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English-medium instruction in Singapore higher education: Policies and realities

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Within the Asian region, Singapore has long been seen as a leader within the field of higher education, with its evident success linked to its adoption of English-medium instruction (EMI) at all levels of education, including colleges and universities. This present study reports on a large-scale survey carried out at one of Singapore's major universities on the communication needs and difficulties of both undergraduate and postgraduate students. The results of the survey also indicate the important role played by overseas students in graduate studies (including many from mainland China), and the links between their recruitment and the reported language difficulties of postgraduate students, an issue that resonates with similar contexts at many other universities worldwide.

Keywords: English-medium instruction (EMI); higher education; language surveys; multilingualism; Singapore.

Introduction

In recent decades, the Singapore government has invested impressively in higher education, and over the last sixteen years there has been a dramatic expansion in higher education, with the number of universities increasing from two to six, which has been financed by a massive government investment in infrastructure, teaching and research. From the early 1990s onwards, Singapore has rolled out a succession of five-year plans to improve science, technology and innovation, with amounts of funding rising from 2 billion in 1991 to 19 billion Singapore dollars for the latest five-year plan, which will run from 2016 to 2020 (Lim 2016).¹ Some of this funding has been used to effect the internationalization of the nation's universities, and by 2013 around seventy per cent of faculty at Nanyang Technological University (NTU) were from overseas, compared with around fifty per cent at the National University of Singapore (NUS), where President Tan Chorh Chuan was quoted as claiming that the use of English as the dominant teaching medium was a 'tremendous advantage' (Matthews 2013). Indeed, in terms of language policy, Singapore might well claim that its emphasis on the use of English as virtually the sole teaching medium at all levels of education represents a major success story in contributing to Singapore's claim to the highest levels of English proficiency in the Asian region (Bolton 2008).

This study draws on the results of a research project conducted at a major Singaporean university (henceforth identified as the 'University'), which set out to survey the use of English by undergraduate and postgraduate students, the linguistic needs of students, as well as areas of perceived difficulty in using English as a medium of instruction.² Notwithstanding the fact that, by many international measures of excellence, English-medium instruction (EMI) in Singapore is often presented as an outstanding success story, one important issue that interested us was the extent to which the realities of language use in universities matched the aims and ideals of the official English-medium policy of the government and Singaporean higher education institutions. In broad terms, we sought to answer three inter-related research questions in relation to EMI at the University:

- How do the communicative needs of undergraduates and postgraduates compare?
- What specific difficulties in academic communication are experienced by students?
- Are there particular areas of academic communication where improvements are needed?

Before presenting the quantitative results of this project, we provide a discussion of the sociolinguistic background in Singapore, with particular reference to the use of English in higher education. Following this, we present the quantitative results of the survey, followed by a discussion of qualitative comments that were submitted by both teaching faculty and students, and which serve to highlight a number of problematic areas in what is otherwise an impressively well-organised and successful institution.

The use of English in Singapore's higher education

In contemporary Singapore, the use of English the sole or predominant teaching medium is accepted and unchallenged at all levels of education, although, historically, the issue of English-medium education has had a complex history from the origins of the British colony in 1819 through to self-governing independence in 1965. Throughout the nineteenth and early twentieth century in the Straits Settlements and Malaya, as in many other colonies elsewhere, the British authorities were typically reluctant to promote the teaching and learning of English, and instead favoured the promotion of Malay (Bolton and Botha 2017). After the Second World War, however, a dramatic shift in policy took place in the late 1940s as, throughout Malaya including Singapore, the British now sought to promote English 'as the common language of the Malayan nation' which would serve as a racially-neutral link language between the major ethnic communities of Malays, Chinese, and Indians. The colonial government then introduced a number of initiatives to promote English throughout education, including the establishment of the English-medium University of Malaya in 1949, located in Singapore. An important motivation for English education at this time was to promote a pro-western (and anti-communist) community spirit, at a time when communism was gaining ground in peninsula Malaya (Sai 2013: 50-54). The University of Malaya drew many of its staff from Britain and the Commonwealth, and soon provided programs the arts, sciences and medicine, but also agriculture, education, engineering and zoology, and in March 1954 a second branch of the institution was established in Kuala Lumpur (Stockwell 2009: 1171). However, one group that felt excluded from higher education were the graduates of Chinese vernacular schools, for whom the medium of English was a major hindrance in gaining access to the University of Malaya. In 1953, the Chinese businessman Tan Lark Sye proposed the establishment of a Chinese-medium university, which led to the opening of the Chinese-medium Nanyang University ('Nantah') in 1956, an institution that subsequently experienced a troubled history, partly because of the alleged communist sympathies of some staff and students (Hong and Huang 2008).

