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Conference or Workshop Item

Published Version

Mihara, Hitoshi, Kurokawa, Megumi, Hughes, Will ORCID logo ORCID: <https://orcid.org/0000-0002-0304-8136> and Hojo, Tetsuo (2014) The comparison of construction management curricula in universities between the UK and Japan. In: 30th Annual ARCOM Conference, 1-3 Sep 2014, Portsmouth, UK, pp. 1443-1453. (Volume 2) Available at <https://centaur.reading.ac.uk/106459/>

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THE COMPARISON OF CONSTRUCTION MANAGEMENT CURRICULA IN UNIVERSITIES BETWEEN THE UK AND JAPAN

Hitoshi Mihara¹, Megumi Kurokawa², Will Hughes² and Tetsuo Hojo¹

¹ *Institute of Technologists, 333 Maeya, Gyoda, Saitama 361-0038, Japan*

² *University of Reading, Whiteknights, PO Box 219, Reading RG6 6AW, UK*

The development of CM education in universities is of significant interest both for academia and practitioners. The comparison of CM education between countries may provide insights into development in different places. The purpose of this research is to consider the contextual differences in construction management (CM) taught education between UK and Japan. Curricula in the two countries were compared. Interviews were carried out in UK universities to learn more about UK CM education. UK curricula were found to be heavily influenced by partnerships with British professional institutions. In contrast, the curricula of Japanese higher education institutions are restricted by the Ministry's requirement in relation to professional licenses. This raises interesting questions about how each institutional context influenced the development of different kinds of skill. The self-regulation of the professions in the UK seems to make British higher education for the professions more responsive to contemporary industry needs. In contrast, Japanese government's control over the curricula is aimed at developing wider architectural and engineering skills. The intention of this paper is to promote dialogue between British and Japanese institutions for the wider development of CM education.

Keywords: curriculum, education, employment, institutional force, professional license.

INTRODUCTION

Construction management (CM) education has developed in different ways in different countries. Since the curricula differ, it may be possible to transfer learning between countries about how CM education is defined and constituted in different places. Such a task requires prudence, taking into account the major differences in the way that construction is organized in the two nations. The purpose of this paper is to consider the differences in CM curricula between two countries, to ascertain the extent of these differences and the reasons for such differences. The premise of this research is that various industrial contexts are connected to systematic issues about how curricula are designed and controlled. For example, differences between CM programmes in higher education in Japan and UK may variously be related to contextual industry practice, to professional infrastructures or to the way that universities are regulated and managed. The broader aim of this research is to develop a conversation between British and Japanese academics, professional institutions and

¹ mihara@iot.ac.jp

civil servants about what constitutes CM and how it may be developed in both countries, while respecting the crucial contextual differences in each country.

LITERATURE REVIEW

Some scholars advocate that higher education (HE) CM curricula need to reflect practical knowledge of the industry. For example, Sher and Walker (2013) studied the development of students' management skills through a computer-based simulation of operating a hypothetical construction company. They reported that simulations modelled on practical cases helped to engage students. Students were able to understand financial management in a practical sense, in a way that can be difficult to deliver through traditional teaching approaches. Sloan (1995) suggested that there are various ways of using computer-assisted learning (CAL). He advocated that universities might use CAL strategically to develop competitive advantage. More specifically, universities are being asked to provide for the needs of their "customers" including students, government and industry. Although his focus was on the use of CAL, his attention to meeting the needs of the wider context of higher education is worthy of attention in considering the broader context of education.

Attention has also been paid more generally to the design of HE programmes. Arditi (1984) reviewed graduate construction management programmes offered by departments of civil engineering in the USA. He found that programmes differed in terms of the concentration and emphasis of each subject category, such as construction technology and general management. However, he did not further explore why the programmes differed from each other. In contrast, Devaney and Roberts (2012) extended the study of CM programmes with regard to graduate employability. They questioned how the different types of qualification affect the employability of property and construction graduates. Their results suggested that a postgraduate degree in land and property management increased the probability of graduate level employment, which was not seen in the cases of construction, quantity surveying or building surveying. They implied that a wider context, such as economic downturn and industry's needs, has to be taken in to account in the provision of programmes. As a means to raise graduate employability, Mullin *et al.* (2010) especially focused on how to accommodate industry's demands into educational programmes. They analysed the gap between graduate skills gained from CM programmes and industry's demands for graduates in the workplace. With a specific focus on soft skills, including team working and leadership, they conducted questionnaire surveys to investigate the views of academics, senior practitioners and recent graduates. They identified certain soft skills that seemed to be needed in the curriculum. However, they did not propose specific ways of improving actual curriculum design according to such industry needs in practice.

