Exploring the Learning Outcomes of International Engineering Students from Chinese Universities

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Work-in-progress

Abstract: In the past decade, China has seen an increasing number of international students from different countries and has become the third-largest destination for international students in the world. An increasing number of engineering students from different countries (e.g. South Korea, the U.S., Thailand, and Pakistan) come to China each year to pursue their degrees. The purpose of this study is to understand the learning outcomes of international engineering students in Chinese universities. Guided by the knowledge, skills, attitudes of learning outcomes framework, this work-in-progress explored international engineering students concerning their learning outcomes and related experience. Preliminary qualitative data analyses suggested that international engineering students in China gained a range of learning outcomes. The identification of different learning outcomes can help us to develop a deep understanding of international engineering students' learning outcomes in China. The findings of this study suggested different valuable experiences which were beneficial to international engineering students' learning. Furthermore, the results reported here could provide suggestions for multiple stakeholders to promote the learning experiences of international students in engineering.

Keywords: International engineering students; Learning outcomes; Chinese universities

Introduction

The landscape of international student mobility in global higher education has been changing over the last two decades. In addition, the countries (e.g. China, Singapore, and Malaysia) that have large study-abroad student populations are now taking an increasingly large market share of global higher education and are attracting a mass of international students [1]. As shown in the Global Mobility Trends, a report released by the Institute of International Education, Mainland China has taken up a 10% market share in 2016, as the third-largest destination for international students [2]. Top five countries that have sent international students to study in China in 2016 include South Korea, the US, Thailand, Pakistan, and India [3].

In 2016, there were 442,273 international students in China in all, in which 48,394 majored in engineering, ranking only below the numbers of students majored in the traditional popular majors-Mandarin Chinese (169,093) and Western Medicine (49,022). In addition, with China joined the Washington Accord as a signatory country and lots of engineering programs taught in English was developed for international graduate students further increase of international engineering students can be expected.

Existent studies have explored the motivation, social-cultural adjustment, learning experiences of international students in China. Nevertheless, few studies have explored their learning outcomes. Considering the shift towards outcome-based education in global engineering education [4], it is essential to explore the learning outcomes of international engineering students. In this work-in-progress, we tried to understand international engineering students' learning outcomes and the associated learning experiences.

Literature Review

The number of international students engaged in higher education has been continually growing, from 2 million in 1999 to 5 million in 2016[5]. Also, nearly one-third of OECD study-abroad students at tertiary education level were enrolled in STEM (Science, Technology, Engineering, and Mathematics) fields of study, with 17% of them in engineering, manufacturing, and construction [5]. Hence, the investigations of the learning experiences of international engineering students have continued to rise.

A number of existent research studies focused on exploring the learning outcomes of engineering students after short-term international learning experiences. Such short-term experiences increased partially owing to the intense global competition and the importance for engineering students to develop global competence [6] [7]. For instance, Bender (2009) interviewed 32 engineering students who participated in international research projects and found that these students have developed writing skills, problem-solving skills, independent skills and self-confidence [8]. Jesiek et al (2012) used the Universal-Diverse Orientation instrument and measured international engineering students' openness to and appreciation of cultural diversity. Their results suggested significant higher levels of cross-cultural competence among the students in the control group and that of students who opted into global programs [9]. McNeill (2010) interviewed engineering students who participated in short-term global learning programs and identified a range of learning outcomes, such as teamwork skills, study skills, leadership skills [10]. Besides understanding engineering students' learning outcome after their short-term international learning experiences, it is also critical to explore engineering students' learning outcomes as they progress through their degree programs.

The importance of understanding students' learning outcomes can be traced to the shift to outcomes-based education in global engineering education [4]. ABET, with the adoption of EC2000, has propagated such ideas among engineering colleges and universities in the U.S. [4]. In other countries and regions, accreditation bodies, such as the European Network for Accreditation of Engineering Education, China Engineering Education Accreditation Association, have further enhanced the awareness of outcome-based engineering education. Among these criteria, expected learning outcomes generally can be grouped into three dimensions: knowledge domain (e.g. an ability to identify, formulate, and solve broadly-defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas

relevant to the discipline.), ability domain (e.g. an ability to communicate effectively with a range of audiences.), and attitude domain (e.g. an ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.) [11]. Researchers have since then explored engineering students' actual outcomes as compared to the expected ones listed in the outcome criteria. For example, Zaharim et al (2009) using convenience sampling, selected a total of 422 companies from various industries in Malaysian to explore the perceptions and expectations of employers towards engineering graduates' skills and attribute. This study found employers were satisfied with engineering students' ability to utilize a systems approach to design and evaluate operational performance, and teamwork skills, but were unsatisfied with their entrepreneurial skills [12]. Martin et al (2005) investigated how well chemical engineering graduates perceive their preparedness for work and carried out sixteen interviews with chemical engineering graduates from the University of Cape Town, finding that they perceived their strengths to be their technical background, problem-solving skills, formal communication skills, and life-long learning abilities. And their weaknesses were also identified, including the abilities to work in multi-disciplinary teams, leadership and management skills [13]. Zhao (2014), adopting a self-designed questionnaire, studied the employers' satisfaction levels of engineering graduates within 263 employers in 300 Chinese firms, showing that employers were pleased with engineering graduates' working performance overall, but their abilities in professional development and engineering skills need be further improved [14].

Against the context of the increased flow of international engineering students in China, this paper focuses on understanding international engineering students' learning outcomes and experiences in China. Existent studies have already examined international students' motivations for studying in China [15] [16], their social-cultural experiences and adjustment in China, and other learning experiences [17] [18]. Based on 40 international students from 22 countries engaged in 13 higher education institutions which located in Shanghai, Ding (2016) identified a low satisfaction level among the international students due to "chalk and talk" teaching, outdated teaching content, and insufficient practical training [19]. In terms of learning outcomes, some researchers pointed out that international students improved their Chinese, communicating skills, critical thinking skills, abilities to live independently and knowing Chinese culture better, and the capability to adapt to a new environment [20] [21]. Despite current understanding of international students in China, few studies have examined international engineering students' outcomes.

In summary, the understanding of international engineering students' actual learning outcomes is important in the context of outcome-based engineering education with regards to the expected outcomes. Nonetheless, what is lacking is a thorough examination of the actual outcomes that were obtained by international students through their study experiences in China. Therefore, in this work-in-progress, we conducted an in-depth exploration of international engineering students' learning outcomes in China.

Theoretical Framework

The knowledge, skills, and attitudes framework of learning outcomes was adopted as the underlying framework in this study [22]. In this study, definitions are a combination of the definitions from the prior studies from Besterfield-Sacre et al. (2000) [23], Deardorff (2004) [24], Downey et al. (2006) [6], and McNeill (2010) [10]. As shown in Table 1, these hybrid definitions have been constructed to understand the learning outcomes of international engineering students in China.

Table 1. Definitions of Knowledge, Skills and Attitudes

Knowledge	Facts Information (Note: It can include both professional knowledge and non-professional knowledge)
Skills	Abilities knowing how to do something Application of knowledge (Note: It can include both professional skills and non-professional skills)
Attitudes	Interests, personal goals, values, and opinions (Such as, awareness, empathy, flexibility, openness, respect, etc.)

Method

Sampling and Participants

In most Chinese research universities (e.g. C9 universities, note: an alliance of leading Chinese research universities [25]), most undergraduate programs for international students are taught in Chinese [26] [27]. Therefore, students are required to demonstrate proficiency of Chinese language during application. But for international graduate students, they are mainly enrolled to English-speaking programs hosted in engineering colleges. Therefore, they mostly attend courses separately from their Chinese peers. This work is part of a larger project to explore international engineering students' learning experiences. This work-in-progress focused on the latter group.

We used purposeful sampling to recruit participants from a leading Chinese research-intensive University H. It is expected to interview a total of 30 international engineering graduates or when the data reach saturation. By the time of writing this paper, we have interviewed 10 participants. To understand the learning outcomes of international engineering students, we purposefully recruited engineering students who 1) were from different countries to ensure the representativeness of our samples; 2) were graduate students (master or doctorate); 3) were at the last semester of their current studies. We got the contact information of international graduate students through the international students' administrative offices, international student associations, and other professional sources. This paper reports preliminary results from the seven analyses.

It should be noted that the top five countries of origin for international engineering

graduate students in University H were Pakistan, Russia, Iran, France, and Nepal in 2018. Students from these countries accounted for about 60% of all student population. The detailed information of the seven international students is presented in Table 2.