After the foundation of Singapore as an independent nation in 1965, the policy of promoting English-medium education throughout all levels of education, including the tertiary sector, became increasingly important as the new nation developed, economically, politically, and socially. In April 1980, after a good deal of discussion with various stakeholders, the decision was taken to merge Nanyang University with the University of Singapore in order to form the National University of Singapore (NUS). Nanyang University's Jurong campus in the west of the island was rebuilt to form the Nanyang Technological Institute, which in 1991 then became the core of a new Nanyang Technological University (NTU), which also incorporated the National

Institute of Education. The choice of name for the new National University of Singapore, which came into being in 1980, was significant for various reasons, given the political priorities of nation-building in the post-Independence era. In a 1966 speech on 'The role of universities in economic and social development', the Prime Minister Lee Kuan Yew argued that higher education had a clear responsibility to assist in nation-building efforts, including:

[To] produce the teachers, the administrators, the men to fill the professions -- your accountants, your architects, your lawyers, your technocrats, just the people to do jobs in a modern civilised community. And next and even more important, it is to lead thinking -- informed thinking -- into the problems which the nation faces. (Lee 1966)

The need to establish national priorities for the University of Singapore occupied the government for some years in the 1960s, and is documented in some detail by Lee (2008). One major turning point here was the appointment of Deputy Prime Minister Toh Chin Chye as Vice-Chancellor of the University of Singapore from 1968-75. Toh was committed to the notion that 'the university should have a national self, an identity rooted in Singapore and in the Southeast Asian region'. He also favoured the promotion of 'value free' subjects such as administration, architecture, business, medicine and science, while regarding the arts and social sciences as 'not value free', at a time when some government spokesmen argued that such expat faculty were encouraging students 'to ape degenerate Western ways' (Puccetti 1972: 238).

The establishment of NUS in 1980 was followed by the foundation of Nanyang Technological University in 1991, as well as four younger universities in the 2000s, namely Singapore Management University (2000), SIM University (2005), Singapore University of Technology and Design (2009) and Singapore Institute of Technology (2009). It is important to note that English is the medium of instruction at all of these institutions, as is also the case at all other levels of public education in Singapore. Over the past five decades, educational policy has been guided by two key objectives of Lee Kuan Yew and successive governments, which is 'to build a modern economy and to create a sense of Singaporean national identity' and as Singapore's economy has developed, educational priorities have shifted accordingly (OECD 2011: 160). In the 1960s, the emphasis was on labour-intensive manufacturing, in the 1970s and 1980s on skill-intensive production, while from the 1990s onwards Singapore has set out to excel in the global knowledge economy and to attract innovative engineering and scientific companies to establish themselves here. Today, at all levels of education, there is a strong focus on mathematics, science and technical skills, and mathematics and science are core subjects for all primary and secondary students, while, in higher education, more than fifty per cent of programs are devoted to science and technology (OECD 2011: 168).³

Language planning and language management has played an important role in the development of Singapore's knowledge economy, and, over the last three decades, there has been a profound shift in the sociolinguistic profile of Singapore society. In the late 1970s, only a small minority used either English (5.2%) or Mandarin (1.3%) as a home language, but now 34.9% of the population report using Mandarin as the usual home language, compared with 36.9% for English. Within the Chinese community, the promotion of Mandarin since the late 1970s has resulted in the attrition of such previously widely-spoken dialects/languages as Hokkien, Cantonese and Teo Chew, while in the Indian and Malay communities the increasing use of English within the family has also continued to displace the use of traditional mother tongues (ELIS 2016: 29-33; Department of Statistics 2016). Given that, in 2015, an estimated 74.3% of the population were ethnically Chinese, 13.3% were Malay, and Indians were 9.1%, it seems clear, that in terms of

numerical dominance not least, English and Mandarin function as the two major languages of Singapore society, despite the somewhat anomalous retention of Malay as the national language.

Higher education institutions in contemporary Singapore

There are currently six local universities in Singapore, providing degree programs to some 90,000 students. In the 2010 census, some 22% of the resident non-student population in Singapore had obtained a university-level qualification, up from just over 11% a decade earlier (Department of Statistics 2010: 8).⁴ The six local universities are: the National University of Singapore (NUS), the Nanyang Technological University (NTU), the Singapore Management University (SMU), the Singapore University of Technology and Design (SUTD), the Singapore Institute of Technology (SIT), and the SIM University (UniSIM). In addition to these universities, there are five institutes in Singapore, known as polytechnics, providing three-year diploma courses to over 70,000 students (Singapore Ministry of Education 2015). The five polytechnics are: Nanyang Polytechnic (NYP), Ngee Ann Polytechnic (NP), Republic Polytechnic (RP), Singapore Polytechnic (SP) and Temasek Polytechnic (TP). In addition, a number of foreign universities have also established branch campuses in Singapore, including INSEAD (Institut Européen d'Administration des Affaires), the University of Chicago Graduate School of Business, the University of Pennsylvania's Wharton School, Massachusetts Institute of Technology, Technische Universiteit Eindhoven, Technische Universität München, the Georgia Institute of Technology and Johns Hopkins University (Ng and Ng 2010; Ng 2013).⁵

Singapore's educational ambitions have spurred its two major universities to develop rapidly and to compete strongly on the international stage. In the latest QS World rankings for 2016-17 NUS is ranked 12th in the world and Nanyang Technological University (NTU) in 13th place, with both institutions gaining wide international recognition for their research and publications, as well as a swathe of teaching innovations. The current research project discussed in this article was motivated not only by the local and specific needs of the University but also by the awareness that many of the issues that the University here faced as an English-medium university also presented challenges to many other universities in the Asian region, in societies such as Hong Kong, India, Malaysia, and the Philippines, as well as other English-medium institutions throughout the world.