One way to tackle this problem is to seek to bridge the gap between HE and industry. Some articles suggest that this might be beneficial for both constituencies. Gann (2001) studied construction firms' capabilities to take up and implement the outcome of academic research from UK universities. He found that professional institutions play a major role as repositories of knowledge. He also noted the role of government as a sponsor of academic research, particularly the low level of investment in R&D in the construction sector. This implies that the institutional contexts that influence academic practice are different in each country. For example, the influence of the government is much stronger in Japan than in the UK. Significantly, Cieszyński *et al.* (2006) studied graduate CM programmes offered by the UK HE institutions to provide

insights into the required qualification in Poland. They noted the importance of the role of accreditation bodies in the UK, which have a big influence on the design of CM programmes. They developed a matrix-categorization of the various disciplines of knowledge required in CM in order to provide insights into the development of CM programmes in Poland. However, they did not further explore professional bodies' influence on the HE institutions' programmes.

In the UK, there seems to be a clear understanding about how to constitute a CM programme. This includes factors such as the needs of students in relation to their employability, the needs of government as a sponsor of academic research and the needs of the industry such as the development of soft skills. In the UK, such programmes have evolved over decades of interaction between industry, professions and both further education and HE establishments. In the absence of such a history, countries like Japan have been seeking how to develop CM programmes that are contextually appropriate. For the purpose of providing insights into the potential for CM education in Japan, a first step is to understand such contextual differences. The specific focus of this research is on educational institutions' concerns about the wider context that influences their design of the CM curriculum in UK and Japan.

METHODS

This paper builds on previous research that involved analysing and summarizing Japanese HE curricula (Mihara *et al.* 2013). To develop an overview of UK universities' approaches, their curricula were studied and interviews were conducted with academic staff in September 2013. Based on our discussions, as experienced UK and Japanese academics, interview questions were developed and sent to interviewees prior to the interviews. The questions included the following: (1) types of CM programmes offered, (2) distinct features of the university's programmes, (3) constraints and requirements of curriculum design, (4) industry's involvement in curriculum design, (5) graduate destinations and (6) contents of subjects provided. Each interview lasted from one to two hours. In parallel with the interviews, the curricula and the aims of the programme were collected from the universities' websites and brochures, as well as through direct contact with university administrators.

Four universities were targeted due to their reputation in the CM area, which have been anonymized and are referred to as A, B, C and D. Interviewees were selected from those who were engaged in the design of CM programmes. The access to these interviewees was gained through personal contacts. Due to the availability of interviewees during the first author's visit in the UK, the positions and numbers of the interviewees vary in each university. In University A, the interviewee was in charge of designing MSc programme as well as teaching undergraduate students. In University B, the interview was conducted with three personnel; the Director of Research, a BSc programme leader and a Higher National Certificate (HNC) programme² leader. In University C, the interview was conducted with the Head of School, who provided answers with regard to the operation of the school. In University D, the interviewee was involved in curriculum development as well as teaching undergraduate students.

The interview data was analysed to explore participants' major concerns in relation to the curriculum design. The specific analytical method was to code interview

² HNC is a qualification that is roughly equivalent to one year of university. Typically, those who are in employment take this course in order to get into an undergraduate course. After successfully completing the HNC, such students can gain a degree with one further year of full-time study.

transcripts to seek common themes. The themes sought were those that would help to understand the wider context that influences their design of the CM curriculum. Following the analysis of the UK universities, the curricula of three higher education institutions in Japan were compared with what was learned in the UK. The three Japanese institutions were selected as their curricula had previously been collected and reported (Mihara *et al.* 2013). Specifically, the inclusion and emphasis of each subject was compared between Japanese and UK curricula. Finally, additional clarifications were sought through questionnaires distributed to academic staff in Japanese institutions through email. The comments gained from these questionnaires are used to discuss the future development of CM education in Japan. The selected Japanese academic staff were all in charge of curriculum design.

The reason for the different methods used in UK and Japan is that the field-work was carried out by the first author, whose first language is Japanese. Interview transcripts of UK participants were needed to ensure adequate translation of the responses to questions. There was also the need to understand the institutional context. Simple written responses were adequate for communicating with Japanese participants.

FINDINGS

CM education in the UK

The interviewees' answers varied depending on their roles in curriculum development and the scales of the university. For example, University B's answers mainly focused on the differences between programmes (HNC, BSc and MSc) as the three staff were interested in discussed these differences with each other during the interview. In University B, the detailed content of subjects was not explained as the interviewee was in charge of overall programme design. In contrast, University D's answers were mainly related to how to teach students as the staff had a close relationship with a small number of undergraduate students in a teaching process.

