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Predicting the success of MPharm graduates in the pharmacy twinning programme

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Abstract

Background: The twinning programme, an international collaborative education system with credit transfer scheme, is growing increasingly.

Aims: To determine the association between academic banding classification on admission and the end-point academic achievement and to identify predictor(s) for the end-point academic achievement in the twinning programme.

Method: A descriptive analysis of the database of 546 students in the twinning programme (2003-2007).

Results: A significant positive association was found between the students' banding classification on admission to the admission university, International Medical University and their award on the first attempt at the degree-awarding university, University Strathclyde (UoS) in the United Kingdom (r = .113, p = 0.009). The credit-mark average from semester 1 through semester 5 in the admission university was the only significant predictor of the likelihood of end-point success in the twining programme (Odds ratio, 3.9; $p < 0.001$).

Conclusion: The academic performance in the pre-university institution and the admission institution were crucial for subsequent success in the twinning programme.

Keywords: *Pharmacy, twinning programme, achievements, predictors*

Introduction

Among the continuum of educational pipeline programs (Grumback & Chen, 2006), innovative work with international collaboration is growing increasingly. Like other countries in the region, Malaysia has a long history of medical and health science education, and establishment of innovative programmes with international collaboration is ongoing. One type of collaborative and innovative programme is the twinning programme for undergraduate students. In this programme, the credit transfer scheme is a core component. Credit transfer allows a student to move between courses, and between universities with the credits they have obtained, and acquire more credits (Bekhradnia, 2004) in the next course or university. The International Medical University (IMU) in Kuala Lumpur, Malaysia has been offering a quality pharmacy degree course via twinning arrangement with the University Strathclyde (UoS), Glasgow, United Kingdom (UK) since 1996. This programme consists of two and a half years of study, five semesters at IMU in Malaysia (part A or phase 1), followed by thirteen months, three semesters (part B or phase 2), at the School of Pharmacy in the University of Strathclyde (UoS), where both IMU-Malaysia and UoS-UK students are taught together in the final academic year (year 4). Since its inception, the twining programme remains popular among students who want to have some exposure to a foreign environment in their education.

There has been a growing demand for admission to the programme. For quality assurance, the programme requires accreditation by the Malaysian Qualification Agency (MQA) and the Accreditation Board of the UK General Pharmaceutical Council (GPhC).

It is of interest to the accreditation bodies and the pharmacy educators to know the outcome of such a collaborative education system. Also, the pharmacy community and society at large want to know that quality remains high.

In the education industry, accreditation is an important external certification that a program provides an educational experience that is consistent with producing graduates, who enter the workforce with the expected knowledge and abilities of entry-level practitioners (Svensson *et al.*, 2011). The current study was undertaken to address this issue, which was often raised during accreditation exercises by the MQA. According to the current practice, to be awarded a Master of Pharmacy (MPharm) UoS degree in the twinning programme, IMU students must complete the core requirements at the same level of qualification as an enrolled student at the UoS, the degree awarding institution.

Taken together, two questions arose: (i) does academic banding classification on admission have a significant effect on student achievement at the end-point of the twinning programme?, and (ii) what are the most accurate predictors

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for the students' academic achievement at the end-point in the twinning programme?

The present study is, therefore, performed with the two objectives: (i) to determine the association between academic banding classification on admission and (ii) to identify predictor(s) for the end-point academic achievement in the twinning programme.

Methods

This study is a descriptive analysis based upon the available data from the academic records of the pharmacy students enrolled into the twinning programme at IMU from 2003 to 2007. Data were retrieved from a centralized database maintained by the Department of Academic Affairs (AAD) of the IMU.

This database included relevant information on each student from the time of program application until the MPharm degree was awarded to the student at the UoS at the end of the course. The information included were personal biodata, academic performance at the pre-university level (banding classification), the score achieved in each semester and the final classification of the MPharm degree awarded.

Selection of Key Variables

In order to measure admission score based on the achievements of the students during entry, a standard academic indicator was followed, the banding classification. This is a method used to equate the entry qualifications of students who have followed different pre-university courses. These are A-level, STPM (Sijil Tinggi Pelajaran Malaysia or High School Certificate, Malaysia) or UEC (Unified Education Certificate). A score of band 1 is the highest score where the student has obtained distinction or a grade of "A" in all his /her subjects. A score of band 5 indicates the student has just met the minimum entry requirements.