Method

Background to the survey and data collection

The methodology adopted in this research utilized two online surveys, one aimed at undergraduate and postgraduate students the University, and the other aimed at academic faculty. The student survey was very successful in attracting a high level of response from students, with some 8,280 completed questionnaires, a number that represented 28.2% of the student population. Of these students, 7,575 were undergraduates and 705 were postgraduate students. In addition, a total of 222 faculty/staff (out of 1,122) responded to the faculty/staff survey, which represented approximately 19.8% of teaching staff. The questionnaire was highly detailed, comprising 114 items, with sub-sections dealing with the personal characteristics of students, their linguistic and educational backgrounds, their reading practices, their writing skills, spoken communication, language mixing, presentation skills, online learning, self-assessment of language skills, and perceived areas of difficulty. The online surveys were carried out between 15 October 2014 and 7 December 2014 using the Qualtrics program, after which the results were

then exported to the Social Sciences Research Centre at The University of Hong Kong, where the data were checked for consistency, and the undergraduate results were weighted in order to correct for sampling bias. A total of 222 faculty/staff (out of 1,122) and 8,280 students (out of 29,319) responded to the questionnaire, totals which represented some 19.8% of teaching staff and 28.2% of the student population. Of the students, 7,575 were undergraduates and 705 were postgraduate students, and were distributed across the four major Colleges of the University, Engineering, Science, Business, and Humanities, Arts and Social Sciences. At the undergraduate level, it was found that Engineering students were over-represented in the survey, and consequently it was decided to weight the undergraduate survey results by College to match those of the general University population, and those results presented below reflect this weighting. In fact, as our analysis of the results proceeded it also became clear that disciplinary affiliation was an obvious and major variable, with many of the results indicating varying levels of communication difficulties according to College of study, as well as according to level of education. For example, 73% of postgraduate students from the Schools of Engineering and Science reporting pronounced difficulties in writing English compared to 37% of students from the School of Humanities, Arts and Social Sciences and the School of Business.

Results

In this section of the article, we report on a selection of results that are related to the research questions outlined above. With reference to the first research issue concerning the reported differences between undergraduate and postgraduate students, one useful starting point here was to draw on the survey of teaching faculty, who were asked a number of questions concerning the respective communication abilities of undergraduate and postgraduate students at the University.

Faculty perceptions of student abilities in academic communication

Specifically, teaching faculty were asked to rate the written and spoken English abilities of their undergraduate and postgraduate students, and the results for these ratings are set out in Figures 1 and 2.

Figure 1. Faculty rating of the written abilities of students (u/grads vs. p/grads)

As is very evident from Figure 1, the reports of teaching faculty indicated that the writing abilities of undergraduate students were perceived as visibly better than those of postgraduates, with 85% of faculty rating undergraduate students writing abilities as either ‘Good’ or ‘Acceptable’, compared with 68% for postgraduate students. Thirty per cent of faculty in the sample even rated postgraduate students’ writing as ‘Poor’. Teaching staff were also asked about the spoken English abilities of their students and these results are presented in Figure 2.

Figure 2. Faculty rating of the spoken abilities of students (u/grads vs. p/grads)

In Figure 2, a somewhat similar pattern, compared with Figure 1, emerges for speaking abilities, with 61% of teaching staff in the sample reporting that undergraduate students’ spoken English abilities were ‘Good’, compared to 42% for postgraduates. What was interesting here was that when we proceeded to compare the reports of faculty with those of students, there was an evident measure of agreement with the faculty’s responses, with postgraduate students typically reporting lower levels of proficiency in English as well as greater levels of difficulty in dealing with various types of academic communication, as reported in the next section.

Student reports of language ability and language use

A number of questions in the survey asked both undergraduate and postgraduate students about their patterns of language use within the academic context at the University. The results in Figure 3 and Tables 1 and 2 compare the responses by undergraduates and postgraduates to the issues of language ability and language use.

Figure 3. Most proficient language

As can be seen from Figure 3, the majority of undergraduate students indicated that they felt most proficient in English, compared to a majority of postgraduate students who claimed greatest proficiency in Mandarin. More specifically, 59% of undergraduates stated that they felt most proficient in English, while only 29% of postgraduate students stated that they felt most proficient in English. Interestingly, just over 40% of postgraduate students stated that they felt most proficient in Mandarin, compared with 31% of undergraduate students who felt most proficient in Mandarin.

