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Educating Industry Ready Professionals for Careers in the Construction Sector

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Abstract

This paper aims to provide insights into the education of construction industry professionals. This is thought to be important for the appropriate development of future construction industry leaders to meet employer requirements. The study does this by first providing a background on undergraduate construction management programs offered at the tertiary or university level. This gives an understanding on what these students are commonly exposed to in these programs and some insight into their preparedness as supported by the previous research and academic literature. The study flows onto providing practical secondary data from education and industry sources on the topic. This then culminates in a discussion piece by the authors. The discussion analyses information sourced on various teaching aspects within construction management programs as well as what is deemed important to industry to determine what is required of construction professionals today. The study found that having basic technical and managerial understandings is well understood but there is a growing emergence of the need to further develop graduate knowledge within areas such as soft skills, technology and sustainability with a greater exposure to industry. This paper has been conducted at the global level and not specific to a region contributing broad knowledge to educators and industry and concludes with some recommendations on the education of construction professionals.

Keywords

Construction, Education, Industry

1. Introduction

The construction industry is a large employer of people across the world. It is central to development of cities and provides many with incomes, livelihoods, purpose and careers. Construction employers require qualified people coming from higher education institutions who are adequately prepared to take on their roles and be productive quite soon after. However, there is discussion that possibly more needs to be done to appropriately prepare students for careers in the construction industry. O'Neill et al (2024) put forth that the relationship between industry and academia is critical in respect to construction management programs and whilst there have been many studies in respect to educational offerings and industry expectations, these programs are possibly failing to keep up with an industry that is undergoing significant change. This is of concern to industry as construction businesses require professional and managerial people to lead their projects. Hence, there is a case to suggest that the construction industry could be better served by the education sector.

This study focuses on the education of students in preparation for construction industry needs. In essence, it investigates what can be done to best prepare generally young people to be of good service to their employers and have rewarding productive careers. Hence the aim of this study is to discover what can be done at the tertiary education level to support this objective. It essentially looks at undergraduate construction management programs which can include those in building, project management and the like. The various scholarly, industry and education sources will be analysed to investigate the topic and provide perspectives in this area. The intention is to examine the literature and secondary sources as contextual background alongside of existing knowledge and experience in respect to the current situation. There is a demand from industry stakeholders seeking improved tertiary education outcomes and hence improved construction management graduates. The research range is believed to be global in nature with many previous studies acting as testament. This study is expected to shed further light on the topic of industry ready construction professionals and provide some guidance in respect to good practice within this area. The paper takes a broad perspective and is not focused on any particular region. It should be of interest to higher education institutions and the construction industry in general.

2. Literature Review

This literature review provides a background into construction management higher education at both the university and vocational level. It also provides some insights into the preparedness of future construction industry practitioners. It makes use of scholarly articles to inform on important information and knowledge within these areas as based on credible peer reviewed research. It selected these articles from recognised journal publications after a thorough review process. A list of journals can be viewed in the reference list.

2.1 Construction Management Education

The area of education in construction management has been well researched and published. For example, Zheng et al (2019) undertook a bibliometric study of construction education research. They found that in publications post 2000 there has been increasing focus on pedagogical approaches to teaching within the construction area. They contend that many studies centred around areas such as curriculum, learning styles, active learning as well as distance education. Furthermore, there was significant attention given to technologies such as that within information technology, virtual reality and even game-based education methods. They also found that as time has gone on newer ideologies and advancements such as sustainability, lean construction and building information modelling (BIM) have found a place in construction education research. Notwithstanding, the traditional technical and managerial areas are still considered of high importance. Aliu et al (2024) contend that looking at industry needs and aligning curriculum as necessary is beneficial and along with making use of experiential learning opportunities will all bode well for successful construction careers.

