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JTET<http://penerbit.uthm.edu.my/ojs/index.php/jtet>

ISSN 2229-8932 e-ISSN 2600-7932

Journal of Technical
Education and
Training

The Adequacy of the Term of Reference for the Construction Management (CM) Education and Training from the Perspective of Practitioners in Malaysia

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DOI: <https://doi.org/10.30880/jtet.2020.12.03.012>

Received 27th March 2019; Accepted 07th February 2020; Available online 30th September 2020

Abstract: The increase in requirement and complexity in managing construction projects has in-part compelled graduates to be highly capable and possessed adequate skills for them to perform well after graduating. To equipped graduates with the required standard, the education curriculum has to be re-design and re-align to the needs of the industry. However, to develop a structured and holistic curriculum, a proper reference framework need to be made available as a term of reference to ensure that the curriculum comprises all the necessary elements to prepare the graduates for the industry. This paper aims to report on the perception of the industry practitioner and stakeholders on the currently available reference framework used as a term of reference for developing the Construction Management education and training program. A qualitative approach using exploratory design has been adopted, which uses an open-ended questionnaire for data collection, drawing insight from experienced construction practitioners and the stakeholders. The questionnaire has been distributed during the Association of Project Managers Malaysia (ACPM) 'The Tarik' session. It has been found that the available reference framework only provides the key knowledge area in Construction Management. It is found that the standards are insufficient and confusing and also not standardized and not integrated. It has consequently created different perceptions of how Construction Management should be practice and thus create a variable in the Construction Management curriculum. It is suggested that a more structured and holistic approach needs to be adapted to provide the 'know-how' of Construction Management, and a commonly recognized term of reference is needed to be made available to achieve the desired outcome.

Keywords: Term of Reference, Construction Management, Curriculum Design, Education and Training.

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1. Introduction

The construction industry is complex and fragmented, involving numerous players, skills, and technologies. Construction managers are engaged not only in tasks that require pure technical expertise such as production and maintenance of constructed facilities but also in specialized tasks that require extensive management and administrative expertise (Carter, 2006; Oberlender, 2000; Bronwen, 1996; Ariditi, 1984). Construction management education is built upon the fundamentals of civil engineering. The most program offers students a balance of research and coursework in construction technologies and management philosophy and practice, with an additional study from other disciplines to provide candidates with the skills and experiences needed to successfully manage a construction project (Russel, Hanna, Bank, & Shapira, 2007).

Construction management education in Malaysia started only last 30 years. In Malaysia, only four public university offers a bachelor degree in construction management. They are Universiti Teknologi Malaysia (UTM), Universiti Teknologi MARA (UiTM), Universiti Sains Malaysia (USM) and Universiti Tun Hussein Onn Malaysia (UTHM). Most of the universities offer a minimum of three years and a maximum of five years of the program structure. For the graduate's job prospects, they have the opportunity to work in the construction management line. In responding to the globalization agenda of education, the Malaysian Qualification Agency (MQA), introduced the Malaysian Qualification Framework (MQF) as a means to standardize the outcomes of the education system in Malaysia. MQA is responsible for the implementation of the principles of the MQF and has established structures to oversee the development of the relevant qualification and to ensure that the institutions that deliver the certifications meet the standards, especially in developing their curricula.

From the curricula of previous existing programs, it is possible to synthesize a set of courses believed to meet the needs of industry and the essential requirement of the Accreditation Board for Engineering and Technology (ABET). A construction management curriculum is also a combination of engineering, technology, construction techniques, and management (Abudayyah, Russel, Johnson, & Rowings, 2000). Harris (1996), as cited in Love and Haynes (2001) suggested that many courses are teaching graduates subjects that they are unlikely to use until 10-15 years after they graduate, by which time the knowledge they have gained maybe out of date. Massyn et al., (2009) identified the problems faced by the tertiary institution:

- These programs are delivered in a period when the industry is facing rapid changes in technological development, and it is not always possible to include these changes.
- The industry expects graduates to integrate into the trade immediately, and is not always concerned with the broader education aims.

The apparent consensus on the needs for the management education for professional justifies the pursuit of a program that encompasses the knowledge required for the construction sectors (Victor, Eugenio, & Alenjandro, 2012). Some believe that managerial education can be acquired at the workplace or should be introduced and integrated as part of undergraduate programs (Ariditi, 1984). However, the availability of any structured framework that can be referred to incorporate the knowledge area is still in question. Hence, this paper aims to explore the perception of the industry practitioner and stakeholders on the currently available reference framework used as a term of reference for developing the Construction Management education and training programs.