Areas of perceived difficulty in academic communication

With reference to the second research issue concerning particular difficulties in academic communication, a number of questions in the survey asked students about their perceived difficulties in various aspects of academic communication, including receptive and productive skills. At both the undergraduate level and the postgraduate level, a major independent variable influencing the type of difficulty reported was the disciplinary background of students, as broadly evidenced by their College affiliation. At both levels of education, there were typically higher levels of difficulty reported by Engineering and Science students, as compared to students from the College of Business and that of Humanities and Social Sciences. Differences of this kind are illustrated by Figures 4 and 5. The results presented below in these two figures were based on sets of questions that asked undergraduate and postgraduate students ‘How able are you to do the following’, with individual questions on the four basic language skills. The responses to these questions were placed on a scale that included ‘Unable’, ‘A lot of difficulty’, ‘Some difficulty’, ‘Very little difficulty’, and ‘No difficulty’. The percentages set out in Figures 4 and 5 are cumulative figures derived from adding the totals for ‘Unable’, ‘A lot of difficulty’, and ‘Some difficulty’. Note that in the horizontal bar charts presented in these figures, the width of the shaded areas is intended to indicate the area of greatest difficulty within a particular discipline. For example, among postgraduate Engineering students, the greatest of level of difficulty was reported by students with reference to speaking English (41%), followed by writing (40%), listening (27%), and reading (21%).

Figure 4. Reported difficulties among undergraduate students by College affiliation (by %)
Undergraduate students

Figure 5. Reported difficulties among postgraduate students by College affiliation (by %)
Postgraduate students

From the responses by undergraduates and postgraduates in the survey, that postgraduate students reported more communication difficulties compared with undergraduate students. One particular area where a notable difference can be observed is between undergraduates and postgraduates in Engineering in terms of speaking English, where 41% of postgraduates expressed difficulty compared with 20% of undergraduates from the same discipline. Similarly, 33% of Science postgraduates expressed speaking difficulties compared with 15% of undergraduate Science students.

In terms of reading, students were also asked to report on which text types they found to be the most difficult. The results indicated that undergraduate students in the survey reported greatest difficulty in reading ‘academic articles’ and ‘research articles’, with more than 33% of students reporting having difficulty in reading such texts. It is also interesting to note that only 12.1% of undergraduate students reported reading academic materials in languages other than English. Postgraduate students in the survey also reported the greatest difficulty in reading ‘academic

articles’ and ‘research articles’, with 32.2% of students reporting having difficulty in reading such texts. Interestingly, 21% of postgraduate students reported reading academic materials in languages other than English.

In terms of students’ perceived difficulty in writing, the results indicate a range of difficulties varying according to particular writing tasks. Undergraduate students reported the greatest level of difficulty writing ‘academic essays’, with over 38% of undergraduates reporting difficulty in essay writing, while other writing tasks considered difficult included research essays, longer reports, cover letters, applications for scholarship and critiques. In somewhat parallel fashion, around 35% of postgraduate students also indicated that their greatest difficulty was with writing academic essays, although they also noted the challenges of writing theses/dissertations, research essays/papers/reports, and research proposals. What is evident from these results is that students need assistance in improving their writing skills with reference to a range of different writing tasks, and not simply in writing their Master’s dissertations, or PhD theses.

Despite the results related to the difficulties experienced by students in using English as an academic language at the University, these reports need to be balanced by the consideration of the positive abilities of many students at the institution. After all, it is important to note that entry to the University is highly competitive and highly selective at both undergraduate and postgraduate levels. In addition, it should be noted that the language skills of the Singaporean students, who constitute the overwhelming majority of the undergraduate population, have been honed by around fifteen years of participation in English-medium education from kindergarten to senior high school before entering university. As a result, many of the undergraduates declared that they had ‘No difficulty’ at all in particular communicative skills, as illustrated in Tables 1 and 2 below.

Table 1. Undergraduate students claiming ‘no difficulty’ in selected language skills

Skill	Percentage of students claiming ‘No difficulty’			
	Engineering	Science	HASS	Business
Listening	39.7%	44.8%	55.2%	59.7%
Reading	47.0%	58.7%	62.9%	63.5%
Writing	35.5%	44.5%	52.9%	56.1%
Speaking	43.6%	53.0%	62.0%	63.2%

The figures presented in Table 1 above indicate two important aspects of communication skills across the university. First, there is prima facie evidence that academic language skills across the university may be generally ranked according to discipline, with business students ranking (themselves) first, followed by HASS students, science students and, in final position, as it were, in communication skills, students from the College of Engineering. On the positive side, the survey results set out above indicate a clear majority of both HASS and business undergraduates express a high degree of confidence in their communicative abilities, unlike, it should be noted, students from engineering and science. Second, there is also evidence of another ranking, this time in terms of perceived difficulty for the four skills in question, with writing believed to be most difficult skill and reading the least difficult across all Colleges in the University. This set of results for undergraduates may also be compared with the results that emerge for postgraduate students, which is set out in Table 2.

