

# 科技部補助專題研究計畫成果報告 期末報告

弱勢者教育提供之有效性：臺灣和英國大數據分析(第2年)

計畫類別：個別型計畫  
計畫編號：MOST 104-2410-H-004-143-MY2  
執行期間：105年08月01日至107年03月31日  
執行單位：國立政治大學教育學系

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報告附件：移地研究心得報告  
出席國際學術會議心得報告

中 華 民 國 106 年 12 月 28 日

中文摘要：註：本計畫已正式發表期刊論文8篇。本結案報告，主要呈現其中一篇期刊論文--因該篇與當前一重要教育政策關係較大，研究結果期能提供參考。

目的：本研究調查台灣的大學入學「繁星政策」是否能夠實現促進教育公平的主要目的。這個政策由政府執行，使用學生的校內排名，把高水平的學生錄取到一流的大學或院系(主要是醫學系)。

方法：本研究使用來自政府、大學、高中和新聞報導的公開數據。定義「受益於繁星政策」為：相較於實施前一年的沒有學生進入醫學系，某高中於政策實施的第一年有學生進入醫學系。使用卡方檢驗和logistic回歸來考驗受益狀態如何與學校類型和地區產生交互作用。

發現：結果顯示「繁星政策」惠及25所高中，包括9所「社區」公立學校(是指不是地區最高成績的高中)和16所掙扎中的私立學校(特別是職業學校)。與預期相反的，以學校或學生為單位，相較於公立學校，私立學校為三倍或七倍受益於繁星政策；弱勢地區的學校沒有受益。

獨創性/價值：繁星政策是中央制定並以學校為單位的獨特設計，此設計的確在某些層面增加教育公平性，但並非有利於尋求進入醫學系的弱勢學生。

中文關鍵詞：教育公平，教育政策，弱勢，醫學生，台灣，大學入學

英文摘要：Purpose. This study investigated whether Taiwan's 'Stars Policy' for university admission can fulfill its major aim to promote educational equity. Implemented by the government, the policy relies on student within-school ranks to admit high achievers to top universities or departments, mainly in medicine.

Methodology. Open data were collected from the government, universities, high schools, and news reports. High schools were identified as having benefited from the Stars Policy if more students were accepted into medical departments in the first year of the policy than one year before its implementation. Chi-square tests and logistic regression were used to examine how the benefit status interacted with school types and regions.

Findings. The results indicated that the Stars Policy benefited 25 high schools, namely, 9 community public schools (not top achieving in a region) and 16 struggling private schools (especially vocational). Contrary to expectations, private schools were three times as likely and private schools seven times as likely to have benefited from the Stars Policy. Schools located in disadvantaged regions did not benefit.

Originality/value. The Stars Policy is unique given its centralized and school-based system. The design, however, increases educational equity in a manner that fails to benefit disadvantaged students seeking admission to the

top-achieving medical departments in Taiwan.

英文關鍵詞：educational equity, educational policy, disadvantaged,  
medical students, Taiwan, university admission

Chiu, M.-S. (2017 accepted). Equality or quality? Using within-school ranks to admit disadvantaged medical students. *Journal of Applied Research in Higher Education*.

Universities have a dual objective of linking human capital to economic growth, national competitiveness, and individual development and promoting individual well-being, human rights, and educational equity through social service, especially in relation to K–12 education (Draisma, 2012; Pimentel, 2006). These objectives, however, may simultaneously exist in harmony and in contradiction to each other (Robeyns, 2006). University admission policy is the first area of conflict between the two objectives: Should universities admit students based on educational capacity or quality (e.g., excellence and achievement, with streaming and tracking in higher education), or equity (e.g., diversity and inclusion, with a focus on selecting students from disadvantaged backgrounds)?

The Stars Policy created by the Taiwan government is innovative in that it aims to provide educational equity while considering educational quality and views universities as a source of human capital. The major principle of the policy is to use within-school ranks in diverse aspects of student competencies to admit high-achievement students within each school to the most highly selective universities (mainly National Taiwan University) and departments (mainly the medical department). The major assumptions underlying the Stars Policy are that all high schools (grades 10–12) should be of equal quality and that students from disadvantaged regions should have the opportunity to enter top universities.