Construction management programs need to be well directed. Posillico et al (2022) put forth that the curriculum should define what is needed to be taught and studied. They elaborate by saying that aspects that should be covered include critical construction topics, activities and milestones that all together work to prepare a student for industry and their work. They go on further to suggest that curriculum development within construction management education within the global context appears to be quite ad hoc in nature and have a poor adaptation of educational frameworks and theories. Hence, it could be suggested that important knowledge and skills may end up missing in some construction education programs. Benhart and Shaurette's (2014) study found that in their case certain graduate competencies were deemed to be important. These include construction cost accounting, basic understanding of materials, systems, structures and processes. Also, the ability to communicate respect, work with craft trades and develop operations plans ranked highly for use in construction management education programs. These professionally based competencies were seen as necessary in these types of offerings. Geng et al (2025) put forth that educators in construction management can improve employability by ensuring the provided curriculum includes real-world case studies and problem-solving activities. They say this will assist students to develop their professional expertise and adaptability.

As mentioned earlier by Zheng et al (2019) there has been significant attention concerning technology and construction education so this requires consideration. Wang et al (2018) offer insights into VR technologies as adopted in what they term as Construction Engineering Education and Training (CEET). The items that they raise include the usage of desktop-based VR, immersive VR, 3D game-based VR, BIM-enabled VR and Augmented Reality as well. They also discuss the aspect of these digitalised applications now increasingly becoming mobile and state that there have been benefits that have been derived within areas such as design, engineering, construction, safety and operational aspects. These are IT tools that need to be understood to enhance students' management of projects. Besides the technological hard skills, soft skills such as within the leadership area also require some consideration within educational contexts. Jenkins (2013) suggests that those that attempt to teach leadership worked on using more discussion-based types of teaching activities alongside of instructional teaching formats. Furthermore, he concluded that traditional assessments such as tests were not the best way forward for leadership education and hence not widely used.

The traditional classroom setting is what is normally thought of when thinking about higher education. However, it is well entrenched now that online education programs have a place in university and college offerings. This mode of education delivery is common, and it is evident in construction management education. The area of blended learning, using classroom and online resources, has also become quite the norm for campus-based studies. Beetham and Sharpe (2013) believe that this hybrid form of teaching provides a more student-centred learning approach and creates increased teaching and learning flexibility. Another form of blended learning is the 'flipped classroom'. This is an active learning pedagogy where students are expected to access course content prior to the classroom and undertake

any required activities in respect to their construction education (Mojtahedi et al, 2020). These courses are run to varying degrees in and out of the classroom as aligned to online resources and provisions.

2.2 Construction Industry Preparedness

The importance of preparing young professionals for the construction industry cannot be overstated. It was suggested by Toor and Ofori (2008) that to produce the required construction professionals of the future, there needs to be a broad alliance amongst stakeholders. This includes those in academia, the construction industry, various professional bodies as well as relevant government agencies. Aliu and Aigbavboa (2021) put forth that universities should create linkages with the construction industry. This is for the benefit of students having exposure to industry professionals which will assist in their development. Ideas mentioned included conferences, symposiums, workshops, training opportunities and research project supervision.

It is also important that government and industry work together to ensure that suitably qualified workers are available to the construction industry. For example, Pan et al (2019) found that in Singapore the Building and Construction Authority (BCA), which is an agency under the Ministry of National Development, drove initiatives to enhance construction industry productivity by means of workforce development. The BCA has an academy which undertakes education and research which is financed primarily by the government. This academy provides programs at the diploma, bachelor, and master degree levels. The provision of qualifications such as these are geared to suitably prepare professionals for the construction industry.

It was earlier indicated that technology and digitalisations within construction are a big part of what students need to know. Thus, there is a need to consider how construction education is preparing students for this aspect. Olowa et al (2020) put forth that construction education is responding to relevant industry needs and they cite the example of providing students with BIM awareness and skills. They feel that within this area industry needs should be met by producing 'BIM-ready graduates'. Toyin and Mewomo (2023) can add that construction industry employers require construction management graduates who have innovative skills and competencies particularly in technological software, tools and the like. Hence, this should be further heeded in higher education for the appropriate development of advanced student skills.

