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The Challenges Faced by the Quantity Surveying Lecturer in Teaching Quantity Surveying Measurement Courses: A Pilot Study

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ABSTRACT

The Quantity Surveying Measurement Course (QSMC) is a core and complex subject that integrates many areas of knowledge to provide Quantity Surveying (QS) graduates with measurement competence and capability. Based on the literature analysis, past researchers say that QSMC lecturers agree that teaching this course is very challenging. Despite QSMC lecturers' acknowledgment that teaching this course is challenging, very little research has been conducted to examine the challenges they face. Therefore, it is a necessity to study the challenges faced by QSMC lecturers to help provide solutions to them in facing the challenges of QSMC teaching, which is the primary goal of the study. In order to collect the data, semi-structured interviews were conducted with a volunteer participant, a QSMC lecturer from a selected higher education provider (HEP). The data shows that the QSMC lecturer has four main challenges: personal challenges, challenges with students, challenges with institutions, and external challenges. The research findings benefit both the education team and the construction industry by raising awareness and encouraging rapid action to improve and reduce the challenges faced by QSMC lecturers. It is important to ensure that teaching and learning can be improved more effectively, making it easier for QSMC lecturers to transfer knowledge while also making it easier for students to understand the things learned.

1. Introduction

The Quantity Surveying Measurement Course (QSMC) is one of the core courses that should be provided by the Quantity Surveying (QS) Higher Education Provider (HEP) in the Quantity Surveying Programme Structure [1]. Its purpose is to provide Quantity Surveying (QS) students with competent knowledge of the fundamentals of measurement works as well as technical skills required by the construction industry. This is consistently mentioned by McDonnell [2], and Marsden [3], that a Quantity Surveyor (QS) is an expert who must have a thorough understanding of measurement principles in order to prepare high-quality Bills of Quantities (BQ). QS professionals' competencies

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and skills in measurement work are critical, and their lack will result in high costs, inefficiency, and profit loss [4]. Therefore, ensuring the best QS education platform is crucial to fulfilling the QS graduates' performance with the norms and requirements of the construction industry, particularly the credibility of the QSMC lecturers. This is because the capability of the QSMC lecturers affects the performance of the QS students. For instance, Yusop *et al.,* [5] and Tunji-Olayeni *et al.,* [6] stated that competence and the well-preparedness of fresh QS graduates are influenced by the effectiveness of teaching methods and the preparation for effective lecturing by the QS lecturers. Therefore, one of the strategies to improve the credibility of the QS lecturers is to explore the challenges they faced and provide them with solutions, which is the major objective of this study.

Most of the QS lecturers have acknowledged that teaching QSMC is extremely challenging because of its complexity [2,6,7]. According to Lee [8], QSMC is a complex subject because it integrates multi-knowledge disciplines and processes, and this subject is designed according to the QS professional tasks. For instance, the QSMC integrates multi-knowledge such as construction technology, mensuration application, reading drawings and specifications, and the QS disciplines such as interpreting the Standard Method of Measurement (SMM) and BQ documentation [8]. Furthermore, QSMC purposely trains the technical skills of the QS students with the QS tasks in measurement works that involve multi-processes and tedious works such as 'taking off' and 'working up' [9,10,11]. The complexity of the QSMC presents challenges to the lecturer, who should prepare himself or herself not only with the content knowledge of the QSMC but also with appropriate technological and pedagogical knowledge for an effective teaching and learning process.

The challenges faced by the QSMC lecturer should be addressed and strategies provided to reduce the challenges because the challenges faced by the lecturer may affect the effectiveness of the teaching process, which further creates difficulties for the students to learn the subject. Difficulties from the students may somehow be one of the reasons why the students started to hate the subjects, develop a negative perspective on learning QSMC, and limit the opportunity for the students to develop more competencies and skills that they should gain during learning QSMC. The complexity and challenges faced by the QSMC lecturers have been understood, but little research has been done on this confrontation. Therefore, this study is to explore the challenges faced by the QS lecturer in teaching QSMC as one of the alternatives for improving and providing effective teaching and learning.