2. Construction Management Education

Projects are becoming more sophisticated and challenging to manage. The reasons for this are rooted in the rapid evolution of social and economic activities during the last decade. The project, which consists of activities with many interacting parties, has put forth challenges in the management of the project. For example, in the planning stage, where several parties need to cooperate to produce thorough planning, which is to provide the guideline for the project to be completed within the stipulated time, cost, and decent quality. The coordination of works between these parties is crucial in achieving the desired goals. The overall quality of the project intrinsically depends on the quality of the associated process (Conradi, Fernstrom, Fugetta, & Snowdon, 1992). These emerging challenges and demands for personnel to be well versed in the overall structure of the project and this is where education and training need to play a role.

The higher education sector has a significant role to play in responding to the predicted skills shortage for the construction sector, and there is evidence showing that retention of graduates in the industry and application to built environment degree are falling (Carter, 2006). Project failure is due primarily to getting the wrong people who are ill-trained for the job, with the wrong attitude, irresponsible, and questionable integrity (Tan, 2004 p:128). Several authors have highlighted that part from course content relevant to job-related situations. Moreover, Construction management skills involve people relationships, which is why most of the skills relate to direct human and project interrelationship (Haryanti et al., 2017). There is the need for an appropriate teaching approach that bridges the perceived mismatch between formal academic instruction and on the job training (Kim et al., 2002; Sanyal, 1991; Ellington et al., 1998; Schaafsma, 1996; Nicholas & Theo, 2007).

Construction management has been recognized as a professional discipline. Undergraduate and postgraduate degree courses have proliferated into many university curricula in countries such as Australia, Hong Kong, China, the UK, the

USA, and Singapore (Love & Haynes, 2001). Also, the discipline has steadily gained status and recognition in the eyes of industry clients and other built environment professionals (Fryer, 1997; Love and Haynes, 2001). Construction graduates are currently in high demand by contractors in all types of construction, including residential, commercial, industrial, highway, and heavy construction (Abudayyah et al., 2000). Considering the diversity of employment opportunities for construction management graduates, they increasingly need to have a portfolio for skills to work efficiently and effectively with other professions in the industry (Love and Haynes, 2001). Smallwood (2000) suggested that construction management undergraduates program need to focus on management and, more specifically, the management of resources within defined parameters, along with the requisite technical experience (Love, Haynes, Sohal, Chan, & Tam, 2002).

2.1 Project Management Standard

Standard is a level of quality, achievement, that is considered acceptable or desirable. Webster (2014) defined standard as something set up and established by authority as a rule for the measure of quantity, weight, extent, value, or quality. It is universally or widely accepted, agreed upon, or established means of determining what something should be. PMI (2013), defined a standard as a document, established by consensus and approved by a recognized body, which provides for frequent and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.

Project management standard refers to the rule of practice in project management. These standards are produced by the project management association such as PMBoK, APMBok, and Japanese BoK, P2M. Project management's professional associations began being formed in the late 1960s/early 1970s principally to facilitate the exchange of information, mainly via conferences, seminars, journals, and magazines. In the mid of 1970s' however, PMI, the US-based Project Management Institute, and later APM, the UK based Association for Project Management, embarked on programs to certify that people met their standards of distinctive knowledge (Engwell, 2003; Morris, 1994). It required a reference work to be used as the basis of the certification tests. PMI established the first version of its (Guide to the) Body of Knowledge in 1976, although it was first published in 1983 (Crawford L., 2004). Various other national project management associations produced their versions, in some cases quite different from PMI's, over the next 10 - 15 years. Several upgrades have followed since.

There are currently three formal and most influential project management 'Bodies of Knowledge': those promoted by PMI, by APM, and by the Japanese ENAA (Engineering Advancement Association of Japan) and JPMF (Japanese Project Management Forum) (Morris, Jamieson, & Shepherd, 2006). The three are not inconsistent but the conceptual breadth – the scope – of each of these three, from this research view, increases as one goes from PMI's PMBoK Guide to the APM BoK and then to the Japanese BoK, P2M. The latter two, the APM BoK and P2M are much broader in conceptual breadth and scope than the PMBoK Guide.

These BoKs has been developed under a process based on the concepts of consensus, openness, due process, and balance, standards provide guidelines for achieving the specific project, program and portfolio management results (PMI, 2013). The development of such measure has been mostly qualitative, based on the collective opinion of experienced practitioners as to what project personnel needs to know and what they need to be able to do to be considered competent. The assumption behind the development and use of project management standards is that the standard describes the requirement for effective performance of project management in the workplace and that those who meet the standards will therefore perform, or be perceived to perform more effectively than those whose performance does not satisfy the standards (Crawford, 2005).