Table 2. Postgraduate students claiming ‘no difficulty’ in selected language skills

Skill	Percentage of students claiming ‘No difficulty’			
	Engineering	Science	HASS	Business
Listening	38.5%	42.1%	58.3%	66.7%
Reading	42.9%	49.1%	59.7%	69.2%
Writing	30.7%	40.4%	45.8%	64.1%
Speaking	34.9%	45.6%	49.3%	61.5%

As indicated by Table 2, at the postgraduate level, perceptions of difficulty are spread somewhat differently. Across all schools, once again, the least difficulty was associated with reading academic texts, but perceptions of the greatest difficulties varied from College to College, with postgraduate students from Engineering, Science and HASS expressing greatest concern with regard to writing, whereas students from the Business College rated speaking skills as most difficult. It was noticeable for Engineering, Science, and even HASS that typically higher levels of difficulty were recorded at the postgraduate level with reference to all four skills, in distinct contrast to the results for postgraduate students from the College of Business.⁶ In addition to standard questionnaire items, a number of open-ended questions were also included in the survey, and these in turn proved valuable in providing a more complete picture of the type of difficulties experienced by students at the undergraduate and postgraduate levels of study.

Reports from faculty on the communication difficulties of students

At the undergraduate level, many of the faculty expressed the opinion that the language abilities of undergraduate students were generally good, commenting that ‘some students are excellent writers and communicators’, and that ‘students [...] from the US and Canada also lack strong writing skills’, and that ‘even native speakers need help’. Other faculty commented on the need for undergraduate students to participate more actively in discussions and seminars, and to improve their written skills.

In contrast, at the postgraduate level, much more concern was expressed about students’ language abilities and difficulties. For example, one teacher commented that:

Many of our postgraduates are from countries where English is not the main teaching medium, and their poor ability in English shows. I don't think we offer enough training for them in the fundamentals of the language, in writing and speaking in particular. [...] I have examined PhD theses which are badly written; in some cases, the bad writing practically obliterated the good quality technical work. They should not have been submitted; the supervisor should have checked that.

The same teacher then went on to note that ‘[o]ur undergraduates, by and large, are better than our postgraduates in their English language skills’. In similar vein, another faculty noted that the situation of postgraduates was complicated, ‘as the majority are non-native speakers. A third commentator amplified this judgement in less equivocal terms, asserting that:

The standard of written and spoken English is appalling [...] among our graduate/research students [...] I have been on PhD oral defence committees and have had a hard time comprehending what the candidate was trying to convey, let alone the merits of the work presented.

Reports from students on areas of difficulty in communicating with faculty

A number of undergraduate students provided rather frank statements concerning their perceived problems, with a sizable number complaining about the accents and communication problems of teaching faculty from overseas, as in the comment below from an Engineering student:

In discrete mathematics, my teacher who is a [...] foreigner has difficulties speaking English and furthermore explain to the class what is going on. [...] Apart from this, my lecturers in computer science have a relatively poor command of English which makes apprehending their meaning a difficult task. [...] If they could attend some English lessons for pronunciation and correction of grammar etc, that would be better. (Undergraduate Engineering student)

Another student had a similar complaint regarding the perceived shortcomings of their teachers' language abilities:

Many lecturers are not from English speaking background, and their accents are very thick. I once went through a whole lecture listening to the prof explain something about "Kappa" (greek symbol) but turns out he was talking about "copper" and I only learnt about it at the end of the lecture. (Undergraduate Science student)

Very often the comments discussed the particular nationalities of faculty, as in the following comment:

Most of the Teacher Assistants are not Singaporeans. Some are from China, India and Bangladesh. Even though, from the way they analyse question are smart but there's a communication barrier between us... often my classmate and I do not know what they are talking about and that hinders our learning for our lesson. (Undergraduate Humanities, Arts and Social Sciences student)

Interestingly, some comments also dealt with the problems of communicating with so-called 'native speakers', as in the following comment:

My lecturers are Caucasians and my tutors are very fluent in English, so its very intimidating to converse with them because I am not very fluent in English (Undergraduate Humanities, Arts and Social Sciences student)

At the postgraduate level, a clear majority of those students writing comments assumed a *mea culpa* stance towards their own deficiencies in English, declaring that 'my English is poor'; 'can't say English clearly'; 'English is not good'; or that 'I want to ask some academic question but I don't know how to describe it in English correctly'. Here too, there was strong evidence that the greatest communication difficulties for students and for educators were present at the postgraduate rather than undergraduate level. In the next section we proceed to discuss the reasons for this.

Discussion

Overall, for internal purposes at the University, the research project on the communication needs of the University's undergraduate and postgraduate students was rather successful in achieving its aims. With reference to the one over-arching issue of the extent to which the realities of language use in universities matched the official English-medium policy, the overwhelming evidence is that English is the predominant medium of instruction for lectures and seminars at both undergraduate and postgraduate level, with 95.5% of undergraduates reporting that 'all' or 'almost all' of their lectures were in English, compared with a figure of 96.5 for seminars and

tutorials. The comparable figures for the postgraduate students were 93.9% for lectures, and 89.3% for seminars and tutorials. While such results provide clear evidence of policy implementation, it would be misleading to assume that EMI instruction at the University was entirely problem free, however.

With reference to the two specific research questions of (i) the communicative needs of undergraduates versus postgraduates; and (ii) specific areas of difficulty, the discussion in the preceding results section has presented a number of relevant results. Cumulatively these results point to a major finding of the survey, which concerns the specific and rather different characteristics of two distinct groups of learners, that is the undergraduate students on the one hand and the postgraduate students on the other, and the fact that these two groups evidently constitute two different populations. An important reason for this is the rather different nationality profile of the two groupings, as the vast majority of undergraduate students are Singapore citizens or permanent residents, whereas a clear majority of postgraduates are foreign students who have been recruited to Singapore. The differences between the two groups in terms of nationality are presented in Tables 3 and 4 below, which also set out the proportions of nationalities for our sample versus the University's percentages.