Table 2. Demographic Information of Participants

Pseudonym	Gender	Country	Major	Degree
Perry	Male	Pakistan	Mechanical	Master
Parker	Male	Pakistan	Electrical	Master
Phillip	Male	Pakistan	Mechanical	Master
Paul	Male	Pakistan	Mechanical	Master
Pamela	Female	Pakistan	Electrical	Doctor
Peter	Male	Pakistan	Civil	Master
Neil	Male	Nepal	Civil	Master

Data Collection

Qualitative one-on-one interviews were conducted. The knowledge, skills, and attitudes framework of learning outcomes guided the design of the interview protocol and the data analyses. Based on this framework, we designed an initial interview protocol, and then tested and revised it through six in-depth pilot interviews. Sample interview questions were shown in Table 3. Interviews typically lasted approximately 45 minutes to an hour.

Table 3. Sample Interview Questions

Descriptive Questions
● Could you describe the process of deciding to study in China? ● What did you hope to learn or gain from your study in China before you came?
Questions in the Knowledge domain
● What knowledge did you learn from your experience in China? ● How did you acquire this knowledge?
Questions in the Skill domain
● What skills did you develop from your experience in China? ● How did you acquire this skill?
Questions in the Attitude domains
● In your learning experiences in China, have you experienced any change in your interests or values? If so, how? ● In your learning experiences in China, have you experienced any change in your view of China/in your attitude toward China? If so, how? ● In your learning experiences in China, have you experienced any change in your attitude toward Engineering? If so, how?

Data Analysis

Each interview was recorded and each audio file was transcribed. All seven audio files

were transcribed by software which developed by iFLYTEK® and the transcripts were double-checked by the researcher to ensure the accuracy.

A structured coding process has been suggested by multiple qualitative researchers [29][30]. Four information-rich transcripts were chosen for first-round analyses to create a structured codebook [30]. Open coding was used for identifying the specific learning outcomes [28]. In the open coding process, after reading and re-reading, learning outcomes relating to knowledge, skills, and attitude and students' experiences linking with learning outcomes were identified from the text and corresponding codes were created by a primary coder. The codes were negotiated and refined through discussions with a seconder coder via an auditing process. Codes and their definitions were compiled to form a codebook. Using the structured codebook, all seven transcripts were then analyzed.

Findings

Based on the analyses of seven transcripts, preliminary findings of international engineering students' learning outcomes are listed in Table 4. It should be noted that only frequencies that were larger than three were included. The learning outcomes were grouped into three categories, knowledge, skills, and attitudes. It is expected that a more comprehensive list shall be identified as we invite more participants. Example codes from the categories and relevant quotes are described as follows.

Table 4. A List of Learning Outcomes

Learning Outcomes	Frequencies	Count of Students
Knowledge		
A. Fundamental engineering knowledge	16	6
B. Cultural knowledge	14	7
C. Academic environment	2	2
D. Employment	3	2
Skills		
A. Interpersonal skills	14	6
B. Software skills	9	5
C. Research skills (generic)	7	4
D. Teamwork skills	7	4
E. Self-study skills	7	3
F. Teaching skills	7	2
G. Time management	6	2
H. Language skills	5	3
I. Reading papers	4	3
J. Presentation skills	4	3
K. Leadership skills	4	3
L. Design skills	3	3
M. Navigation skills	3	3
N. Hands-on skills	3	2
O. Working under pressure	3	2

P. Living independently	3	2
Q. Problem-solving skills	3	2
R. Organization skills	3	2
Attitudes		
A. Hard-working	11	5
B. Perception of Chinese people-friendly	8	5
C. Empathy	8	1
D. Perception of Chinese infrastructure and economic development-great progress.	7	4
E. Persistence	6	4
F. Self-confidence	5	3
G. Openness to new ideas	4	3
H. Openness to other cultural	4	3
I. Perception of freedom in China-more freedom than expected	4	2
J. Patience	3	2
K. Interest towards research	3	2

Knowledge Domain

In the knowledge domain, students mentioned their learning in terms of fundamental engineering knowledge, knowledge of design, cultural knowledge, sports knowledge, Chinese food knowledge, software knowledge and so on.

Fundamental engineering knowledge

When it comes to what they gained, as shown below, six students mentioned their learning in terms of fundamental engineering knowledge, including, math, physics, thermodynamics, or some specific knowledge relating to their field.

"*One thing I learned is about my field---**mechanical (engineering)***."

--Perry

"*I learn a lot, like **thermodynamics**. Yeah, that about **thermodynamics and design**. And all of those subjects that I have taken, **Heat transfer, Combustion Theory***."