2.2 Project Management Standard as The Term of Reference

The project management standards are being used extensively throughout the world in education, training and development, professional certification program, and corporate project management methodologies on the assumption that there is a positive relationship between standards and effective workplace performance. However, according to Crawford (2005), there has been no empirical research reported that supports or indeed question this assumption. Morris et al., (2006) also ask whether knowing what it takes to manage a project will ensure a complete performance? Morris et al., (2006) also argued that it is quite challenging to demonstrate the causal linkage between BoK and project success (Cooke-Davies, 2004) methodologically, and this area has been virtually ignored in the project management literature. Nonetheless, it has generally been accepted that these standards are the primary reference for project management practice.

There is little evidence that suggests how knowledge of BoK topics is correlated with improved project performance, and it is dangerous to put too much credence on BoK's ability to guarantee project performance (Morris, Jamieson, & Shepherd, 2006). However, a study by Hodgson and Cicmil (2006), Thomas (2006), Thomas et al. (2002), and Williams (2004) suggest that a proper mechanistic application of the BoK can lead to satisfactory project outcomes. The mechanical approach requires an appropriate mechanism to be made available to ensure the applicability of the BoK in the management of public projects.

3. Methodology

This study uses a qualitative design that adopted the exploratory approach using an open ended questionnaire for data collection. The data collection has been carried out to obtain actual industry practitioners' perceptions of the availability of a commonly recognized term of reference for construction management education. The focus areas of the data collection were:

- The current state of the available term of reference.
- The function of the current professional standards.
- Availability of proper term of reference.
- The need for an improve reference framework.

This open ended questionnaire has been distributed during ACPM Annual gathering. The sample for this study has been chosen from the members of the Association of Construction Project Managers Malaysia (ACPM) using purposive sampling technique. Most of the ACPM members have more than 15 years' experience in the management of projects. In addition, to be the ACPM member, one must possess several distinct criteria of project managers and also go through a certification process as a project manager. It is considered that the sample chosen is experienced and represents the professional practitioner.

Fifty questionnaires have been distributed during this session. However, only ten completed questionnaires have been able to be collected. These respondents represent the developer, the main contractor, and also the consultants. Their insight is vital as they have the first-hand experience on project management and what are the areas needed to be focused. Although the number is quite low, the respondent that completed the questionnaire did represent a G7 company which handle a multimillion and prolific projects. The respondent profiles are as shown in Table 1.

Table 1 - Respondent profiles.

Respondent	Position	Company Grade	Years of Experience
1	Project Manager	G7	19
2	Project Director	G7	23
3	Project Manager	G7	24
4	Project Manager	G7	20
5	Project Manager	G7	19
6	Project Manager	G7	21
7	Project Manager	G7	22
8	Project Director	G7	23
9	Project Manager	G7	19
10	Project Director	G7	18

4. Result and Discussion

Result for this study has been derived from an open ended questionnaire which has been collected during a ACPM Annual gathering ACPM in the Faculty of Architecture, Planning and Surveying (FSPU), University Technology MARA (UiTM). The result of the open ended questionnaire survey as shown in Table 1.

Table 2 - Result summary.

Questions	Respondent	Responses	Themes
What is the current state of the available term of reference?	1	They are very confusing. No direct guideline to follow.	Available standards are confusing and insufficient
	3	What do you mean by Project Management frameworks? If you mean the existing methods like PMBOK, PRINCE2...then it is very confusing	
	5	Still in the stage of confusion	
	6	The existing framework does not ensure full competency needed for a project manager to control the whole project lifecycle.	
What is the function of the current professional standards?	7	There are elements in project management not adequately address in the context of skills required to apply during the performance of project manager duties.	Current SOP/RF is not standardized and not fully integrated
	1	Not organized as there is no standardized procedure to be followed.	
	2	From the government context, they have but not integrated. Lack standard or regulation, different projects are managed differently.	

Table 1 - (Continue)

Questions	Respondent	Responses	Themes
	3	Have a basis but not standardize.	
	4	There exist frameworks, but it is not comprehensive.	
	6	This because of the lacking of guidelines or checklist that we can refer in order of gaining total confidence from the practitioners in the construction industry.	
	7	Need to be more transparency	
		Need a common understanding in practice	
	8	There seems to have existing frameworks but not strictly implemented	
	9		
	10		
Is there any proper term of reference available?	2	Currently, there is no national standard for project management framework	The availability of a holistic RF is in question
	3	No, emphasize by the client, they care more about the final product rather than the process.	
	4	The availability of Project Management frameworks is too small, and it supposes to be wider / holistic to ensure the success of the project.	
	5	Some of the Project Management frameworks especially on client side only has availability on feasibility part and not for the whole project.	
	6	To look at the holistic component of project management, it seems there is gap exists.	
	8	Very general and the implementation is not overall / holistic.	
Is there a need to improve the reference framework?	1	There is room for improvement.	Current RF needs to be improved
	2	Still, need to be improved and upgraded to suit the current environment	
	3	The existing project management frameworks should be added more flexibility.	
	4	Lack of in-depth details.	
	5	Seems inadequate and further upgrading is required	
	6	Insufficient and needs improvement	
	7	It needs to be review	
	8	Especially in the public sector, lots of improvement needed.	
	9	There are gaps in the field offered by the higher institution, further improvement is needed.	
	10	There is a gap between the competencies needed by the industry and provision in modules of training and education.	