Table 3. University undergraduate students and survey sample by residence status

Residence status	University	Sample
Singapore citizen	77.7%	71.5%
Singapore Permanent Resident	5.6%	4.9%
Non-Singapore citizen or Non-Permanent Resident	16.6%	21.0%
Missing	-	2.7%
	N=23,155	N=7,717

As can be seen from Table 1, the overwhelming majority of undergraduate students at the University are either Singapore citizens (77.7%) or Singapore Permanent Residents ('PRs' who account for 5.6%). Only a minority of undergraduate students (16.6%) are 'foreign' students from overseas, with many from such countries Malaysia, mainland China, Indonesia, and India.

Table 4. University postgraduate students and survey sample by residence status

Residence status	University	Sample
Singapore citizen	23.8%	14.3%
Singapore Permanent Resident	10.9%	4.7%
Non-Singapore citizen or Non-Permanent Resident	65.3%	74.3%
Missing	-	6.7%
	N=6,164	N=705

At the postgraduate level, an almost reverse set of circumstances applies, with a substantial majority of postgraduates (65.3%) coming from overseas, with Singapore citizens (23.8%) and Singapore Permanent Residents (10.9%) accounting for smaller totals. The survey also included questions on the nationality of postgraduate students at the University, and Table 5 below sets out the results for this variable.

Table 5. University postgraduate students and survey sample by nationality

Nationality/residence	Sample
Mainland Chinese	43.3%
Indian	15.2%
Singaporean	14.9%
Singaporean Permanent Resident	4.9%
Indonesian	3.0%
Malaysian	1.9%
Other	16.8%

What is immediately noticeable from Table 5 is the relatively high total for students from mainland China (43.3%), followed by those from India (15.2%), Singapore citizens (14.9%), Singaporean PRs (4.9%), Indonesians (3.0%), and Malaysians (1.9%).⁷ These results point to a key characteristic of the postgraduate population at the University, and other tertiary institutions in Singapore, as well as elsewhere in the Asian region. This is that there is an acute lack of demand from Singapore students for places in postgraduate education, including PhD programs, a lack that has been explained anecdotally with reference to the preference of the brightest local students for postgraduate studies at elite institutions overseas, and the desire of local students to enter the workplace after long years in the public education system, with male students also serving up to two years national service in addition. As a result of these and other factors, a large number of postgraduate students, whose studies also contribute substantially to the research outputs of the University's laboratories are recruited from overseas, not least from mainland China and India, as indicated above.

In fact, the recruitment of graduate students from China, South Asia, and elsewhere is not peculiar to Singapore or other Asian institutions, but is even more dramatically evidenced in the research laboratories of North American and European universities, where, in recent decades, growing numbers of students from mainland China in particular have embarked on PhD studies, very often with particular reference to STEM (Science, Technology, Engineering and Mathematics) subjects. An emblematic example of this development has been the experience of many US universities, which are typically the first choice for students from China. One recent study noted that in recent years, approximately half the Chinese students going to the US to study were enrolling at graduate school level, with a total of 88,477 Chinese graduate students at US institutions in the academic year 2011-12. In addition, it was noted that, in 2013, Chinese students gained 4,789 PhD degrees, with 93% of these in STEM areas, compared with 2,205 PhD for Indian students, and 1,229 for students from South Korea (Xiang 2016). Further afield, in the OECD countries, a similar pattern has played out with high proportions of international students enrolling for Master's and PhD programs within the UK, Europe, Australia and New Zealand. In 2013, 40% or more of PhD graduates from the UK, Belgium, Netherlands, Switzerland and New Zealand were international students, compared with 36% of PhDs from Australia. In fact, the seven OECD countries, Australia, Canada, France, Germany, Japan, the United Kingdom and the United States together attract more than fifty per cent of all international students worldwide, with large numbers of these opting for graduate studies (OECD 2016). The influential US journal *Foreign Policy* recently noted that there were now 'more Chinese students are studying in the U.S. than ever before', and went on to explain that:

Chinese students are by far the most visible international presence at many universities across the United States, and their numbers continue to grow. This year, during the 2014-2015 academic year, the number of Chinese students studying stateside was 304,040, a 10.8 percent increase over the 2013-2014 academic year. [...] Out of the more than 974,000 international students currently in the United States, almost one in three is now Chinese. (Allen-Ebrahimian 2016)

The same report also went on to note that 39.6% of Chinese students in the US were enrolled at graduate level. Similarly, in the UK, there have also been reports that in recent years there have been ‘almost as many Chinese students on postgraduate courses at English universities as British students’ (Gye 2014).

The trend of Chinese students opting for overseas studies has not been confined to North America and Europe, but has also been played out in other parts of the world, including Australia, New Zealand, as well as a number of Asian societies. As Table 6 indicates, in 2014, Japan was the third most popular destination for overseas study, compared with South Korea in sixth place, and Hong Kong in seventh.