Also, it was discovered that CM courses may or may not be separated from other courses such as Quantity Surveying, Building Surveying and Property Management. This is because the distinctiveness of these courses and their titles varied between universities. CM courses at undergraduate and MSc level were particularly focused. For example, University C offered so many different courses, all of which could not be explained during the time of the interview. These unexpected difficulties with regards to the difference in interviewees' perspectives and that in the distinctiveness of course names led to the collection of relatively inconsistent information between universities. However, this is seen as acceptable as the main purpose of this study was to explore and broadly understand the range of different perceptions with regard to the context of CM education in UK universities.

The analysis of the interview data gained from the UK resulted in the identification of UK universities' main concerns about the industrial context. First, there were concerns about the relationship with professional bodies such as Royal Institution of Chartered Surveyors (RICS) and Chartered Institute of Building (CIOB). Second was their concern about graduates' employability. The close relation between these two concerns marks the distinctive features and aims of curriculum design. This is because the accreditation of these professional bodies (e.g. RICS, RIBA) is significant in recruiting students who have certain vocations in mind (e.g. quantity surveyors, architects). Graduates who have taken accredited courses are exempt from further professional exams for membership of professional institutions, which is often a

requirement for employability. In order to gain and retain accreditation, professional bodies visit accredited HE institutions every five years to check that their curriculum conforms with contemporary professional needs.

Other themes were identified from the interview transcripts, including the balance between teaching of hard and soft skills, the regular meetings between academic staff, professional bodies and industrial professionals and the involvement of professionals in teaching. These are seen as specific means of meeting major concerns about professional bodies and graduate employment. In Table 1, these two major concerns in each university are summarized.

Table 1: Features of the UK Universities' CM education

	University A	University B	University C	University D
Identified features of the design of CM programme	Integration of broad areas of construction management	Distinction between programmes in relation to the balance of theory and practice	Two masters courses aimed for domestic and international markets	Emphasis on construction techniques
Partnership with professional bodies	CIOB/RICS	CIOB/RICS	CIOB/RICS	CIOB/ABE
Entry requirement	360 UCAS points	320 UCAS points	260-300 UCAS points	240 UCAS points
Graduate employment	Consultancy, construction companies	Consultancy, construction companies	Consultancy, construction companies, subcontractors	Regional construction companies, subcontractors

In University A, the broad range of subjects is provided in an integrated way. The curriculum includes the management of property, construction procurement and construction operations. Not only management skills, but students' technical skills are also developed, especially in relation to building surveying and the maintenance and repair of buildings. Building information modelling (BIM) was recently incorporated into the curriculum as providing opportunities to develop the students' capability to integrate technical knowledge and management skills. The aim of this university's curriculum is to prepare graduates for a career leading to a senior management position in related vocational disciplines. The majority of graduates become consultants. With the support of RICS and CIOB, as well as building surveying and property management companies, industrial placements are provided as a career development module.

In University B, the curricula were distinctive in each programme (HNC, BSc and MSc) in relation to the kinds of knowledge and skills the students need to develop. In the undergraduate course, cost management occupies a significant proportion. This is in response to the requirement for the accreditation of RICS. The accredited programmes are followed by students who aim to become quantity surveyors. In contrast, the curriculum of MSc courses emphasizes the development of skills for managing people. This is related to the strength of research area in this university. In the HNC programme, the science of construction is central, including the use of BIM. One of their challenges is to balance theory and practice in the curriculum. The University employs some academic staff who have rich work experience. Also, they regularly hold an employers' forum to seek their opinions about the curriculum. In

response to industry's needs, soft skills including communication skills and leadership were considered to be increasingly important compared with hard skills.

University C has two CM-related, MSc programmes; one is for students who aim to work in the domestic market whereas another is for students who aim to work in the international market. The university is proud of the large number of students and their variety of graduate destinations from consultancy to subcontractor companies.

Through the partnership with RICS and CIOB, professional opinions are incorporated into the curriculum with different emphasis. Some subjects reflect the wishes of RICS, while others reflect the wishes of CIOB. Regular meetings are held between academic staff, practitioners and students. Also, lectures from practitioners and from doctoral students are encouraged as a way to integrate practice, teaching and academic research.