From the analysis, we can summarise the findings into four key issues. The first issue is related to the insufficient and confusing available standard found within the practice. Within the practice, there are several standards produced by professional associations such as the International Project Management Association (IPMA), Association of Project Management (APM), and many more. The primary purpose of these standards is to provide an understanding of the key knowledge areas of project management rather than to offer ways to manage projects. It is up to the practitioner's understanding to translate the standards into a working reference for managing projects. These standards although may cover the essential fundamental areas, but it varies depending on the regulations and policy governed by the country they are based in. Nevertheless, their standards have been used worldwide, and the variations of their standards have been produced by different countries to suit the practice of the country.

The current reference framework, which is relatively adopted from the international standard, such as the Project Management Book of Knowledge (PMBok®), is found to be too general. Different interpretations can be made by different people based on their understanding. It has created a variable understanding among the practitioner and curriculum developer, which has lead to the development of a different form of guidelines and reference which are currently being practice. Due to the absence of a generally accepted holistic term of reference, academic and professional practitioners don't have an overview of the whole structure of construction project management. Furthermore, to apply the content of the PMBoK, one must be experienced and understand how construction management should be practice properly so that the content can be translated into practice. In the development of curriculum, design attempts to consider the ways students are engaged, how information is represented, and learning expressed (Farrow C. B. & Leatham T., 2020). With a proper term of reference, this requirement can be met and mapped properly to the industry needs and ensure comprehensive education delivery.

This has contributed to the second issue, which is related to the current Standard of Procedure/Reference Framework, which is not standardized and integrated. With the variety of international standards available to be referred, it has caused a variety of understanding on how to interpret the standards depending on the experience and knowledge of the practitioner. Furthermore, as for Malaysia, a professional body which governed the practice of project management is still in its infancy stage, and there is minimal effort to develop such standard. The practice may opt to use the standards which they find suitable for them. Unless a proper standard design for our industry is to be made available, the practice may still face the variation and different interpretations of standards adopted in practice. It has also affected the curricular of construction management in tertiary education and indirectly affected the graduates' performance. From the industry feedback, there exist preferences for graduates from certain public higher education institutes due to student performance in the workplace. The variety understanding and interpretations of the standards has given an effect on the employability of the graduates, and it is important for educational institutions to develop the programs which provide high employability chances for their graduates (Afolabi et al., 2019).

The third issue is related to the availability of a holistic reference framework. Since there is still lacking in the availability of national standards, a comprehensive reference framework also seems non-existent since there are no standards that can be followed to develop one. And due to that, the fourth issue has identified that the need to developed and improved the reference framework that suits the industry needs. During this study, questions arise as 'why do we need such framework?' and, 'should the Body of Knowledge (BoK) guideline already be sufficient?' The BoK may be sufficient to a certain extent. However, bear in mind, BoK is relatively a guideline of the knowledge area found within the project management, which is design to cater to a variety of disciplines. It is needed to be designed as general as possible without sacrificing the essence of project management so that it does not tend to be biased towards specific disciplines.

Moreover, the BoK initiatives are an attempt to define the body of knowledge primarily for certification processes (Morris, Jamieson, & Shepherd, 2006). It gives guideline in what consist of project management rather than to guide on how to manage a project. The standards did tell what must be done but did not say how (Gough & Hamrell, 2010). From the summary, it can be observed that there is lacking in the available term of reference. Overall, a structured term of reference needs to be made available. The available term of reference is insufficient and very confusing. The current term of reference is not standardized and not fully integrated, and to a certain extent, the availability of a holistic term of reference is in question.

5. Conclusion

This study has highlighted the perception of the adequacy of the term of reference for construction management education by the industry's practicing professional. It can be concluded from the study that there is an absence of a commonly recognized term of reference for the CM education. This absence has created variables on how the CM is perceived and, therefore, has created inconsistency in the CM program. A working reference framework needed to be made available to complement the available international standard to give a clear structure on how CM programs should be developed. It is suggested that a more structured and holistic approach needs to be adapted to provide the 'know-how' of Construction Management, and a commonly recognized term of reference is needed to be made available to achieve the desired outcome.

Acknowledgment

We would like to record our appreciation for the award of the University Research Grant (GPU-Khas) 2017-0308-107-01, RMIC, Sultan Idris Education University.

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