In order to measure exit achievement for part A of the programme (IMU part or phase 1), a standard academic indicator, the credit-mark average (CMA)[§] which is the average of scores from semester 1 through semester 5 at the IMU was used. The exit achievement for part B (UoS part or phase 2) was assessed based on the academic indicator pertinent to the end-point award of the MPhram degree on the first attempt at the degree awarding university, UoS. This has 3 categories: (i) distinction, (ii) merit, and (iii) ordinary pass (UoS, 2011).

Data Analysis

Descriptive statistics was used for the student profiles. For comparison between those awarded and those not awarded the MPharm degree on the first attempt, chi-square test or Fisher's exact test was used for categorical data, as appropriate. The variables with more than two categories were then collapsed into binary variables and a matrix of correlations was used to test the magnitude as well as direction of relationships between the variables. In order to identify the predictor(s), a binary logistic regression was used to develop a model for the end-point award. The model fit was checked with the Nagelkerke *R*-square statistic. For all analyses, the statistical significance was set at $p \leq 0.05$, unless otherwise stated. Data were entered into a spread sheet and analysed with PASW version 18.0. (SPSS, USA)

§ A credit-mark average (CMA) is obtained by taking the first-attempt mark in each class and multiplying it by the number of credits awarded for that class. The products of credit awards are then summed for all classes in the year of study and the result is divided by the total number of credits associated with the classes. In this calculation, the greater the number of credits associated with a class, the greater the influence that mark for that class will have on the computed average (UoS, 2011).

Results

The sample population consisted of five consecutive cohorts of pharmacy students admitted to the IMU for the twinning programme from 2003 to 2007 (n = 546). Table I provides the profile of the students. The majority are female (76.2%) and mostly Chinese (92.3%). Overall, almost one third of the students (31.7%) had obtained band 1 classification on admission to IMU, while some (12.6%) had band 5. On the average, the mean CMA score was 69 (range: 51-84) in 2003-2007. This mean (±SD) score was highest for the 2007 cohort (70.5 ± 4.93) and lowest for the 2004 cohort (67.2 ± 6.78). About half (50.2%) of the students obtained recent English proficiency at level 1 and 2, while few students (11.4%) were at level 4. Only a small proportion of students (18.5%) received scholarship.

Table I: The profile of students (2003-2007) (N = 546)

Descriptions	2003 n (%)	2004 n (%)	2005 n (%)	2006 n (%)	2007 n (%)
Gender Female	79 (73.8)	85 (76.6)	88 (84.6)	83 (70.9)	81 (75.7)
Ethnicity Chinese	104 (97.2)	108 (97.3)	96 (92.3)	114 (97.4)	84 (78.5)
1. Award i. Distinction ii. Merit iii. Pass 2. No award Total	106 (99.1) 36 (33.6) 69 (64.5) 1 (0.9) 1 (0.9) 107	92 (82.9) 32 (28.8) 51 (45.9) 9 (8.1) 19 (17.2) 111	95 (91.35) 26 (25) 56 (53.8) 13 (12.5) 9 (8.65) 104	116 (99.15) 28 (23.9) 58 (49.6) 40 (34.2) 1 (0.85) 117	95 (88.8) 19 (17.8) 67 (62.6) 9 (8.4) 12 (11.2) 107
CMA* (mean± SD)	68.71 (6.64)	67.15 (6.78)	69.97 (6.56)	69.28 (7.36)	70.49 (4.93)
Academic banding (N = 533) Band 1 Band 2 Band 3 Band 4 Band 5 Total	 21 (19.6) 23 (21.5) 20 (18.7) 19 (17.8) 22 (20.6) 105	 18 (16.8) 14 (13.1) 26 (24.3) 34 (31.8) 15 (14) 107	 46 (44.7) 15 (14.6) 14 (13.6) 19 (18.4) 9 (8.7) 103	 46 (39.3) 12 (10.3) 17 (14.7) 26 (22.4) 15 (12.9) 116	 42 (41.2) 16 (15.7) 21 (20.6) 17 (16.7) 6 (5.9) 102
English proficiency (N = 544) Level 1 Level 2 Level 3 Level 4 Total	 14 (13.1) 10 (9.3) 54 (50.5) 28 (26.2) 106	 11 (9.91) 45 (40.54) 40 (36.04) 15 (13.51) 111	 28 (26.92) 46 (44.23) 27 (25.96) 3 (2.88) 104	 23 (19.66) 39 (33.33) 50 (42.74) 5 (4.27) 117	 26 (24.3) 32 (29.9) 37 (34.6) 11 (10.3) 106
Scholarship holder	0	8 (7.2)	25 (24)	29 (24.8)	39 (36.5)

