in study abroad programs since this initiative is not subsidized by the government.

The study further revealed that most construction programs are familiar and engaged in some form of articulation agreement across their education platform, which spans across high school, technical programs, and four-year institutions. Promoting articulation agreements among international construction programs will be a first good step to promote program credit transfer across countries to help students develop intercultural competencies and expertise to be successful in the international construction market.

Study data also revealed that most programs require students to engage in internship experiences. Despite the prevalent requirement for internship experience, international internship opportunities are scarce to come by due to immigration requirements in most countries. The most common duration of internships across programs are between 3 to 6 months. Multinational construction companies should explore the possibility to obtain pre-approved work visas for students to engage in international internship opportunities.

The final category is bedded in the option for students to obtain industry certificates during their degree experience. From the countries and programs surveyed, only Malaysia and South Africa promote and encourage students to obtain industry certificates as a measure of assurance and knowledge in a specific field. Most students are willing to invest and study abroad to obtain certificates that will add to their portfolio.

Due to globalization in construction, there is a pervasive need to hire graduates with intercultural competencies and expertise who can effectively interact with people from different cultures and backgrounds. Despite the need, such international exchange programs are not easy to come by and hard for students to navigate in. Therefore, a call for collaboration among construction programs to develop articulation agreement platforms is essential in the development of a capable future global construction workforce.

Future research will include the analysis of international construction training program accreditation platforms, the involvement of industry with teaching and comparative income of construction students in other countries.

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Appendix

Category 1: Program Design

- 1.1 How long does it take to graduate from your Construction Education Program?
- 1.2 What kind of Construction Education Program does your institution offer?
- 1.3 Does your Construction Education Program engage in articulation agreements with: (e.g., high schools, two-year institutions, four-year institutions or universities, industry, others)
- 1.4 Is your Construction Education Program accredited?
 - 1.4.1 If yes, please name the accreditation body/entities.
- 1.5 Does your Construction Education Program require students to acquire internship/industry experience before they graduate?
 - 1.5.1 If yes, please indicate the duration of the internship/industry experience.

Category 2: Construction Curriculum

- 2.1 How many construction courses are students required to take before they graduate from your Construction Education Program?
- 2.2. Do students in your Construction Education Program obtain industry certificates during their course of study?
 - 2.2.1 If yes, please indicate the industry certificate(s) obtained by the students. (e.g., sustainability, safety, etc.)
- 2.3 What is the minimum required qualification for an instructor to teach in your Construction Education Program?
- 2.4 What is the average annual salary for an instructor in your Construction Education Program?
- 2.5 What are the admission requirements for students to enroll in your Construction Education Program?

Category 3: Industry Involvement

- 3.1 Is the industry involved in the curriculum development and teaching in your Construction Education program?
- 3.2 What is the average starting salary of students graduating from your Construction Education Program?
- 3.3 Which construction sectors mostly recruit from your Construction Education Program?
- 3.4 Does the construction industry engage in program activities like student clubs and/or student competitions?
- 3.5 Does the construction industry financially support your Construction Education Program? (e.g., scholarships, grants, etc.)

Category 4: General Program Information

- 4.1 What is the faculty to student ratio in your Construction Education Program?
- 4.2 What is the percentage of female representation in your Construction Education Program?
- 4.3 What is the average age of students graduating from your Construction Education Program?
- 4.4 What percentage of students graduate successfully from your Construction Education Program within the stipulated program duration?
- 4.5 What is the job placement rate of students 3 months after graduation?