1.1 Challenges for Teaching Quantity Surveying Measurement Courses (QSMC)

The term 'challenge' according to Oxford Learner's Dictionaries [12] means a new or difficult task that tests somebody's ability and skill. Moreover, Hickman [13] defined a lecturer as anyone who is involved with facilitating the learning of others in terms of understanding, knowledge, and skills in a specific domain of human achievement. He or she is someone who does this well to the extent to which learners are enabled and empowered through the subject taught. Therefore, based on both the definitions of the terms challenges and lecturers, the objective of this study is to discover the difficult task a QS lecturer faced that tested his or her ability and skills in facilitating the learning of QS students in terms of understanding, knowledge, and skills of measurement works as to the extent the learners are enabled and empowered through the subject taught. The challenges can be considered from various angles, such as the lecturer himself or herself, students, and internal and external factors as assembled based on the information from the previous researchers in Table 1.

Based on Table 1, the common challenge faced by the QS lecturer is choosing appropriate teaching methods, teaching materials, and tools in teaching QSMC [5,14] that can integrate the four elements of theories and practices in the measurement work [8,15,16]. Another challenge that is

faced by the QS lecturer is the students' characteristics and attitudes towards learning. For instance, Nimon [17] and Szabo *et al.,* [18] mentioned that millennial students learning differ from previously. Nimon [17] and Szabo *et. al.,* [18] have discovered several attitudes of today's learners in Higher Education Institutions (HEI), which are known as Generations Y and Z, such as a short span of focus, which is no more relevant to the traditional lecture method where the student sits and listens in the classroom, is less punctual in terms of time, creates problems of attendance, submissions, as well as consultation hours with the lecturers, tends to not stay longer in one company, and this may affect their interests to stay study in which the programmes of study last up to 4 years period of time. Therefore, the QS lecturer has to explore more knowledge about the preferred learning styles of current characteristics students, such as Kamarazaly *et al.,* [19], who mentioned that QS students fall within the cognitivist and constructivist types of learners.

Table 1
Challenges faced by QS lecturer based on previous researchers

Challenges		Author
Lecturer himself/herself	to choose appropriate teaching methods and teaching materials and tools,	[5,6,8,14-16]
Students	attitudes, Characteristics	[17-20]
Internal factors	Unavailability of certain facilities provided, provision of training for using certain facilities time consuming	[2,21]
External factors	to have collaboration or engagement with people in the construction industry	[22]

Moreover, QS lecturers also faced challenges from internal factors, which are the institution. McDonnell [5] and Palis *et al.,* [21] mentioned the challenges faced by the lecturers to acquire skills and adapt to the new technologies before delivering the measurement courses. Besides, the technologies always incur costs to procure the software and get the licence, which sometimes the institutions lack. Furthermore, QS lecturers face challenges in order to create engagement and collaboration with the people in the construction industry, such as the availability and time flexibility between the schedule of QS practitioners and the institution's schedule [22].

1.2 The Complexity of Quantity Surveying Measurement Courses

According to Oxford Learner's Dictionaries [12], the term complexity refers to the state of being formed of many parts or the state of being difficult to understand. The complexity of QSMC is due to the state of integration of multiple sources of knowledge as well as skills. The complexity might be interpreted differently from the point of view of lecturers and students, as the lecturers faced challenges to deliver the knowledge effectively, but for the students, the complexity is due to their understanding of the knowledge and how to apply the knowledge. For this study, the complexity of the QSMC due to requirement to the integration of multiple sources of knowledge, or the content knowledge of the QS lecturers, with the pedagogical knowledge of the QS lecturers as well as the technological knowledge and skills in handling the tools as simplified, in Table 2.