The construction industry needs job ready graduates that know how to work effectively. Aliakbarlou et al (2020) have done research that pointed to key success factors in this regard. This emanated from New Zealand and factors were raised such as 'team-working skills', 'communication skills', and 'good reading/writing skills'. These three skills were highlighted as the most important factors in the provision of work ready graduates for the local construction industry. Of great interest, the study also found that their Australian counterparts thought the very same aspects were of most importance in comparison. Borg and Scott-Young (2020) found that project management graduates working in construction had some good aspects in respect to their preparedness for the workforce, but they were lacking in critical competencies required for success. This is a cause of reasonable concern for both the education sector and the construction industry. Barnes et al (2022) researched how capabilities and competencies can be introduced into teaching so as to create graduates that meet the needs of the construction industry. The research was based on operationalising workplace competencies for young people within a schooling context. An important point made in the research was that what is needed in the workplace in respect to competencies should be prioritised in the classroom.

3. Research Methodology

This study makes use of both academic literature and open-sourced secondary data to bring to the fore the issues at hand with educating professionals so that they are ready for careers in the construction industry. The paper first referred to scholarly knowledge on the topic which is formulated into a literature review. This literature is collected from previous researched information on the topic and comes from notable academic journals, publications, etc. The study then proceeds to also collect secondary data from credible web sources to provide a more practical perspective in respect to the current situation. Secondary data from recent sources were used (mainly 2024/2025) and came from online websites of official industry bodies and higher education institutions as well as other informative sources. These were thoroughly reviewed and deemed credible. Search machines were used to find the information with key words used such as 'construction' in tandem with 'graduates', 'industry ready', 'education', 'programs', 'employment', etc. Hence, these search terms directed the data collection to be inclusive of relevant articles and the study excluded any information which did not address the research topic. An assessment was made on educational offerings from relevant

domains as well as secondary data from construction education and industry forums on important matters in respect to suitably preparing construction professionals.

It is believed that the above processes provide an academic, education and industry background to support the topic and discussions. The authors insights were derived from the various literature and secondary data sources by ensuring extensive and deep reviews were undertaken allowing for greater understandings. This informed and expanded on their academic and industry experience to highlight areas of importance within construction management education as aligned to industry readiness in respect to construction professionals. Moreover, the education and industry secondary data are analysed for current situations of interest. The findings are further discussed by the authors in the appropriate topic contexts providing expert commentary within construction education and the construction industry. It is noted that the education and industry secondary data is qualitatively based and comes from more advanced nation sources as these are thought to hold the most up to date information on education and training matters.

The combination of academic literature and secondary education/industry data provides for a body of information to examine. The qualitative analysis consisted of reviewing of all relevant information to discover current trends and themes so that they could be presented in a logical order with high coherence. This will be presented in several sections with applied commentary and a discussion piece in respect to industry graduate requirements and future development of relevant educational programs. The methodology adopted, whilst limited by not being empirically based, provides valuable insights on the education and requirements of construction professionals.

4. Results

This section is intended to work off the background provided in the literature and further this into a more practical domain concerning construction education and industry preparedness. It provides notable information from selected education and industry sources alongside author viewpoints and perspectives within these areas. The data is secondary and qualitative in nature and is written in a style that suits the practice-based nature of the information. It is acknowledged that some data references provided in this section may not hold the same academic standard as peer-reviewed sources. However, these are still thought to be valuable to provide for more real-world perspectives and they have been vetted for quality. Furthermore, ignoring logically sound and experientially derived sources for a practical discipline decreases the body of relevant evidence about that very practice of the discipline.

4.1 Construction Management Programs

Construction management as a course of study in universities and higher education has existed for many years now. Their ultimate goal is to provide educational needs for future industry professionals. As Sheryl Grey (2023) from Forbes Advisor puts forth, there are many educational pathways available for those who are interested in pursuing a career in construction management. This is very true as any search on the internet displays many offerings, at many levels at many institutions around the world.

University programs that educate eager students in the construction management professions seem to lead the way. Some examples of construction management programs from reputable universities have been accessed for some insights on their objectives. The below information provided on their websites indicates what their construction management programs hope to provide.

> *Gain the skills and knowledge needed for the management of people, processes and materials in the construction industry, and how these apply to specific building projects* (University of Melbourne, 2025).

> *Develop an expertise in the planning and programming of construction operations with this BSc Construction Management course* (University of Reading, 2025).

> *In addition to the University's general education requirements, students are introduced to the current processes and functions utilized by construction industry practitioners. Theoretical concepts are reinforced and practiced in the laboratory by site visits and through seminars conducted by industry experts* (Clemson University, 2025).