--Phillip

"*Another thing is I learned a lot about courses such as **Technical Communication**, and **Mechanical Laboratory**. Then there was one course for **Virtual Reality**. These are the courses that I never took even in my bachelor's degree or my master's degree.*"

-- Pamela

Cultural knowledge

Within the knowledge domain, cultural knowledge was mentioned by every student. Take Phillip as an example, due to participating in Chinese festivals, he learned about traditional Chinese culture, which helped him to respect others and some rituals.

"*Oh, I have learned about **Chinese culture**. Yeah, I stayed with my professor in*

Jiangshan. Yeah, he brought me in a Chinese New Year. So it was really the best experience of my life that everybody from neighbors to families, everybody came to your house and you had food together, such delicious food all over the table, that experience, I think, I'm never gonna to get again. I really felt home and I really felt that you know, ***fireworks and all that for the Chinese culture in the Chinese New Year****. But I think the Chinese culture might be similar to our culture. Pakistan is also in Asia. We* ***respect our ancestors****,* ***respect our parents our professors****, whoever teaches us, really, have the highest respect.*"

-- Phillip

Skills Domain

In the skill domain, students' perception of their learning gains mainly reflected in the following aspects: software skills, design skills, hands-on skills, time-management skills, people skills, navigation skills, and teamwork skills.

Software skills

Five participants mentioned the different software skills they learned, including the abilities to using software, such as SolidWorks and Matlab for programming and modeling, and for the visualization and analyses of data. When asked about skills learned in China, Perry replied,

"*I learned two very good designs software. Their names are* ***SolidWorks*** *and* ***Photoshop****. Yeah, these are different design software, because one is about visualization like document design and poster designs. But the other one is about the modeling, the mechanical modeling, and the analysis and simulations. So SolidWorks is like an engineering software, I think.*"

--Perry

After two and a half years, Perry built programming skills and was competent enough to program in the workplaces.

"***I'm good at programming.*** *Okay, when I apply for the job, I will be able to say to the interviewer that I am proficient in programming. You can ask me anything. You can just ask me to do it right now.*"

--Perry

Phillip also indicated learning about how to use different software as a main learning outcome in his Master's study,

"*A lot of software, because as Masters, we use a lot of software to complete the data.* ***Matlab****, that kind of things.*"

--Phillip

When it comes to the skills developed while in China, Paul also indicated similar outcomes but often through online courses. He mentioned about learning various

programming skills via Coursera and edX. Now, he also taught some junior international students how to use software, because he believed that these software skills are vital when they do research work effectively in future.

"*I think, **I developed a lot of skills in programming**. I think it's very essential. I developed skills in how to deal with data, and I developed image processing skills in how to deal with image and optimization. I know how to optimize things, how to make them more efficient, how to find out a more suitable match.*"

--Paul

Design skills

Design, as one of the essential skills for engineers, emerged as one of the preliminary outcomes in our analyses. As Perry said, when he was doing his own project, he had to come up with every detail of his project and improved some design parameters again and again.

"*My project is about printing like 3D print from a 3D printer. So **I had to come up with very minor, details of the design so that it fits around each other**. … **I had to do some other experiment and improve some parameters, design parameters and then printing them again**. And then it's okay. You know, yeah, it sounds a little easy, but it takes a long time and it takes a lot of very detailed, very frustrating sometimes.*"

-- Perry

In addition, Parker found the process of design and implement very interesting. Although the process could be frustrating, they developed various aspects of design skills.

"*Interviewer: Um, in your learning experience in China, have you experienced any change in your attitude toward engineering?*

*Interviewee: Oh, I did have a change on attitude because I learned a lot of things here, as I already told you, **to design** and to implement things… **Because I found very interesting by doing this, you can change your idea, you can implement it**. Even there is a small change, the whole system will have a big change. And engineering is difficult, but it is easy if you are dedicated to the field and go to the right direction.*"

--Parker

Hands-on skills

Several students mentioned that access to expensive experimental apparatus was very helpful for them to develop hands-on skills in the research. As Neil said, he wanted to do more real experiments during his graduate studies, so the main reason he applied Chinese universities was the opportunity to operate on the equipment.

"*While in most of Chinese universities I look for, **you are allowed to handle million-dollar equipment**. And that was primarily, the main reason why I thought China might*

be a good idea."

--Neil

The availability of lab equipment provided students with the opportunity to implement their own ideas and conduct practical research. As Parker said below, hands-on skills were developed through this process.