According to Lee [8], the QSMC lecturer has to have good knowledge of the course contents, such as the principles of measurement and mathematics, theories in construction technology, reading the drawings and specifications, taking off and working up processes, and processes involving

measurement works until BQ documentation. The challenges faced by the QSMC lecturer were not only the competency in the integration of multiple knowledges but also the pedagogical knowledge that was appropriate to enable the lecturer to deliver the teaching effectively. Shulman [23] mentioned that pedagogical content knowledge (PCK), which is the combination of content knowledge (CK) and pedagogical knowledge (PK), is very important for effective teaching. PCK in this study is the combination of QSMC course contents and the appropriate teaching methods, teaching skills, and QS skills in measurement work that QSMC lecturers should gain.

Table 2
Quantity Surveying Measurement Courses and the complexity

Description	Complexity	Author
Content Knowledge	• Principles of measurement for each topic and mathematics • Theories in construction technology • Knowledge in reading drawings • Knowledge in taking-off quantities and working-up • Theories in process from measurement works to BQ preparation	[5,8]
Pedagogical Knowledge	• Teaching skills • Different method of teaching • Skills in reading drawings • Skills in taking off quantities and working up • Skills in using QS tool, scale ruler, dimension paper, Standard Method Measurement (SMM) etc	[5,23]
Technological content knowledge	• Knowledge of information communication and technology (software, hardware) • Skills and knowledge of Related QS software and hardware (BIM, autocad etc) • Skills of Virtual reality software, tools, or related apps	[5,8]

Another point that makes the QSMC a complex subject is that the QSMC lecturer also should have technological content knowledge (TCK) in order to teach the subject, such as QS software, virtual reality software, etc. Moreover, the TCK, as well as the strategies required for effective teaching, such as using applications and tools such as laptops and PowerPoint presentations with photos and animation, is more interactive compared to teaching using chalk and talk [5]. In fact, finding appropriate technology and, at the same time, gaining the skills to handle the technology in teaching is one of the situations that create challenges for the QS lecturer in teaching QSMC.

2. Methodology

This study is qualitative in nature, and the philosophical assumptions fall within phenomenology as the research design. The research strategy is a semi-structured interview with selected QS HEP in Malaysia. This study is a qualitative approach that necessitates studying an in-depth investigation of a specific group of lecturers' practices and experiences with regard to challenges that they faced to teach QSMC, and this nature falls under phenomenology research [24].

2.1 Method of Data Collection

The semi-structured interview was adopted because it allows the participant to share their experiences and generally decreases the number of "don't know" and "no answers," which may provide rich data information [25]. The semi-structured interview was chosen because it is less rigid and involves little pre-planning. The interview session was conducted on January 5, 2022, on Wednesday at an unspecified venue as suggested by the participant. The time taken for the interview session was one hour. It started at 12:00 p.m. and finished at 1.00 p.m.

2.2 Sample

Only one volunteer participant was invited to take part in this pilot study since the target group of the actual data collection of the study is small, which is only six lecturers. The participant is a female, 45 years old, and a lecturer from a public HEI that offers a Bachelor Degree in Quantity Surveying Program. The lecturer chosen is actively teaching QSMC and has experience teaching QSMC since 2002.

2.3 Instrumentation and Protocol

The semi-structured interviews were conducted face-to-face. In order to easily record important information in an efficient and sufficient way and to avoid missing valuable information, proper drafts of written notes, a voice recorder in the handphone, and a digital voice recorder (brand Sony) are used, as suggested by Ahmad [26] and Blaxter *et al.,* [27]. The interview protocol followed the processes illustrated in Figure 1. A set of interview questions was drafted, and three members checked the instrument. The background of the members checking were two expert lecturers in qualitative research with experience ranging from twenty-one to thirty years of teaching experience from the school of education, and another member checking was a lecturer with eleven years of teaching experience from the school of quantity surveying. Before conducting the pilot study, other related documents were prepared, including an invitation letter, a consent form for the participant, particularly for ethical procedure and to state the confidentiality of the data, as well as asking permission to record the interview session, the participant information sheet, and an interview guide.