University D's CM education reflects its history. The university used to be a technical institute catering to the local industry. Its particular emphasis on the development of industry-relevant, practical skills led to the recruitment of students with various backgrounds including construction operatives. The programmes are accredited by CIOB and Association of Building Engineering (ABE), but not RICS. This is because the minimum level of entry requirement dictated by RICS is above the level that that University can recruit. Due to this restriction, students who aim to become quantity surveyors do not normally come to this university. Instead, some graduates become building control officers as the accreditation of ABE is suitable for this profession. Active partnerships with local employers enable some graduates to be employed by regional contractors, as well as by subcontractors. The university has an industry advisory board in which people from local industry advise on programme content.

CM education in Japan

The curricula of Japanese HE CM education reveal marked differences from the UK. The study of these curricula was augmented with an emailed questionnaire sent to the participating universities for clarification of specific points. The three participating institutions have been anonymized and are referred to as E, F and G. The questions included: (1) particular features of CM education, (2) industry needs and (3) partnerships with industry.

The institutions encompass CM curricula in the Department of Architecture. This is because there is no HE education in CM outside of architecture schools. In Japanese, the term, *Kenchiku*, has an approximate translation as architecture. However, the term is much wider than this translation would imply, as it infers the whole non-civil engineering sector, including the process of building. This can lead to much confusion in making detailed comparisons.

The *kenchiku* curriculum is mainly designed under the influence of the Ministry of Education, Culture, Sports, Science and Technology (MECSST). Significantly, the Ministry sets the requirements for the curriculum in HE as eligibility requirements in relation to examinations for attaining a professional licenses include first class architect (*kenchikushi*) license and Engineering Operation Management Engineer certificate. Students mainly aim to attain the license of first-class *kenchikushi*, which is of significant importance for career development.

The selected institutions have particular features in terms of CM education. Based on the study of UK universities, Table 2 summarizes the features of Japanese HE institutions in relation to the background institutions and graduate employment.

Table 2: Features of Japanese higher education institutions' CM education

	University E	University F	Institute G
Emphasis of the programme	Large proportion of management and planning	Architecture	Construction techniques
Background institution	MECSST	MECSST	MECSST
Graduate employment	Construction, housing, architecture, real estate	Construction, housing, architecture, real estate	Construction, builder architecture, real estate

University E included a relatively large proportion of management and planning subjects in the curriculum compared with other universities. CM subjects include construction methods, construction process, building economics, building industry, housing process planning and urban design. The academic correspondent in this case stated that the Ministry's requirements for a first-class *kenchikushi* license have a major impact on curriculum design. He wrote that the curriculum benefits in developing broad architectural engineering skills including structural and services engineering as well as construction methods. He pointed out that current CM education may need to respond to a problem in the industry that architects and contractors lack a clear sense of roles and responsibilities. In terms of the partnership with the industry, he asserted that construction companies are not motivated to establish partnerships as they do not expect universities to develop students' practical skills. The companies are willing to train new employees because there is a common expectation for lifetime employment or, at least, employment for a long duration.

In University F, management subjects are not particularly emphasized in the curriculum. However, some of the academic staff carry out research in construction management. CM subjects include building economics, facilities management and process planning. These are optional subjects and not required for graduation. In response to our questions, the participants suggested that the University may be too focused on how to meet industry's needs. The partnership with industry is seen in internship schemes for students and cooperation in academic research. Our correspondent mentioned that maybe either academia or industry had not made much effort in developing the partnership because the partnership is not a necessity in Japan. He also mentioned that the requirements for a first-class architect license have a major impact on designing the curriculum.

Institute G emphasizes much more on the development of technical and practical skills. Management skills are gained from practical experience which is incorporated into the curriculum, including mock-ups of real construction processes. Internship is a required subject for graduation. A particular aim is to develop students' practical skills that will be immediately applicable in the industry upon graduation. Graduate destinations vary from builders to real estate companies. The correspondent felt that there is a lack of knowledge and skills of graduates in the Japanese construction industry. He strongly stated that, in the partnership between HE and industry, there is an urgent need to solve the problems confronting the industry.

Comparison between Japanese and British curricula

CM subjects were compared between Japanese and British curricula. Broader categories of the subjects were developed by authors to make comparison easier, interpreting curricula. As a result, the differences in inclusion or emphasis of subjects

were identified. This was analysed based on the names of subjects shown in the syllabus. The interview data and the frequency with which subjects were mentioned in each category were used to understand the difference in the emphasis of subjects between Japan and the UK. It is acknowledged that the names of subjects may not precisely indicate the content of the curriculum. For example, 'architectural design practice' may be partly included in the subject of 'project' in CM education in the UK, which does not appear as a topic in the curriculum. Also, 'industrial context' may be taught in Japanese universities depending on the research area of academic staff. Despite this limitation, the analysis still provides a basic picture of where the emphasis differs in the two countries (see Table 3).