The design of the Stars Policy is unique in comparison with other related initiatives worldwide. The university admission policy is advocated, guided, and regulated by the government rather than by the universities themselves. The significant features of this policy must be documented in the educational literature and its effectiveness examined in order to inform future policy making. One concern is that the government does not release most of its data on the Stars Policy. Nevertheless, a recent report indicated that it provides opportunities for economically disadvantaged students to enter top universities in Taiwan (Department of Statistics, Ministry of Education [MOE] in Taiwan, 2015). Research conducted by universities based on their own data has yielded generally positive results. However, universities have a measured attitude toward the claim that the Stars Policy benefits economically disadvantaged students. This is because of the small number of students admitted through the policy and the use of average regional incomes to represent student economic status (Li, Lee, & Lien, 2016; Luoh, 2016). Students entering medical departments are highly respected by the public in Taiwan and are often recognized in the news and on the websites of high schools. The current study used open data from news coverage, high schools, universities, and the government to explore how the Stars Policy addresses the dual objective of educational quality (for capacities) and equity (for rights) in the admittance of students to medical departments.

### **Educational Equity versus Quality**

Whereas quality in education focuses on achievement, competitiveness, and ranking, equity emphasizes diversity (equal opportunity) and inclusion (broad participation). Equity can be measured by the degree of equality in the distribution of specific groups of people in an educational system (Farrell, 1999) or by the availability of equal opportunities for the members of different groups in a society to enter the educational system. Social justice and mobility can be the major guiding philosophy for promoting educational equity (Moses, 2010) and broader participation (Hoare & Johnston, 2011).

Equity initiatives can be implemented to address three dimensions: access, schooling or instruction, and learning outcomes (Coleman, 1990). As suggested by Rawls's (1999) theory of justice, equal opportunities should be given to share the limited resources in a society. Individual differences should be acknowledged and addressed through adaptive, remedial instruction. In addition, policies or measures that provide the most disadvantaged students with resources that help them become learners on par with their nondisadvantaged counterparts are required. When all three dimensions (equal access, adaptive instruction, and learning outcomes) are addressed, educational equity is likely to contribute to educational quality.

### **University Admission Policies for Promoting Equity Worldwide**

First, universities face the challenge of balancing two goals: maximizing academic selectivity and maintaining diversity of student sources (Kane, 2000). University admission policies, therefore, are generally based on two principles. First, they use standardized, national achievement tests to present the image of a fair playing field for assessing academic ability. This principle is consistent with the general phenomenon of a positive relationship between student achievement at the beginning and that upon completion of university education (Hoare & Johnston, 2011). Standardized tests to assess student achievement include the Scholastic Assessment Test (SAT) and the American College Test (ACT) in the United States, the General Certificate of Education (GCE) Advanced Level in the United Kingdom, and the General Scholastic Ability Test (GSAT) in Taiwan. Broadening low achievers' achievement is a means of justifying the use of standardized, objective tests to attain equal opportunity (Moses, 2010).

Second, university admission policies use affirmative action to admit a greater number of disadvantaged students. Examples of these policies include those benefiting women in the Netherlands, racial minorities in the United States and in Brazil, low-income neighborhoods in France, lower classes in India, and rural communities in Scandinavia (Moses, 2010; Tapper & Palfreyman, 2005). These examples demonstrate that disadvantaged students' pathways can be conceptualized as multifactorial, complex, and nonlinear (Abbott-Chapman, 2011). This means that the challenges faced by these groups are interwoven and can be considered separately or as related to one another.

A typical approach to implementing the two principles is to use the results of standardized tests, which are then adjusted by governments or universities (Belasco, Rosinger, & Hearn, 2015). Adjustment strategies may add a certain percentage to disadvantaged students' original

standardized achievement test scores to offset their perceived disadvantage or set quotas for the admission of ethnic minorities or other disadvantaged students to ensure that admission rates reflect overall demographics (Hinrichs, 2014). Most of these practices tend to focus on the student level and are regulated by countries with detailed measures designed and implemented by universities such as those in the United Kingdom (Hoare & Johnston, 2011).

### **Debates on University Admission Policies for Promoting Equity Worldwide**

University admission policies for promoting equity (e.g., affirmative action) are a controversial issue worldwide. Such policies should be implemented strategically by accounting for local demographic and logistical considerations. Scholars advocating affirmative action policies emphasize the policies' fulfillment of the objectives of social justice and diversity, which facilitates the incorporation of more diverse talents into an organization and may in turn lead to increased quality (Hoare & Johnston, 2011; Moses, 2010). Pro-affirmative-action scholars also warn that sciences (e.g., standardized tests) are never value free (Crosby, Iyer, Clayton, & Downing, 2003).