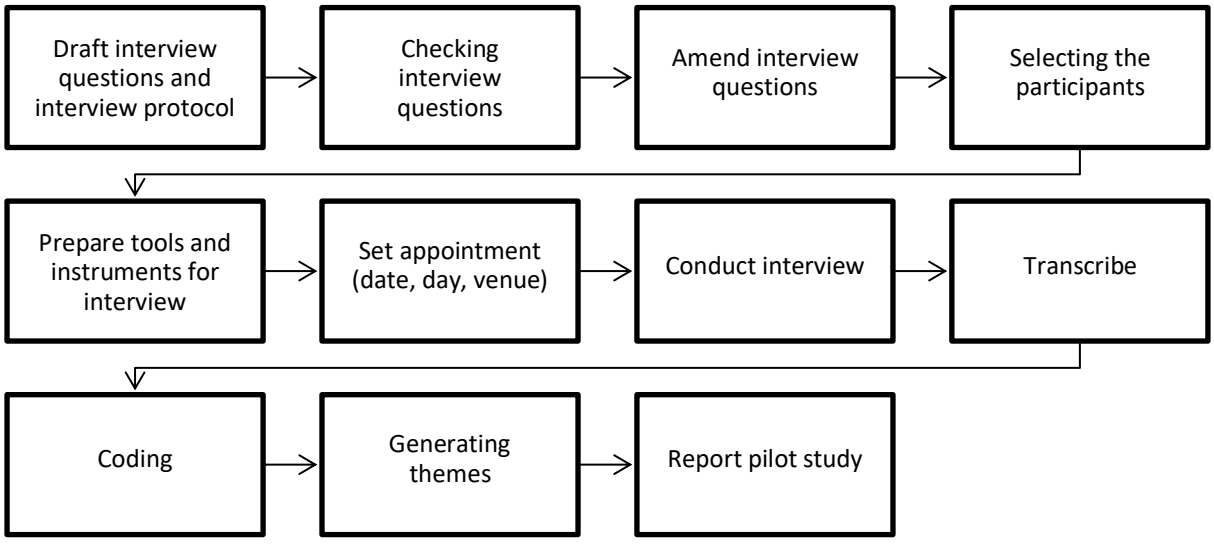

Fig. 1. The interview Protocol of the study

The following are the interview questions or interview guide used for the pilot study:

- What are the challenges you face in teaching measurement courses?
- How do you overcome the challenges?

2.4 Method of Data Analysis

The interview data was analysed using thematic analysis in four stages, as illustrated in Figure 1. The thematic analysis was modified from both Ahmad [26] and Creswell [24]. The first stage is data transcription, which arranges the interview data in a dialogue form known as verbatim transcription [28]. The transcription was done manually without any apps or software since there was only one participant involved. The second stage is data categorization, which involves the coding process. The coding process is to generate the main ideas from the verbatim transcription. The third stage is to produce themes from the main ideas generated in the second stage by merging the key concepts of "challenges" faced by the QSMC lecturer. The last stage is reporting the formulated themes, which will be discussed in the next section, findings, and discussions.

3. Results

Four topics emerged from thematic analysis of the challenges faced by the QS lecturer when teaching QSMC, namely self-challenges, challenges with the students, challenges with the institutions, and external challenges, as illustrated in Figure 2.