Table 6. Destination countries for China’s tertiary-level overseas students

Country	No. of students	Percentage of Chinese students abroad
United States	260,914	36.6%
Australia	90,245	12.7%
Japan	89,788	12.6%
United Kingdom	86,204	12.1%
Canada	42,011	5.9%
South Korea	38,109	5.4%
Hong Kong	25,801	3.6%
France	25,388	3.6%
Germany	19,441	2.7%
New Zealand	13,952	1.9%

Total nos. of Chinese students abroad (2014) 712,157 (UNESCO 2016)

In the Japanese context, over the last ten years, Chinese students have constituted around 60% of all international students in the country, although the vast majority of these have been at the undergraduate level, or junior colleges and language institutes (JASSO 2015). Judging from the literature, however, until recently the motivation for many students in opting for Japanese higher education was often as a means of migration and obtaining employment in Japan, rather than pursuing focused postgraduate research, that is for reasons of ‘transnational migration’ rather than ‘international education’ (Liu-Farrer 2011). In South Korea, the numbers of Chinese students studying at Korean universities has risen greatly over the past decade, increasing from around 8,000 in 2004 to just over 38,000 in 2014, with 50% of these following undergraduate studies, and around 21% enrolled in graduate schools, with Chinese students accounting for around half of all postgraduates in Korean universities (Lee 2013; UNESCO 2016). Once more, however, the recruitment of large numbers of Chinese students has not been unproblematic in the Korean context, and a very recent article in the English-language Korea Times accused some universities of ‘recklessly recruiting Chinese students’, arguing that, the admission requirements for such students were too loose and that:

Education experts point out that colleges and universities have resorted to recruiting as many Chinese students as possible in their blind pursuit of money, without having proper programs to cater to their needs and provide quality education. In many universities, Chinese students account for more than half of the entire foreign student body. [...] Due to the language barrier and cultural differences, Chinese students are also hurt by Korean students. "Korean students are reluctant to work with Chinese students because they think we Chinese students cannot do well in our given work," said Yang Weimin, a graduate student at Kyung Hee University. (Chung 2016)

Finally, another explanation for the popularity of Korean universities among students is that, for many students, a degree from a Korean university is seen as a stepping stone to postgraduate studies in Europe or North America, rather than an 'endpoint' in itself (Lee 2013: 333).

Perhaps a better context for comparison for Singapore institutions is provided by Hong Kong universities, where the overwhelming majority of 'international' students over the past decade have been recruited from mainland China, and very few from elsewhere. For example, in the academic year 2015/16 there were a total of 5,931 research postgraduates at all government-funded Hong Kong universities, and of these, 4,909 were recruited from mainland China, which represents 82.7 per cent of postgraduate students (Hong Kong UGC 2016). In recent years, many of the mainland students have reported difficulties in adjusting to English-medium education in Hong Kong. One recent study quoted various students from China commenting that 'my oral English was not sufficient'; 'the biggest challenges are speaking and writing'; 'it was rather difficult to switch from all-Chinese to all-English' (Cheung 2013: 230-231).

One pertinent issue here might be the basic question of why so many students from mainland China choose to pursue graduate studies abroad. The reasons for this are many, and relate to such factors as the reputations of international universities, students' desire to study abroad, and the perceived benefits of an international education, which can all be seen as 'push' factors propelling students to go overseas. In addition, however, there are also a number of 'pull' factors, as many overseas universities are eager to recruit some of the brightest and best Chinese students into their research laboratories overseas. Perhaps the most obvious beneficiary of Chinese academic talent have been leading US research universities. A 2013 study by Gaulé and Piacentini reported that:

Immigrants from China are a large fraction of Science and Engineering PhD graduates educated in the United States. Of around 30,000 PhD students graduating in 2006, more than 4,300 (14.3%) were Chinese citizens [...] Recent PhD graduates from US universities are more likely to have done their undergraduate studies at Tsinghua University or Peking University than at the University of California, Berkeley, or any other institution [...] Our results suggest that the immigration of Chinese students substantially expands the pool of talent available to the American scientific research enterprise. [...] Chinese students have a scientific output during their thesis that is significantly higher than other students. (Gaulé and Piacentini 2013: 698)

The same study went on to note that, compared with other students, Chinese graduate students generally gave an 'excellent performance' in producing research publications during the period of their PhD studies, although the researchers also warned that the 'negative effects' of such recruitment might de-incentivize 'native' US students from engaging in scientific careers. Given such a background to the recruitment of Chinese graduate students in the US, we suggest that it would not be unreasonable to infer that similar motivation applies to the recruitment of such students in Hong Kong and Singaporean universities. The leading universities in both Hong Kong and Singapore have been competing determinedly in the international rankings in recent years, not least with reference to STEM subject research, which typically relies on laboratory output from PhD students engaged in team-based research projects. However, in the US and UK

contexts, it has also been noted that many Chinese graduate students often face substantial communication difficulties in using English in the university studies (Edwards et al. 2007; Kuo 2011). Within contexts such as Hong Kong and Singapore, moreover, there is also the likelihood that Mandarin (or 'Putonghua') may well be used instead of English, both with teachers and with fellow students, where this is a possible lingua franca. For example, in the Singapore University survey discussed above, 7.2% of postgraduate students stated that when asking questions in the classroom, they either used Mandarin or Mandarin-English mixed, while a total of 14.9% reported the same pattern of language use when asking their teachers questions outside the classroom. When asked directly what language they used when talking to their thesis supervisors, a total of 18.9% responded 'Mandarin/Putonghua', while another 10.6% reported that they used 'Mixed' languages.