Table 3: Comparison of curricula between UK and Japan

Categories	UK	Japan	Topics	UK	Japan
Technology	○	●	Construction technology	○	●
			BIM	●	△
			Environmental services engineering	△	●
			Construction material	○	●
Management	●	×	Construction process	●	△
			Human resource management	●	×
			Project	●	×
Design	×	○	Planning ¹	×	○
			Design ²	×	●
Basic principles	○	○	Industrial and professional context	○	△
			Engineering	○	○
			Economics	○	△
			Law	○	△
			Maths, physics, chemistry, biology, geotechnics	△	●

Key: × – Not included, △ – Mentioned, ○ – Included, ● – Emphasized

The result of the comparison provided some insights about the difference in CM education between two countries. First, management is not central in Japan compared with UK. Broader knowledge about the construction industry and human resource management are not taught in Japanese programmes. Also, construction economics and law do not figure highly in Japan. These may be considered as important subjects for graduates who are to become leaders in the UK construction industry. Second, contemporary industry needs, such as BIM, are not often seen in Japan. This is because there is not so much motivation to update the curriculum based on industry's current needs both for universities and practitioners. Third, the main subjects in a kenchiku department in Japan include architectural, structural and services engineering planning and design. This is related to the skills required for kenchikushi professions in Japan. Finally, subjects related to general science such as mathematics, physics and chemistry are included as requirements by the government in Japan. These subjects are a useful basis for learning structural and services engineering.

DISCUSSION

Difference in the background institution

It was found that the professional bodies and graduate destinations play a major role in the way that universities design their programmes. The key difference between the two nations is related to requirements for entering a professional career. The direct government control of the relevant profession is seen in Japan, by comparison with self-regulation of UK professions.

In Japan, the development of the CM curricula is restrained by the requirements for the professional *kenchikushi* license set by the Ministry. Although the number of subjects related to the management area has been increasing in a few HE institutions, these subjects are merely optional. The development of the professional skills of architects is seen as more important. Construction companies employ graduates without practical skills as they educate new employees in their own systems (interview with University E). Therefore, there is not so much motivation for both the academia and industry to develop the partnership (interview with University F). Clearly, this background context does not motivate the development of CM education.

The accreditation of professional bodies is significant in influencing the curriculum in the UK. Students aim to attain membership of the professional bodies as a result of their education in the Universities. The professional institutions tend to restrict entry to the professions to suitably qualified graduates. The particular benefit of this partnership is that this allows the curriculum to be updated according to contemporary industry needs (interview with University B). This is mutually beneficial for HE institutions and practitioners, as the industry is left to the market in the UK (interview with University C). The lack of motivation for the partnership as well as government control over the curriculum makes this updating mechanism difficult to develop in Japan.

Towards the development of CM education in a Japanese industry context

The main general contractors have been proud of managing all aspects of construction projects in Japan for decades, from safety and quality through to process management. However, the management area has been gaining recognition both in academia and industry. The role of professional institutions in influencing the curriculum in the UK may provide insights into the way that CM education might take root in Japan. It is hoped that this paper is the beginning of a more involved conversation between the CM communities in both countries.

CONCLUSION

In this research, the concerns of UK academics in designing CM curricula were investigated. Their main concerns about the partnership with professional bodies and graduate employment were found to have a huge influence on the design of the curriculum. The inclusion and emphasis of subjects were compared between Japan and the UK in relation to these concerns. The relation between HE institutions and professional institutions was found to contribute to the design of CM curricula around meeting contemporary industry needs in the UK. In contrast, the relationship between Japanese higher education institutions and the Ministry was found to develop architects' broader skills as well as restrict the development of CM education in Japan. The key finding is that, in both countries, those who regulate admission to a

professional career are the most significant in terms of the impact on the content of curricula.

This research provides insights into the study of curriculum design in relation to the institutional context. Previous research typically focused on either specific subjects in curriculum or on market needs. This study suggests that it is useful to relate the institutional context to specific subjects, in order to develop a better understanding of the academic-industrial partnership. Also, this study can be applied to investigate CM education in other countries. As a future direction of this research, the way that professional bodies influence curriculum design in the UK will be further investigated. This is expected to benefit the discussion on how to develop CM education in Japanese higher education institutions.

ACKNOWLEDGEMENTS

The authors acknowledge the support of the UK and Japanese universities who kindly offered their data and participation.

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