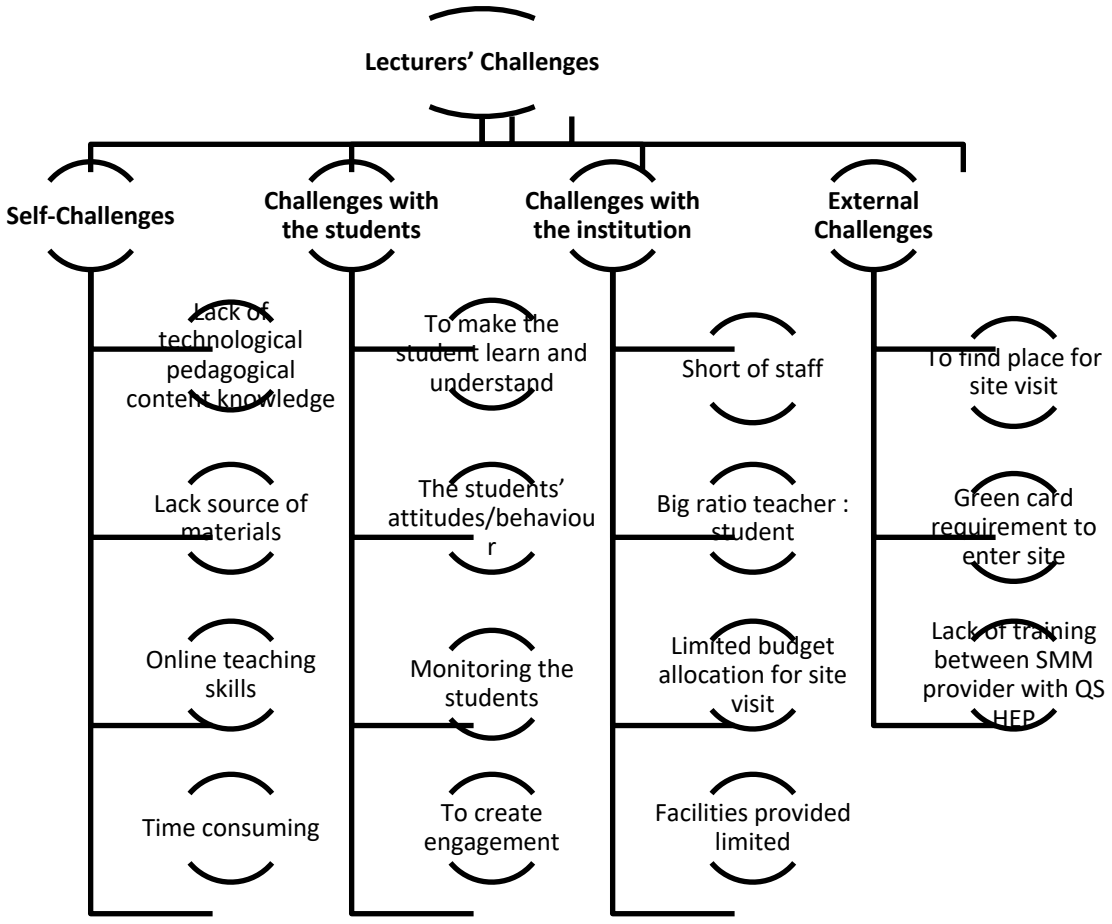

Fig. 2. Challenges faced by QS lecturer in teaching QSMC

3.1 Self-Challenges

Self-challenges faced by the lecturer are divided into four aspects: lack of pedagogical content knowledge, lack of a source of materials, lack of online teaching skills, and time-consuming. The lecturer faced challenges when teaching measurement courses in which the lecturer was unfamiliar with the topic and the topic was specialised. For instance, if the lecturer has to teach the topic of services such as Mechanical and Electrical Works (M&E), this topic is very specialised and commonly handled by the engineers, not the Quantity Surveyor. Thus, this phenomenon puts the lecturer in a state whereby the lecturer lacks pedagogical content knowledge while teaching certain measurement course topics.

Moreover, the lecturers also faced limited sources of material to prepare notes for the lectures since the text book is very limited and certain topics have no references to be referred to. It is because most of the books are from overseas, which is not compatible with the construction system in Malaysia. Not only are the references lacking in preparing the notes for the lecture session, but the lecture also faces difficulties in finding suitable sites for visiting, which denies the students the opportunity to see the real construction works at the construction site.