The three examples provided above are indicative of what a review of many universities found. It gives some insight into what these universities hope to deliver in their construction management education which is normally at the bachelor degree level as a starting point. They could be considered typical of what the university sector sets out to do

in this area. Then there are the more vocationally based higher education providers that market themselves as being more practical, less theory. Some examples of these providers' outlooks have been sourced and are presented below in respect to construction-based programs.

> *When it comes to construction management, professionals are often required to manage onsite projects and work directly with materials, techniques, and engineers. Given this requirement, hands-on experience becomes essential for aspiring construction managers looking to enter the industry, and this is where PSB Academy's courses shine* (PSB Academy, 2025).

> *Covering all the essential elements of communication, teamwork, problem solving, initiative and enterprise, planning and organisation, self-management, continuous learning, and the use of technology, tools and equipment, this comprehensive course will have you job ready and eager to build your future career* (TAFESA, 2025).

> *The five-course UCLA Extension Construction Management Certificate provides a solid foundation in the essentials of construction management, including key principles of project scheduling, cost management and quality assurance. Perfect for individuals who are new to the field or currently working in construction and looking to formalize their education, the program offers an overview of the industry's critical aspects* (UCLA Extension, 2025).

These institutions pride themselves on providing a form of education or training that is seen as more practical and relevant to the everyday workplace and are good indicative examples of what was reviewed. The qualifications they provide are normally at the diploma or certificate level within building and construction management areas as relevant to this study's topic. These programs are normally of shorter duration than university programs and generally not seen as being as intensive. Of note is at the pre higher education stage there are initiatives in the United States such as the ACE Mentor Program. This is delivered by a not-for-profit organisation and provides mentoring by industry professionals encouraging and preparing high school students for careers in the construction industry (ACE GNY, 2025).

When looking across various higher education providers in construction-based programs it is evident that their subjects/topics can be quite similar. For example, core construction subjects such as within technical construction, site management, materials, structures, scheduling, estimating/costing, contracts, etc all feature in the mix. This is not surprising as it aligns with basic industry and professional work requirements. However, on more refined searches there are also other less frequent subjects or topics covered such as in innovation, sustainability, emerging technologies, refurbishment and maintenance, fire technology and international construction which can be seen to exist as well.

With the wide adoption of new information technologies over the last two decades there has been a growing trend for programs that are delivered solely online. This includes programs within construction management. These are managed in many different ways and can come from universities or various education providers. Open Universities Australia have an arrangement where they market and support programs that are delivered online from partner universities. They say that their construction management offerings provide online study that can provide for the required skills as well as allow for flexibility (Open Universities Australia, 2025). Flexibility would appear to be a major selling point of these types of online programs.

4.2 Construction Industry Requirements

It is important that what is provided by higher education institutions in the construction management space suits what is required within the construction industry. Construction employers of today are less likely to want to train but rather have graduates that are reasonably job ready. The American Institute of Constructors (2023) highlight the importance of construction management education meeting industry requirements. They say that companies can have different requirements from their construction managers and hence good knowledge is required in many areas so as to adapt to varied construction company situations. Furthermore, they strongly advocate that getting construction management qualifications from an 'accredited degree program' is of importance to be able to satisfy the expectations of employers.

There are many skills needed to effectively operate in the construction industry. The U.S. Bureau of Labor Statistics (2025) outlines various skills required for the effective construction manager on its Occupational Outlook Handbook

for Construction Managers website. These include analytical skills, business skills, communication skills, decision-making skills, leadership skills and technical skills. Hence, budding construction management professionals need to acquire these skills through their education or training to a reasonable degree. Other construction industry skills that can be added include those in problem solving, collaboration, time management and attention to detail (Skills You Need, 2025). However, it is said that some of these can be very difficult to teach. Mike Jeavons (2023) from Go1 outlines some important areas for consideration in the areas of construction supervision and management. He can add skills in project management, strategising and planning, risk assessment, budget management, customer service, stakeholder management, life-cycle management, flexibility and conflict management. The construction management skills that have been highlighted seem all worthwhile and quite interestingly with many seemingly based more in soft skills rather than technical skills.