Conclusion

The research project reported on here set out to investigate three key issues, drawing in on data from a large-scale survey at a Singapore university in order to do so. One broad aim of the survey was to investigate the extent to which official language policies were matched by actual practice within the institution. Other more specific questions related to the differences in needs and use between undergraduates and postgraduates, specific areas of difficulty, and areas where improvements and interventions might be made.

With reference to the broad issue of the agreement between policy and practice, the results of the survey generally indicated that there was overwhelming compliance to the official EMI policy of the university at both undergraduate and postgraduate levels. However, a detailed examination of the data suggested that this was greater compliance with this policy at undergraduate than at postgraduate level, where a good deal of communication between thesis supervisors and students evidently took place in Mandarin (Putonghua). Such a finding also corroborated other results relating to the differences between undergraduates and postgraduates, which have been discussed at length above. As noted earlier, many of these differences may be explained by the rather different provenance of these two groups of students, with a total of 16.6% of foreign students at the undergraduate level, compared with 65.3% of non-Singaporean students at postgraduate level. Linguistically, the difference between these two groups of students is also profound, with a majority (59%) of undergraduates claiming that their strongest language is English, compared with a majority of postgraduates (42%) claiming that their strongest language is Mandarin.

With reference to the specific question of language difficulties, it was noted that generally, the greatest levels of difficulty related to the productive skills of speaking and writing academic English, although self-reported proficiencies varied greatly according to discipline and College of study, as discussed at length above. With reference to the third research question of particular areas of academic communication where improvements and interventions might be needed, the results of the survey clearly indicated that there were many more problems reported at postgraduate level than at undergraduate level, with 32% of the University faculty describing the written abilities of postgraduate students as either 'Poor' or 'Very poor'. One obvious intervention required here would be the provision of many more appropriate and relevant teaching/learning programs for postgraduate students in such subjects as research writing and thesis writing.

Finally, however, the researchers in this project also found it interesting and noteworthy that many of the problems concerning postgraduate communication were related to the substantial

recruitment of non-Singaporean graduate students, including substantial numbers of students from mainland China. In many respects, this connects trends in Singaporean higher education to the wider arena of graduate studies elsewhere, and the somewhat astonishing role now played by Chinese graduate students internationally, where many such students are now making notable research contributions to the world's leading universities.

Notes

1. Singapore's investment in higher education and scientific and technological development has been cited as one major reason for the city state's impressive economic success. Singapore's GDP per capita in 2014 was an astonishing US\$83,100. The comparable figure for the US is \$54,400, with \$46,600 for Australia, and \$39,800 for the UK (World Factbook 2015).
2. The authors wish to acknowledge the contributions of their colleagues to the survey, in particular, the contributions of Carmel Heah, Sujata S. Kathpalia, Shu Yun Li, Eng Kiat See and Roger Winder, who advised on the design of the questionnaire, as well as other aspects of the survey. We also wish to thank Ms Charlotte Choo for her assistance in formatting the current article.
3. In addition to Singapore's six universities, the Ministry of Education's Higher Education Division (or HED) also oversees nine other institutions, including five Polytechnics, the Institute of Technical Education (ITE), the Science Centre Singapore (SCS), the Institute of Southeast Asian Studies (ISEAS) and the Council for Private Education (CPE) (MOE 2015).
4. The 2010 census also reported on the resident student non-student population by ethnic group and highest qualification obtained, where it is interesting to note that, at that time, 22.6% of Chinese, 35% of Indians, and only 5.1% of Malays had obtained a university-level qualification.
5. It is unclear from official websites and other sources exactly how many foreign universities are operating in Singapore. Various listings are posted on websites such as the following: Internations (2015), Universities in Singapore (2015), Digital Senior (2015), but one problem here is that such listings seem to conflate both private Singaporean universities and branch universities of overseas institutions, a situation further complicated by multiple collaborations between local educational players with overseas providers. In addition, there are also multi-national educational entrepreneurs such as Kaplan operating locally and providing a platform for degree courses from such Australian universities as Murdoch and RMIT, and UK institutions such as Essex, Northumbria and Portsmouth. The official government list of private colleges and universities lists a few hundred such organisations, but many of these appear to be lower-level vocational institutes, and little hard information about the enrolment and operation of these institutions is provided on this website (Council for Private Education 2015).
6. One might speculate that the difference in these results displayed by the College of Business may be due to the high proportion of Singapore students enrolled in postgraduate courses in this College.
7. The precise breakdown of nationalities for the University was not available to the researchers.

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