Conversely, critics argue that affirmative action policies have failed to guarantee quality or to achieve equity. Regarding quality, the major arguments are that high-school achievement and results on college entrance examinations remain stable predictors of student performance in university and that those from public schools perform at a higher level in university than those from private schools (Hoare & Johnston, 2011). In one instance, a selective university in Chile chose students with class grades in the top 10% from a few disadvantaged schools. It later found that those students had less satisfactory learning outcomes than their counterparts as they progressed in higher education (Koljatic & Silva, 2013). Furthermore, Arcidiacono and Lovenheim (2016) showed that relatively less prepared students admitted to universities through affirmative action policies are more likely to pursue less demanding majors.

The debates regarding equality come in several forms. They are based on the assumption that affirmative action policies are too flexible, adaptive, and context based to guarantee governmental transparency (Moses, 2010). Moreover, ethnic minority disadvantaged students benefiting from these policies may face additional challenges in the labor force because their wages are lower than those of their peers (Wydick, 2008). Ethnic minority students, who generally have higher achievement than their ethnic majority counterparts, may also be disadvantaged by an affirmative action policy designed by politically dominant majority groups that aim to raise their own places in higher education (Lee, 2012).

### **Admission System in Taiwan Higher Education Institutions**

Taiwan has a centralized educational system. Especially before the political reform starting in 1987, the government maintained a high level of ideological and structural control over higher education institutions (Mok, 2000). After the reform, higher education faculties began to enjoy more autonomy in governing their own institutions and finances. However, they have faced the challenge of marketization with the rapid expansion of higher education institutions,

especially private ones (Mok, 2002), which dilutes the resources allocated by the government to each university.

Despite the political reform, the government (mainly the MOE) still sets most of the rules and controls the design of university admission policy. For example, one affirmative action policy designed and directly implemented by the Taiwanese government is to add 25% to the original scores on the university entrance examinations for students belonging to indigenous groups (Hung & Yao, 2008). High schools (with their students, parents, and thus the public) use strategies to game the system. Universities mediate and must negotiate with the government and the public.

### **Examination Policy**

Using single-examination results as the major criterion for admitting students into the Chinese education system has been a common historical practice in Confucian cultures and has received public attention in East Asian, Chinese, and Western countries (Tan, 2017; Spangler, 2016; Waldow, Takayama, & Sung, 2014). The single-examination policy has been widely advocated, given its fairness for students from different backgrounds and potential to break the cycle of social class or poverty. However, this policy has also been criticized for its use of a single academic test result to represent student ability to succeed in the various fields in higher education. Multiple enrollment programs, which were launched in 1987, allow policies other than the single-examination policy for admittance to universities (Yang, 2004). For the academic year 2017, 40% of students were admitted through the single-examination policy (University Entrance Examination Board in Taiwan, 2017), and 60% were admitted through alternative policies.

**Two alternative policies.** Since 1994, Taiwan has advocated diversity in human resources and created alternative university admission policies (Lin, 2012). The movement is a response to criticism of the single-examination policy. It aims to meet the challenges created by the rapid changes in today's society and world. The movement is still in progress; two salient alternative policies currently remain in effect.

(1) The Application Policy. Students apply to a maximum of six departments based on their GSAT results, supplemented with interviews and portfolio results. The policy began in 2001 and allows for the admission of approximately 40% to 45% of university students as of 2017.

(2) The Stars Policy. Students' within-school achievement ranks for grades 10 and 11 are calculated and submitted to the government. Each school can recommend at most two students to each of four university department categories: humanities/social sciences, physical science, biological science, and medicine. The first criterion for choosing student candidates is their within-school rank. The next criterion is set by the departments; for instance, it could be part of the total GSAT score or the school rank in a particular subject (e.g., English departments may choose GSAT English scores or within-school English ranks). The goal is to admit

outstanding students to the top universities (mainly National Taiwan University and a few others) and departments (primarily the medical department).

### **Stars Policy**

**History.** The short history of the Stars Policy reveals that the government intends to expand it incrementally. The initiative was partly launched in 2007, was formally launched (6% of students were admitted through the policy) in 2011, fully included medical students in 2012, and established a new regulation (15% of all students entering each university are to be admitted through the policy) as of 2016. The development of the Stars Policy for general and medical students and some unique events are described chronologically and in greater detail as follows.