Construction graduates aspiring to work and be productive in the construction industry must have good learnings and hold knowledge in such areas as construction techniques, materials, management, scheduling and costings. However, many sources encountered also seemed to point towards more progressive areas that construction professionals need to be competent in such as sustainability, innovation and digital understandings. For example, construction industry trends in 2024 have sustainability as becoming quite an important factor within the construction industry (Deltek Project Nation Blog 2024). It appears that construction companies are committing to sustainability in their firms by adopting items such as eco-friendly practices and green building material usage as well as providing for energy-efficient technologies. However, a report by the Higher Education Academy has indicated that many built environment employers want sustainable literacy in their staff, but they tend to give it a low priority when recruiting graduates (The Higher Education Academy, 2009). The construction industry is known to be one of the biggest contributors to carbon emissions (Construction People 2024). Hence, people drawn into the industry must have some understandings in these areas so as to ready themselves towards reducing environmental damage.

Digital technologies have all but taken over many facets of people's lives and has dramatically impacted the construction industry. Education providers such as The New South Wales Institute of Applied Technology promote their courses as getting 'the digital skills you need and employers want' (NSWIAT, 2025). They say this includes being able to make appropriate use of digital technologies, software, and tools to assist in construction processes. They highlighted platforms such as building information modelling, computer-aided design, project management software, data analytics, virtual reality and drones (unmanned aircraft systems) as being useful in application to the construction industry and during project lifecycles. There are many other innovations either already here or about to transform the construction industry. Grace Ellis (2024) from Autodesk Construction Cloud enthusiastically writes about the emerging innovations such as artificial intelligence & machine learning, 3D printing, sensor data, truly connected construction, take-off & estimating tools, BIM beyond design and robotics. These digital tools will be useful across specialist job areas including management, estimation, contract administration, safety, etc. Hence construction professionals wishing to enter the workforce need some preparation for whichever specialist field they venture into so as to be of adequate service to their employer.

The Master Builders Association of Australia is the major representative of construction employers in that country. They appear to lament the bias of directing young people towards a university pathway for construction related occupations at the expense of vocational education and training organisations (MBA, 2023). It is also felt that those university graduates who can show that they have had prior industry experience are set to be more successfully employed. Hence the Master Builders Association is very much in favour of higher education institutions providing more real-world experience as part of construction management studies as well as enabling students to undertake their qualification as part of some form of paid cadetship. A notable industry led initiative comes from construction company Russell WBHO in the United Kingdom. They have a training scheme which provides for on the job learning whilst studying a funded program at the University of Salford (Russel WBHO, 2025). Such efforts provide for work experience in tandem with study.

5. Discussion

The information provided in the literature review and secondary data have provided valuable findings and assessments that can now be discussed and expanded on. The authors who are two experienced education and construction experts with a combined experience of over 80 years will provide this via appropriate topic application and analysis. Extensive understandings within academia and industry allows for a lens of experience to be held over the relevant areas. The sourced information is carefully analysed and discussed below providing for discussion on the current situation and possible improvement via recommendations.

It would appear that university programs are a popular option for those wanting to pursue professional careers in construction management. This would seem reasonable as these institutions are set up to provide education at the highest level. What they seek to provide is stated in the above quoted examples. However, when it comes to job ready graduates, considerations should be given to what is actually being taught and what is actually needed in the construction workforce of today. For instance, are there enough soft skills being taught as opposed to the traditional hard skills? Furthermore, it seems evident that the more vocationally oriented programs at colleges and such are still highly valued and these programs are seen as possibly more a practically based form of education that should not be underrated with employers seeking graduates who can operate productively very soon after being taken on. Quite often these programs work in tandem with industry in that many students may be employed to some degree during their studies. The advent of purely online construction programs is interesting. For those already working in the industry in a trade capacity it provides the flexibility to study in their own time and gain qualifications towards a more professional role. For those who are quite young and without any real-world experience, they may struggle and the quality of their education experience may be questionable to employers.