Furthermore, given the impact of pandemic COVID-19, the lecturer shares the challenges of teaching measurement courses using online platform. According to the lecturer, teaching online is very difficult, tiring, and hard work, particularly without the skills to conduct the technology, such as the apps for the online platform and the tools that are effective for online teaching. Especially to explain the drawings, during face-to-face, the lecturer and students will refer to hardcopy drawings; however, during online, the lecturer has to convert to soft copy and think of effective techniques and strategies, which is quite crucial because the screen of the computer is small. Sometimes it is difficult to show the drawings. Another factor contributing to the challenges of online teaching is the late age of the lecturer, which makes it difficult to adapt to technology.

Another challenge is the time factor. There are three situations faced by the lecturer, such as not having enough time to mark the students taking-offs individually; the lecturer has experience not finishing marking the students works. It is because there are too many items to be evaluated when multiplying the number of students by 14 topics over 14 weeks. However, if the lecturer assigns the tasks based on groups, the students will become free riders. So it is always a dilemma and trial and error for the lecturer. Another situation is the time taken to entertain students during online teaching. Because the platform of communication for the online studio is WhatsApp, the students will consult anytime throughout the day. It is quite tiring. The crucial part about the time factor is when the lecturer only realises that the students do not even understand the measurement in the class when marking the final exam. There is no more consultation with the students after the final exam. This phenomenon happens when the lecturer marks tutorial work for continuous assessment and the students' copy others work. So the lecture cannot trace that the students actually did not even understand during the class.

3.2 Challenges with the Students

There are four challenges stemming from students that lecturers face in teaching measurement courses. The challenge is determining effective ways to make students learn, student attitudes, and appropriate strategies to monitor and create engagement with students. The lecturer mentioned that giving students an understanding of how measurement works is very challenging. Moreover, when the students sit quietly and the lecturer asks, they say they understand. However, when the final exam arrived, the results showed that the students did not actually understand how the

measurement worked. Some students are shy about asking questions because they are afraid their friends will laugh at them. Thus, the students kept quiet even though they did not understand.

It is crucial when the students copy or imitate their friends' works, such as tutorials. Measurements or quantifications require knowledge to write descriptions, interpret relevant clauses, read drawings, and use mensuration to quantify the quantity of the construction items. Thus, knowledge and skills will develop based on the tutorials given. If the students copy the works of friends, they will not learn and will not gain knowledge and skills. Some of the copying tasks by the students can be traced during the semester, but for some of the students, the lecturer only realised this during the final exam, which is the end of the semester, and there will be no more discussion on the measurement for the topics. This phenomenon contributes to low competency and skills once the student graduates. The lecturer also mentioned that when the tasks were given as group work, the challenges were that some of the students became free riders in the group, which led such students to not gain knowledge and skills in measurement work.

Furthermore, the lecturer also faced difficulties when the students did not try to learn to interpret relevant clauses in SMM or read the information and specifications in the drawings when they wanted to write descriptions of construction items but just memorised the BQ standard phraseology. In fact, some of the information in the BQ standard phraseology should be amended, which should tally with the information in the drawings as well as certain clauses in the SMM. Thus, due to memorising descriptions in the BQ standard phraseology without knowing the use of which clauses in the SMM and not reading the drawings, students will not gain the knowledge and skills to write an accurate text description of items for construction projects, which will further affect the cost of the projects. Generally speaking, the lecturer voiced that most of the works of the students were not achieve the expectation of the lecturers.

The lecturer's responsibility for student supervision presents another difficulty. The lecturer frequently leaves the door open for questions from the students, and occasionally, the lecturer may also probe the students directly. The students don't say anything, despite their bad replies, particularly, when teaching online, when it is not necessary for the video to stay open the whole class period in order to conserve the student's internet bandwidth for future lessons. As a result, the lecturer was unaware of the students' attendance during the lecture. Some of the students just keep mute when the lecturer calls out their name.

The lecturer's final student-related problem is determining how to establish engagement with the students during the class and create an interactive class. It is not easy to create an interactive class that can engage the students. For instance, the lecturer procured an app that can play games, which she thought would make the class interactive and create more engagement, but it ended up being vice versa. Thus, this puts the lecturer in a dilemma.