In 2007, the Stars Policy was partially launched. Over the subsequent 3 years, it gradually included more departments and universities, but excluded medical departments. In 2008, a scandal occurred when one high school revised students' within-school ranks to fit their GSAT scores. This placed many students within the same ranks, which created more eligible students than it should have (see <http://news.ltn.com.tw/news/life/paper/200833>). For example, at a school that has 10,000 students, 10 students are in the top 1%. However, if that 1% is a rounded integer (e.g., 1.4% rounded to 1%) or many students have the same top 1% scores, then there can be more than 10 students in the top 1% (e.g., 14 or more students). After the scandal, the government began to require high schools to provide raw scores before administering the policy and to calculate students' within-school ranks to ensure that they match the theoretical number (e.g., only 10 students in the top 1%).

In 2011, the Stars Policy was formally launched. All top universities had to adopt it to continue to obtain extra funding. Some medical departments adhered to the policy with limited quotas. The final percentage of university students admitted through the Stars Policy is documented as 6%. In 2012, all medical departments adopted the policy. One initially planned to admit only two students through the policy. Ultimately, the department admitted nine students because they had full scores on the GSAT and were the top 1% achievers within their schools in all subjects.

In 2014, face-to-face interviews were required for admittance to medical departments but not other departments. In 2016, the government formally stipulated that 15% of new students entering national universities and 13% entering private universities partially supported by the government must be admitted through the Stars Policy. The government uses a formal regulation to set the percentage of students admitted through the policy. The rule for private universities partly funded by the government was reset to 15% of new students in 2017.

**Debates and changing aims.** Most news coverage and blogs are positive about the Stars Policy, given that it offers more opportunities for underrepresented, disadvantaged students from nonelite high schools to attend top universities (e.g., <http://www.epochtimes.com/b5/12/2/19/n3516936.htm>;



<http://maomaochao61.pixnet.net/blog/post/236038328>). Thus, universities are viewed as being socially responsible. Despite the positive attitudes of policy makers and the public, educational researchers have revealed potential limitations of the Stars Policy. For example, the policy does not apply to students who change high schools, likely increases peer competitiveness within schools, and leads to conflicts between parents and schools in calculating students' achievement scores (Chiu, 2013; Lin, 2012).

Another consideration is that the aim of the Stars Policy has gradually changed from helping the disadvantaged to balancing regional development (Lin, 2012) based on social justice, as indicated on the website of the MOE (<http://nsdua.moe.edu.tw/index.php/admissions/admission-1>). That the objectives of the policy have been revised may be an inevitable development. The Application Policy has been criticized for benefiting advantaged students, who can afford to travel to participate in face-to-face interviews and can save on fees because they live in regions where most universities are located (e.g., Taipei). The Stars Policy originally favored disadvantaged students who typically live in disadvantaged regions. However, because the top-achieving students within these regions may not be from disadvantaged families, the aim was changed to balancing regional development.

### **Research Questions**

The preceding review of the literature indicates that the Stars Policy is an innovative university admission policy. It is a governmental, publicly advocated policy that sets student achievement ranks within high school as an alternative criterion for university admission. One unique aspect of the Stars Policy is that it focuses on the school level and is mostly controlled and implemented by the government, whereas most similar policies are at the class level and implemented by universities. For example, selective universities in Texas in the United States admit students in the top 10% of their high school without considering SAT results, increasing the number of ethnic minorities (Kane, 2000). Similarly, some University of California campuses admit students in the top 9% of their high school class or in the top 9% of their state (Arcidiacono & Lovenheim, 2016).

The Stars Policy is a national policy that applies to all schools in Taiwan. Therefore, school types and regions are the main variables to be examined. For example, the tuition at public schools tends to be lower than that at private schools. Schools located in disadvantaged (e.g., rural) regions tend to have students of lower socioeconomic status and lower achievement than schools in advantaged regions (Sirin, 2005).

Because it is unique and influential, the features of the Stars Policy must be understood, especially with regard to its aim of achieving educational equity. Another feature is its focus on increasing opportunities for students from disadvantaged schools and regions to enter top universities or departments (mainly medicine). Therefore, by using a sample of medical students, this study addressed the following research questions:

1. What characteristics and strategies helped high schools benefit from the Stars Policy?
2. Do high school types (public vs. private) and regions (ranging from advantaged to disadvantaged) determine which schools benefit from the Stars Policy?