* CMA denotes "credit mark average"

Table II presents the student achievements in phase 1 and phase 2 during the period of 2003-2007. Overall, a higher number of the top achievers (CMA≥ 80) were found with better classification of banding; 83.8% for band 1, 58.8% for band 2, 42.8 % for band 3. In the same vein, the proportion of final awards granted on the first attempt was the highest with students classified with band 1 (100%). This pattern was true for almost all students in the 5 cohorts (data not shown).

Table II: Distribution of the academic achievements of students at the entry and in phase 1 and phase 2

Banding classification*	Total student	CMA**≥ 80 n (%)	End point achievement	
			Awarded	Not awarded
1	173	145 (83.8)	173 (100)	0
2	80	47 (58.8)	80 (100)	0
3	98	48 (49)	97 (99)	1 (1)
4	115	36 (31.3)	115 (100)	0
5	67	13 (19.4)	60 (89.6)	7 (10.4)
Total	533			

Value in parenthesis indicates percentage;* entry * *credit mark average

Table III presents a correlation matrix among the variables of interest. It has been found that among the students, the better the banding classification, the more likely they were to get their award on the first attempt (r = .113, p = 0.009). There is a significant relationship between the CMA and the banding classification (r = .598, p < 0.0001). The better the banding classification on admission, the higher the CMA obtained and, vice versa. As expected, significant positive association was found between the CMA and the English proficiency (r = .301, p < 0.0001). Also, there is an association between CMA and the class of degree awarded on the first attempt (r = .202, p = 0.001). This suggests that the better the level of English proficiency, the higher the CMA and the better the chance for the student getting the award on the first attempt. However, all these associations are weak. Thus far, the association between pre-university scores (banding in this case) and the part A score (i.e. CMA) was stronger (r = 0.598, p <0.0001) than the association between CMA (part A scores) and end-point success (r = 0.202, p < 0.0001).

Table III: Correlation matrix among the selected variables (2003-2007)

	Banding	CMA	English proficiency	Award
Banding		.598*	.25	-.113**
CMA	.598*		.301*	-.202***
English proficiency	.25	.301*		-0.038
Award	-.113**	-.202*	-0.038	

* p < 0.0001; ** p = 0.009; *** p = 0.001

The proportion of students who were awarded the MPharm degree on the first attempt was significantly different among the 5 categories of banding classification (X^2 = 9.86; df = 4; p = 0.04) (data not shown). For end-point success, the banding classification and the most recent English proficiency level were not the significant predictors. It was found that the CMA from semester 1 through semester 5 for part A was the only significant predictor of the likelihood of end-point success in the twining programme. The predictive value of the CMA was strong, with an odds ratio of 3.9. This applies for each incremental of increase in the CMA; the odds of end-point success increased by about 4 times (p < 0.0001). According to the diagnostic tests, the model fit was confirmed (Nagelkerke R^2 = 0.073, Cook's distance <1, DFBetas <1 (Howell, 2010).