"*Because then I found it very interesting by doing this, you can change your idea, you can implement, and you can change your idea, then you can* ***implement it****.*"

-- Parker

Time management skills

Participants learned time-management skills due to the fast-paced life and the research load. Pamela self-reported that she had many roles---a teaching assistant, a leader in a student's community, and a doctoral student, so she learned to value and manage her time in the tough weekdays.

"***I value my time more****. Previously, I would never say no to any gatherings. I could never say no to a friend. But now I value my time. So it's very important, it's very crucial to know that. Okay, so I have priorities….But now I know what I want, and I make effort for it, and I remind myself, like when I wake up, and I have this habit of seeing my cell phone.* ***I have a schedule of the days****. So I know this is the schedule, I have to make sure that I follow.*"

-- Pamela

Interpersonal skills

How to deal with other people is another one of the most mentioned skills which the participants learned. Some of them described this skill more generally, like Parker,

"*So* ***how to meet with the other person****,* ***how to deal with them****. This is the thing and I have learned.*"

--Parker

Others, like Paul and Neil, went into more details. In Paul's opinion, as an international student, how to deal with the professor and the landlord was important to live and study in China; Neil said that he used to keep talking all the time, but he learned to talk less sometimes and listen others more.

"*So there that's another issue,* ***how you deal with the "Lao Ban"****(means, the boss), with the landlord, you know, how you do the like, as a foreigner.*"

--Paul

"*Um, others like people skills, for example,* ***I learned to shut up****, to be completely honest, I talk a lot, now but I like just listening to people, which give you a lot of ideas.*"

--Neil

Teamwork skills

In graduate studies, most students have lab mates, with whom they do the project together. Various aspects of teamwork skills were mentioned as students' learning outcomes. As Paul mentioned below about his ability to motivate others during teamwork,

"*And I have the ability to motivate others if they're working with me, and I love to teach. If someone is working with me, I will try to take him with me towards the goal. This is a teamwork. And I'm a team player. I won't let other people stay behind because eventually, they will slow down the process. I'll try to take them with me towards.*"

-- Paul

For Peter, the development of teamwork skills was also associated with his experiences of doing volunteer works.

"*I also learned* ***teamwork skills*** *by doing volunteer works.*"

--Peter

Attitudes Domain

In the attitude domain, students regarded hard-working, empathy, openness to new ideas, openness to other culture and being more confident as their major learning achievement.

Hard-working

Before participants came to China, they expected to learn something which cannot be learned in their home country. Therefore, Paul was willing to spend long hours in the lab, and he was more hard-working than before.

"*And I think* ***hard work*** *is something you learn, spending fourteen hours in the lab, twelve hours in the lab.*"

--Paul

Phillip became more hard-working, too. Partially affected by his advisor, he believed that pushing the limit of oneself was one of the most important factors to succeed.

"*Many people let me learn a lot of things, my supervisor push (me) really hard. And you have to work hard, hard, hard. Yeah, you know, and you become working hard.* ***Pushing yourself to the limit*** *which are really important, make you become great. And from my feeling, you know, I think all of the great people in the world, if you take athletes, scientists, everybody, they do more than the average person.* "

--Phillip

Empathy

Empathy refers to the ability to understand the experience of others. As Phillip remarked, he understood that everyone could have a bad time, his professor, his lab

mates, or strangers, so he could feel the pain and helped them. He also mentioned before he came to China, he had a good quality of life and thought others' life were similar to him. But after coming here, he met many people whose lives were much worse. As a result, he began to do volunteer works.

"*I can **feel the pain of others** because I think everybody may have a bad time in their life, if I could put a smile on my face, they would be better.*"

"*I have given supports towards them (note: the Chinese students). And sometimes, they are really scared of the professor. Sometimes, it's not the fault of our professor, because he had pressures from his boss, his team. Chinese students, they cannot understand these things. I helped them with psychological ways and taking them out of stress or having good food with them. Ok. That's not the end of the world.*"

--Phillip

Openness to new ideas

Openness to new ideas means having an open mind, being less judgmental, looking at things in a new way or experiencing a change in perspective. For instance, in Paul's view, he became more open and accepting towards different opinions from others.