## **Method**

### **Data Sources and Samples**

This study used open data drawn from the government (e.g., <https://stats.moe.gov.tw/files/analysis>), medical departments and their universities (e.g., <http://www.aca.ntu.edu.tw/recruit.asp>), the university admission test center (e.g., [www.jbcrc.edu.tw/](http://www.jbcrc.edu.tw/)), high schools (e.g., <https://apps.nknush.kh.edu.tw>), and news reports (e.g., <http://freshman.tw/cross/>). The Stars Policy is controversial and has raised debate (Chiu, 2013; Lin, 2012) but has been strongly advocated by the government. All relevant data are managed by the government, potentially leading to bias. Furthermore, open data are free from sampling errors because they are gathered from the entire population rather than a sample of that population. By contrast, interviews with or surveys of stakeholders may collect different types of data influenced by perceptions and context and therefore may yield different findings. Thus, using open data enabled this study to avoid bias and generate findings different from those yielded by the interview and survey methods traditionally used in the education field. The data were cross-referenced, cross-validated, and coded to form a data set that included all of the variables required in this study: the medical students' names, high schools, and universities, as well as the university admission policies under which they were accepted into the various medical departments.

This study collected data on all students entering medical departments through the Application Policy 1 year before the formal implementation of the Stars Policy (2010) and those admitted through the Stars Policy in the first year of its implementation (2011). The data set comprised a sample of 454 medical students. Because the Stars Policy applies only to current high school graduates, students who graduated in previous years were excluded from further analysis, which resulted in a sample of 343 students from 68 schools.

### **Data Analysis**

The aim of the first data analysis for answering Research Question 1 was to identify the students and schools that benefited those that did not benefit from the Stars Policy. A high school was identified as having benefited if its students entered medical departments through the Stars Policy in its first year of implementation but not through the Application Policy 1 year earlier. The Stars Policy and the Application Policy are comparable in that both use the GSAT results, but the single-examination policy uses another test administered approximately 6 months after the GSAT.

To further answer Research Question 1, the websites of the schools that benefited from the Stars Policy were analyzed. School websites were first searched for the keywords "Stars Policy," "admission policy," "new students," and "school performance." Next, characteristics and

strategies likely enabling schools to benefit from the policy were identified and compared with those of the schools that did not benefit. Then, the identified characteristics were coded and organized into themes. Finally, an independent research assistant, who was not an author of this paper, verified the coding and themes. Disagreements were resolved through further verification and discussion between the researchers.

Research Question 2 was answered by using chi-square tests and logistic regression to examine how school types and regions can differentiate and to predict which schools and students benefited and which did not. The school types were coded as 0 = *public* and 1 = *private*. School regions were coded as east (the most disadvantaged region in Taiwan), south, central, and north (the most advantaged region), with the north as the control for the other three regions separately (i.e., dummy coding 0 = *north* vs. 1 = *east*, 0 = *north* vs. 1 = *south*, 0 = *north* vs. 1 = *central*).

The Stars Policy stipulates that only one student from one high school can enter one university; the Application Policy, which mainly uses GSAT results, does not have this rule. To make the two policies comparable, the medical students admitted through the Application Policy were resampled using this rule. This resulted in 171 students from 68 schools in total as the data set used to answer Research Question 2. Detailed demographics of the sample are presented in Table 1.

<Insert Table 1 here.>

## Results

### Schools Benefiting from the Stars Policy

A total of 25 high schools were identified as having benefited from the Stars Policy among the 68 high schools with students entering medical departments through the Application Policy in 2011 and the Stars Policy in 2012. These 25 schools did not have students entering medical departments—the field of study most respected in Taiwan—1 year before implementation of the Stars Policy but did in the first year afterward. Among the 25 schools, 9 were public community (or not regional top-achieving) schools and 16 were private. None of the schools were in the east of Taiwan (the most disadvantaged region), 11 were in the north (the most advantaged region), 11 were in the south, and 3 were in the central region (Table 1). In summary, all of the 25 schools that benefited from the Stars Policy were not top-achieving schools within their regions, and none were from the east (the most disadvantaged region). The regional top-achieving public high schools are normally determined by their students' achievement on national or regional entrance exams. For example, if most top-achieving girls in northern Taiwan select Taipei First Girls High School (<http://www.fg.tp.edu.tw>) as their first choice, then the school becomes one of the top-achieving high schools in the north (or Taipei) region. The top-achieving private schools normally select students based on their own examinations and procedures. They have established reputations and aim to admit only high-achieving students from high-income families.

The websites of the 25 schools that benefited from the Stars Policy were analyzed to further understand how they benefited. The contents were coded, and the codes were further organized into two themes: school characteristics and strategies. The results of the analysis revealed that two characteristics and five strategies of the 25 schools might have been part of the reason they benefited from the Stars Policy. Four public schools did not use any of the five strategies.