3.3 Challenges with the Institutions

The lecturer faces challenges not only from self-challenges and from the students but also from the institution. The lecturer revealed that the department is short on staff. The impact of the short staff is that the ratio of lecturer to student is high, which is 1 ratio 20 (1:20) and up to 1 ratio 25 (1:25), which is one lecturer for a range of 20 to 25 students. Even suggested by the lecturer to have better monitoring for the students is ratio 1:5. The impact of a high ratio of lecturer to student will lead to unclose monitoring. For instance, the lecturer cannot spend enough time marking or assessing individually, and the lecturer has limited time to entertain all of the students. For a core subject such as QSMC, the small ratio of lecturer to student is very important for close monitoring, in which the close monitoring will be very helpful for the lecturer to entertain one-on-one students to avoid the

lower-performing or introverted students being left behind. One-on-one monitoring is very helpful for discovering each student's problems in learning QSMC and is one of the strategies for effective pedagogy for teaching QSMC. Therefore, the ratio of lecturer to student, specifically for QSMC, should not be similar to other QS courses.

Another challenge faced by the lecturer from the institution is the limited budget for the site visit. Since there is a limited budget allocated by the institution for site visits, the lecturer and students have to spend their own money or collect funds, and the place and number of visits will depend on the amount collected and the affordability of each student. This actually might be a burden to students with low financial ability and might cause them to not follow the trip and miss the opportunity to gain experience and knowledge at the site visit.

The lecturer also faced the lack of facilities provided for teaching QSMC. For instance, the number of personal computers available for teaching QS software is limited. Thus, the students have to share the computers for learning the QSMC software. Even though the students can bring their own personal laptop, they still cannot learn the QSMC software due to the licence, and the cost of the QSMC software is expensive.

3.4 External Challenges

The external challenge faced by the lecturer is to find out the construction project for the site visit. Nowadays, not many construction teams allow students to enter the site of a construction project. It seems that construction people are also not so encouraging for the students to gain more knowledge in the real construction world. Moreover, it is not easy to find a construction project that matches the topic of measurement work that the students are currently learning. For instance, some of the work is already finished and cannot be seen at the construction site during a visit. The requirement for having green card by the students in order to enter the site is one of the challenges faced by the lecturer first to ensure the students get the green card and then enable to enter the construction project. It is a good idea for health and safety purposes but adding to more procedures and time consuming instead of lecturer dealing with the owner of the project to get permission enter the site, due to green card requirement, the lecture has to urge the students to go for training to have the green card.

Another challenge faced by the QSMC lecture is a lack of training about the Standard Method of Measurement (SMM) from the SMM provider, which is the Royal Institute of Surveyor Malaysia (RISM). The interpretation of the clauses in the SMM might vary from one lecturer to another, which may contribute to various interpretations. Therefore, training regarding the SMM might be very helpful to give a certain standard of knowledge transfer to QS students from various institutions, and this may also help avoid misinterpretations of the clauses in the SMM.

4. Conclusions

In conclusion, there are four challenges faced by the QS lecturer in teaching QSMC. The challenges are self-challenges, challenges with the students, challenges with the institution, and external challenges. The first QSMC lecturer challenge is self-challenges which consist of a lack of pedagogical content knowledge, a lack of a source of materials, a lack of online teaching skills, and are time-consuming. The second QSMC lecturer challenge is a challenge with the students, such as determining effective ways to make students learn, student attitudes, and appropriate strategies to monitor and create engagement with students. The third QSMC lecturer challenge is challenges with the institutions, such as being short on staff, which led to unclose monitoring of the students. The

fourth QSMC lecturer challenge is external challenges, including difficulty getting permission to conduct a site visit and the fact that the site visit does not cover all the measurement topics. Some of the construction work will already be finished when the time comes to visit the site.

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