"*You become **more open**, **more accepting**, for example, some things are fun or funny to someone, but they may not be funny to other people… so you can become **more accepting** of that.*"

--Paul

For Neil, people from different cultures may approach a problem in different manners, which expanded his thinking,

"*The way you approach problems is very different depending on cultures. …Like some of the Americans I met, for example, if you want to connect one variable to the next, they go for a direct solution. I met with people who do that. For example, we do a static solution. This will cause this. We draw an entire map which is more complicated, but a direct solution is way easier. …This is a discussion I've had with a few colleagues quite a few times. In my own research, if there is a water level at a certain level, then the concrete will break them, water will come inside the dam, then there will be a leakage. I go step after step. He said, why do you do all this? You put water level at a certain step and you measure the water coming out. You have your equations. Why do you do all this?*"

--Neil

Openness to other culture

As Phillip said, because international engineering students were exposed to other cultures, they respected other cultures. After meeting many people from different countries, Neil became more open to the traditions in other cultures.

"*I have met all of the people coming from different religions and every religion have*

good and bad people. Oh, Buddhist, Hindu, and other foreign students, we sit together and we have fun together. Yeah, ***we open towards each other****. And* ***we open towards other cultures****.*"

--Phillip

"*When I first came here, some people didn't eat pork or beef either. There were few people eat pork, but not nobody eats beef. I came here, I tried and I think that's delicious! Why we do not eat that?* ***The way you approach problems is very different depending on cultures.***"

--Neil

Self-confidence

Some participants said they became more confident. For example, due to being more proficient in programming, Perry was more confident. Before, he thought he was not able to undertake a PhD program, but after two years' training, he believed that he could do it if he wanted.

"*But now I can say, ok, I am proficient in it. You can like, uh, it will not take me long to learn some other new things about design because I know these things before. Yeah, so now I can be* ***more confident****. So that's okay.*"

--Perry

Discussion

Our preliminary findings provided a series of learning outcomes obtained by international engineering students in University H in the dimensions of knowledge, skills, and attitudes domains. Findings from this qualitative study enrich the existent studies of international students' learning outcomes by studying the engineering international students in a Chinese context. So far, in knowledge domain, international engineering students self-reported learning design knowledge, fundamental engineering knowledge, Chinese cultural knowledge; In the skills domain, learning outcomes included both hard skills (e.g. design skills, programming skills, hands-on skills and using software skills) and soft skills (e.g. time-management skills, navigations skills, people skills, and timework skills); In the attitude domain, students self-reported to be more hard-working, open-minded, and confident, less judgmental and yet more respectful towards different cultures and ideas. Meanwhile, as we increase the diversity of subject population in terms of their home countries, their engineering disciplines, and their degree levels, we will maintain an open mind as to new learning comes.

Our findings support previous research concerning international engineering students' various learning outcomes [8] [9] [10]. Studying abroad is not just an experience, cultural knowledge, people skills, openness to new ideas are also learned in this process. According to the preliminary data analysis, some valuable experiences which were associated with international engineering students' learning outcomes emerged. For

example, guidance from professor and help from lab mates were mentioned as beneficial experiences to their research skills; Dealing with different people from different cultures were cited as valuable experiences in forcing them to be more social and develop interpersonal skills; Several students also mentioned that Chinese students were shy which made them had to speak first; Teamwork skills were also acquired through practicing sports and group projects; Also, traveling was an important way to learn about Chinese culture.

Nevertheless, international engineering students also self-reported some challenges in areas of such as food, religion, language, the lack of research help from others, the lack of communications between Chinese and international students. Some students mentioned that their professors held separate research meetings for Chinese and international students partially because of the lack of a lingua franca, that is, some international students were not able to speak proficient Chinese in group meetings, or, the English proficiency of some Chinese students was not good enough for communications in the group meetings.

Recommendations to improve international engineering students' learning experiences in China also emerged. Concerning their language barriers, students expressed their hope to learn more Chinese. Recommendations from students included offering more resources for learning Chinese on campus. Considering the lack of communications between Chinese and international students, some students hope professors can hold research meetings that include all students instead of separate meetings. We expect further recommendations will emerge as more data were analyzed.

Conclusion

This work-in-progress explored international graduates' learning outcomes in Chinese universities. This study aims to provide an overall understanding of the learning outcomes and related learning experiences of international engineering students in China. This work-in-progress only provided a preliminary view due to the current limitation in the number of interviewees and the countries of origin. We expect to include international engineering students from more countries and regions and possibly integrate additional perspectives from the instructors and professors to a complement to students' self-report. Such findings will render a more in-depth understanding as to the diverse learning outcomes of these students. It is expected that recommendations shall emerge this study for administrators, professors, and students for engineering education in China, especially for the international student population. Last but not least, this study can provide insight into similar future studies in countries and regions that are seeing an increasingly international student population.

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