**Characteristic 1: Non-top-achieving high schools (25 schools: 16 private, 9 public).** None of the 25 schools were top achieving in their regions. No school in the east region benefited from the Stars Policy (Table 1).

**Characteristic 2: Vocational schools (10 schools: 10/16 private, 0/9 public).** Among the 25 schools benefiting from the Stars Policy, 10 were vocational high schools. Vocational high schools typically emphasize the production of skilled laborers or technicians, only partially preparing students to enter technology colleges or universities. Such institutions do not have medical departments and use different tests (not the GSAT) to admit students. Moreover, all 10 vocational schools that benefited were private. No public vocational schools benefited from the Stars Policy. The nine public schools that benefited were academically oriented and aimed to prepare students for general universities (Table 1).

**Strategy 1: Scholarships (20 schools: 16/16 private, 4/9 public).** Twenty schools awarded scholarships to students who had high academic achievement and scored well on high school entrance tests and on the GSAT, as well as those who entered top universities or medical departments. The scholarships were donated by foundations for both private and public schools or the boards of directors of the private schools. The largest scholarships awarded (NT\$1,000,000), based on high school entrance test scores, were provided by two private schools. All private schools used this strategy.

**Strategy 2: News about successful students (17 schools: 15/16 private, 2/9 public).** Seventeen schools honored successful students entering top universities and medical departments through the Stars Policy. Their websites provided the percentages of students entering universities through the policy and some detailed information about the students.

**Strategy 3: Special classes (13 schools: 11/16 private, 2/9 public).** Thirteen schools created a small number of special classes, generally one to three, for high achievers or students aiming to achieve high scores on the GSAT. The classes were named based on their stated objectives related to the Stars Policy: elite, gifted, early start (from primary or junior high school), and study at the top (national) universities and/or medical departments.

**Strategy 4: Testing and learning activities for recruiting sixth- or ninth-graders (9 schools: 9/16 private, 0/9 public).** Nine schools provided tests and science camps for upcoming primary or middle school graduates, as well as scholarships for high achievers in these camps. These students were actively recruited by the schools through personal contacts. All nine schools were private.

**Strategy 5: Highlighting advantages of the Stars Policy (3 schools: 1/16 private, 2/9**

**public).** Three schools made announcements and provided government and teacher reports about the advantages of the Stars Policy to promote educational equity and community schooling.

### **Using School Types and Regions to Determine Schools That Benefited and Those That Did Not**

The results of chi-square tests revealed that public and private schools were not significantly different in their degree of having benefited from the Stars Policy in terms of school numbers ( $\chi^2(df) = 3.788(1)$ ,  $p = .052$ ,  $n = 68$ ). However, they were significantly different in terms of student numbers ( $\chi^2(df) = 17.351(1)$ ,  $p < .0005$ ,  $n = 171$ ; Table 1, Figure 1). The four regions were not significantly different in their degree of having benefited from the Stars Policy in terms of school numbers ( $\chi^2(df) = 5.677(3)$ ,  $p = .128$ ,  $n = 68$ ) or student numbers ( $\chi^2(df) = 3.843(3)$ ,  $p = .279$ ,  $n = 171$ ).

<Insert Figure 1 and Figure 2 here.>

For school types, the results of logistic regression for analyzing school numbers revealed that private schools benefited significantly more from the Stars Policy than did public schools ( $b$  (standard error [SE]) = 1.113 (.557),  $p = .045$ ), with control for school region (Table 2). Moreover, with the school region held as a fixed value, the odds ratio ( $OR$ ) of private schools benefiting from the Stars Policy relative to public schools benefiting was 3.045, which is greater than 1.000. In other words, the ratio for private schools having benefited to those not having benefited was 3.045 times that for public schools. In terms of percent change, the odds for private school students were 204.5% higher than the odds for public school students. Logistic regression for analyzing student numbers presented a similar but more salient result, showing that private school students benefited from the Stars Policy more than did public school students ( $b$  (SE) = 1.890 (.458);  $p < .0005$ ;  $OR = 6.618$ ).