The construction management subjects and topics taught at higher education institutions range from covering technical construction and scheduling aspects to more commercial costing and contracts areas. These types of study are undoubtedly important to an industry that traditionally requires skills and knowledge in these areas. Emphasis should also be placed on areas such as analytical skills and problem solving, leadership, interpersonal skills and collaboration. It would seem that some of these skills can be challenging to teach. Hence, considerable effort needs to be made by education providers on how to best impart knowledge with particular attention on soft skills. At the current time there are many new expectations that construction employers have of graduates. Examples such as knowledge in sustainability and environment as part of corporate and social responsibility as well as digital technologies and future industry innovations would rate highly amongst these expectations. Not surprisingly the study pointed to the mass of technology that is upon us. With artificial intelligence's rapid rise, it is surely an area that employers will also seek skills in very soon. Hence, revising and restructuring construction management programs is useful with changing technologies and industry needs. Although one sees that concerns of earlier decades remain today, understanding the evolution of the practice compels effective educators to understand and address the changes, if their programs of instruction shall remain relevant and valuable. Essential to effective instruction is directly measuring the learning delivered by the instruction. While not the sole mechanism, standardised, third-party examinations can provide objective and revealing information by which to accurately revise construction management curricula. Program accreditation offers a mechanism by which to confirm appropriate curriculum. Carefully devised program differentiation is arguably worthwhile for developing competitive advantage among a student population free to choose their discipline and program for higher studies.

From what has been discovered in the literature and secondary data as well as author understandings, employers highly support construction management educational qualifications for professional entry into the industry. This is important for both budding construction managers and the industry itself. However, it is critical that graduates are delivered to industry with not only the basics but also more of what is engulfing the business agendas of today. Appropriate student development and preparation is imperative in higher education construction programs. Aspects to be considered include the role of relevant industry experience in an academic's capacity to impart useful instruction to students, i.e. instructor qualifications. Are they all academic and therefore lack the required practical industry relevance. Perhaps bringing more construction practitioners into the classroom from industry would enhance that 'real world' experience that is often heard so much about. Furthermore, construction programs might have some work experience or internship component to build student development prior to them graduating and entering the jobs market.

This study has provided many insights and some recommendations for improvement can be made. Higher education providers should constantly seek external industry input on their construction programs and be flexible enough to adapt to change. This is because construction employers will increasingly want more from graduates than the traditionally accepted provisions. With the onset of advanced technologies and a new era of artificial intelligence this has never been so true with this area needing to be adequately addressed. Soft skills development is another area where further attention can be given to as well. Plus, more education is possibly required within sustainability topics and perhaps corporate social responsibility covering aspects in respect to the environment, ethics, social awareness, etc. Hence, delivering construction management graduate capabilities and competencies in both the traditional and the new must be embraced. Also, providing students with real life construction understandings in the classroom or industry is highly advised. There are many other issues that face construction management education and job readiness for the

construction industry. However, it is thought that this study has provided some contributions that highlight the educational preparedness and industry requirements for construction professionals.

6. Conclusion

This paper is thought to hold significant findings in respect to the education and development of future construction industry professionals. This has been done in the context of construction education, graduate preparedness and industry requirements. It is thought to be of importance as there is a need to provide for construction industry leaders who can deliver successful project outcomes via acquiring appropriate education. However, even the most educated and industry-savvy construction academics know but a fraction of all they might, were they perfectly knowledgeable of their broad discipline. So, proven sources to guide development and delivery of construction management programs should be embraced.

For its part this paper has provided information via a scholarly literature review and provision of education and industry secondary data which assisted author assessments, commentary and discussion. These aspects integrated together have led to several contributions in respect to construction education programs, required knowledge and skills, teaching and development approaches, and industry standpoints. Aspects such as soft skills, technological features, university versus vocational studies, curriculums, real world experience and sustainability all presented themselves. The findings that are represented within these areas provides knowledge that can possibly enhance the current situation towards improvement in this space. They will assist academics, curriculum designers, industry leaders and others.

There are many more aspects and issues that could be covered within the construction graduate readiness debate. Hence, this study does have its limitations based in the areas of scope and empirical research. It is recommended from the findings delivered that further future research is undertaken that investigates wider issues contained in higher education curriculum design, industry experience and the impact of artificial intelligence in the construction education domain.

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Appendix – Education and Industry Secondary Data Sources

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