Discussion

The present study analyzed the profile of student achievement and looked at the predictors of success at the end-point of the twinning programme between IMU and UoS. The results of the present study indicate that academic performance in part A was critically important for subsequent success in the twining programme. The findings, the association between "banding on admission" and "CMA", and "CMA" and "the end-point success" suggest that there is a carry-over knowledge and skills acquired at the pre-university institution, and that these skills are a good asset for the next part of learning at the IMU. Studies have explored correlations between student pre-admission characteristics and academic success in pharmacy school (McCall *et al.*, 2007). The results of the present study support this point: achievement at IMU is an important predictor for the successful completion of the degree at the end-point. Although there is no discrimination of either gender or ethnic status, it is of interest to note the consistently dominating single ethnicity and female majority in this twinning programme. This may be related to the better grades achieved by female students and the high motivation by families of Chinese ethnicity to pay for private education in pharmacy. It has been suggested that this shift towards female majority at least correlate with pharmacy itself becoming a more attractive career for women than men (Gidman & Hassell, 2005). This gender difference was shown to emerge between aspirations to work in the different sectors and pharmacy ownership intention (Capstick *et al.*, 2007). Ethnic disparities have also been recognised in other studies (Studley, 2003; Capstick *et al.*, 2007) although there was variation in the types of study programme and campus locations. Differences by ethnicity were found in terms of influences of parents, which support the findings of Capstick *et al.*, (2007). A primary motivation for completing the study at an English university would be the opportunity of exposure to native speakers in the environment during the final year of study.

Students who are required to speak English in their profession would prefer an exposure to educators whose first language is English (Bekhradnia, 2004; Kohnert, 2008). A future study addressing these issues would be desirable for better understanding of students' preferences for joining the twinning programme. Overall, this may be related to factors perceived to be intellectually satisfying (Capstick *et al.*, 2007), self-interest (i.e. the advantage conferred by the foreign degree in our case), among others.

The better the banding classification on admission, the higher the CMA obtained as found in this study. This might be partly explained by the fact that a certain level of English language proficiency (i.e. minimum essential score) and understanding of science subjects are necessary for the subsequent academic success. A previous study had reported that students also rated 'being a good communicator with good English' (language skills) as the top attribute the school should consider when selecting students for the pharmacy programme (Capstick *et al.*, 2007). Along this thread, it has been documented that English skills correlate highly with final pharmacy examination marks for non-native English speakers (Sharif *et al.*, 2003; Capstick *et al.*, 2007).

A yearly decline in the number of top achievers and the proportionally lower number of the top achievers at the end-point may be due to many factors. One possible explanation could be the outcome expected of the learners become progressively higher and more complex as the studies becoming more difficult, with increasing competition (Studley, 2003; Koskinen & Tossavainen, 2004) in the foreign land (UoS in this case), although the extent of this factor is not known. It has been demonstrated that studying abroad as a process of learning intercultural competency, consisted of three ethno-categories: transition from one culture to another, adjustment to the difference and gaining intercultural sensitivity (Koskinen & Tossavainen 2004). Many, if not most, selective colleges and universities consider the student backgrounds when making decisions on admission (Studley, 2003). It has been shown that students who had international placement experience tend to apply broader perspectives to pharmacy practice (Bress *et al.*, 2011); this would be worthy of future study.

A common limitation to all documentary analyses is the accuracy of primary data. This concern is less likely in the present study as we have collected data from the official academic records of the students. Based on available data, our analysis relied on the cognitive variables, and non-cognitive variables were not included. We hypothesized that academic variables and other key variables (i.e. cognitive variables in this cases) are not mutually exclusive (Wilkinson *et al.*, 2008). Thus, this limitation is less likely to introduce any bias into our results. A previous study has shown that good admissions decisions are essential for identifying successful students and good practitioners (Allen & Bond, 2001). A future study could cover how they are practising after graduation.

Nevertheless, our outcome variable is the award of the MPharm degree on the first attempt. This is an important reflection of the academic standing of the institutions participating, of the students' motivation toward higher learning, their determination to study towards future careers (i.e. career intention), and constitutes a good record for those who hold scholarships/sponsorship. This can also be regarded as the perceived value of a 'pharmacy passport' (Capstick *et al.*, 2007). On the other hand, obtaining the degree on a repeated attempt reflects a lower achievement. For instance, there will be an escalation of costs. Success on the first attempt takes less time and therefore saves significant amount of money and other resources. In the present study, the identifying variables used to predict success of pharmacy students on the programme have been the focus of the educators.

In conclusion, the good academic performance on university admission and part A of the programme were crucially important for subsequent success in the twinning (IMU-UoS) programme.

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