<Insert Table 2 here.>

For school regions, the results of logistic regression for analyzing school numbers revealed that with control for school type, none of the three less advantaged regions benefited significantly more from the Stars Policy than did the most advantaged region (the north) ( $b$  (SE) = -20.307 (28420.722), .339 (.601), and -1.395 (.779), all  $p > .050$ ;  $OR = .000$ , 1.403, and .248 for east, south, and central, respectively). The results of logistic regression for analyzing school regions revealed only one significant finding: students from the north region benefited from the Stars Policy more than did those from the central region ( $b$  (SE) = -1.285 (.652),  $p = .049$ ;  $OR = .277$ ). No school in the east benefited from the Stars Policy.

## **Discussion**

### **Promoting Education Equity by Recognizing the Quality of Struggling Schools**

The Stars Policy provided students in 25 traditionally non-top-achieving high schools an opportunity for admission to medical departments, which are the traditional recipients of the top 1% high achievers from the high-achieving public or private high schools in Taiwan. The

results appear to fulfill the social responsibility of universities to provide a social service and to promote educational equity as initiated and advocated by some educators and the government (Chiu, 2013; Draisma, 2012).

In addition, private vocational schools tended to benefit most from the Stars Policy. Vocational schools, especially private ones, face the challenge of reduced student enrollment. This is because of the massive expansion of 4-year universities from 1975 to 2009 in Taiwan (Chiang, 2013). This development allows for all students, including those with a low GSAT score, to attend higher education institutions. Private vocational schools have difficulty surviving because of the market oversupply of students entering universities, combined with Taiwan's Confucian culture, which emphasizes education, especially in the academic fields (Liu & Xie, 2016). Thus, the Stars Policy appears to have in some degree saved private vocational high schools, which receive little support from the government.

The outcomes of the policy for struggling high schools appear to be positive: The Stars Policy successfully increased the inclusion of students from nonelite schools in medical departments, which typically only the top 1% achievers from elite schools can enter. The results also support Taiwan's recent grade 1 to 12 curriculum reform, which is based on the notion that all schools are of equal quality, regardless of whether they are elite or nonelite, academic or vocational. This, however, has raised further issues. Is the end result of being equal (acceptance to medical departments) a sign of educational equity worth pursuing? Is comprehensiveness or streaming (academic vs. vocational schools) preferable in education? Is saving vocational high schools through a university admission policy a rational or convincing policy? In a centralized government system such as that in Taiwan, manipulating the university policy to fulfill the ideal of educational equity appears to be sensible but remains controversial.

### **Private Schools with Strategies Emphasizing Quality Benefit from the Stars Policy Emphasizing Equity**

Five likely strategies were identified, in descending order in terms of the number of schools, as part of the reason for schools benefitting from the Stars Policy: (1) scholarships, (2) news about successful students, (3) special classes, (4) testing and learning activities for recruiting sixth- and ninth-graders, and (5) highlighting advantages of the Stars Policy. Except for the last strategy, all emphasize high achievement (quality), representing the opposite of the Stars Policy goal of educational equity. Both Strategies 1 and 4 focus on rewarding high-achieving students; Strategy 4 also aims to pursue high achievement early. Strategy 3 focuses on streaming within schools, which is generally not advocated by educational scholars due to its negative effects on student learning outcomes (Chiu, Chow, & Joh, 2017) and tendency to potentiate large socioeconomic status gaps (Chmielewski, 2014). The results of the study reveal an ironic phenomenon: schools using quality-related strategies benefit from the Stars Policy, which itself emphasizes equity.

Further, private schools use Strategies 1 to 4 more than public ones. The result implies that

private schools have a great capacity to adjust to fast-changing educational policies (Robeyns, 2006). Private schools normally charge higher tuition fees than public schools, but students from public schools normally perform at a higher level in universities than those from private schools (Hoare & Johnston, 2011). The question emerges of whether the Stars Policy increases or decreases educational equity. In other words, how are educational opportunities shared under the Stars Policy? In recent years, Taiwan has experienced a series of educational policy changes at the national level in rapid succession (Yang, 2004). It is worth considering whether or not the educational policy changes themselves have diminished the ideal of educational equity, given the concern that private schools and wealthy families fare better in adapting to fast-changing policies than public schools and poor families.

### **Meeting Educational Equity Halfway**

The Stars Policy broadens the inclusion of students from nonelite schools in medical departments. However, quantitative analysis revealed that private schools have benefited and that schools in the most disadvantaged region have not. Private schools and their students were 3.045 and 6.618 times more likely to become medical students through the policy than were public schools and their students. In addition, none of the 25 high schools were located in the most disadvantaged region of Taiwan (i.e., eastern Taiwan), and schools in the south and central regions have not benefited from the Stars Policy compared with those in the north region.

The results suggest that the Stars Policy increases the inclusion of diverse students entering university, but whether it promotes educational equity remains an issue. When the increase in inclusion occurs for private schools more than for public schools and when the disadvantaged regions do not benefit, can we conclude that the Stars Policy is an “effective” policy?

### **Limitations, Policy Recommendations, and Suggestions for Future Research**

Using open data is not a typical practice in education research and may be considered a limitation of this study. Traditional education methodologies such as interviews and surveys have solid backgrounds, are widely used, and may produce different data sets and findings. However, controversial education issues such as the Stars Policy may entail challenges related to sampling and bias. The government controls all relevant data and strongly advocates the policy, which potentially leading to bias. In addition, large amounts of open data are becoming more available with the development of information and communication technologies. Moreover, using open data may provide a new approach to studying controversial education issues from different perspectives. Future empirical education research may need to develop methodologies using open raw data to examine controversial issues. This would offer opportunities for national comparisons.

Future affirmative action policies may need to consider equity and quality simultaneously in three dimensions, equal access, adaptive instruction, and learning outcomes, as suggested by Coleman (1990) and Rawls (1999). Directly recruiting ethnic minority and rural students for the medical profession using careful assessment and support and consequently reducing

mismatch may be a straightforward, valid solution (Frisancho & Krishna, 2016; Girotti, Park, & Tekian, 2015).

Selecting a certain top percentage of students from schools or classes is generally supported by scholars (e.g., Crosby et al., 2003). However, the present findings imply that a similar policy implemented by the government may not fulfill the aim of equity. Providing universities or departments (e.g., medicine) with the autonomy to assume major roles in designing their own inclusion policies may better fit the changing environment. It may also allow them to select which disadvantaged students are suitable for their own professional communities. For example, to increase medical support in remote areas, specific medical departments near these areas can provide affirmative action policies to admit students from remote high schools. In future research, measures must be developed to create educational equity and quality simultaneously in the three dimensions of equal access, adaptive instruction, and learning outcomes. Affirmative action policies are complicated and context or culture dependent, and further cultural comparison studies are necessary.

### **Conclusion**

The aim of the Stars Policy implemented by the Taiwan government—to admit students to higher education based on within-school ranks—is based on the assumption that all schools are of equal quality. This helps the highest achieving students in all aspects of ethics, academics, physical ability, social ability, and aesthetics to be accepted to top universities and medical departments. Comparing data from the first year of the Stars Policy with those from the previous year indicates that the policy increases inclusion by admitting medical students from nonelite schools. However, it benefits private schools more than public ones. In addition, the Stars Policy encourages competition for academic achievement beginning in primary school and continuing through university entrance exams. Moreover, the policy encourages streaming within schools, which widens the ability gap between students.

In summary, the Stars Policy creates a unique picture of educational equity. It increases the inclusion of students from nonelite schools in top medical departments but also encourages private schooling and school strategies for admitting high achievers and honoring high achievement. Thus, the Stars Policy partly diminishes its aim, namely, to promote educational equity and comprehensive student development. The findings suggest that allowing individual universities or departments in Taiwan to design their own affirmative action policies may increase the likelihood of fitting the policies to their own communities and reducing the weaknesses revealed by this study.

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Table 1

*Frequencies and Chi-Square Test Results of Having Benefited versus Not Having Benefited from the Stars Policy by School Type and Region*

		School types			School regions				
		Public	Private	Total	East	South	Central	North	Total
<i>In School Numbers</i>									
Benefited	Count	9	16	25	0	11	3	11	25
	% within Benefited	36%	64%	100%	0%	44%	12%	44%	100%
Not benefited	Count	26	17	43	2	11	14	16	43
	% within Not benefited	61%	40%	100%	5%	26%	33%	37%	100%
Total	Count	35	33	68	7	22	17	22	68
	% of Total	52%	49%	100%	10%	32%	25%	32%	100%
		$\chi^2(df), p$	3.788(1), .052		5.677(3), .128				
<i>In Student Numbers</i>									
Benefited	Count	10	18	28	0	12	4	12	28
	% within Benefited	36%	64%	100%	0%	43%	14%	43%	100%
Not benefited	Count	108	35	143	4	47	42	50	143
	% within Not benefited	76%	25%	100%	3%	33%	29%	35%	100%
Total	Count	118	53	171	0	12	4	12	171
	% of Total	69%	31%	100%	7%	35%	27%	32%	100%
		$\chi^2(df), p$	17.351(1), < .0005		3.843(3), .279				

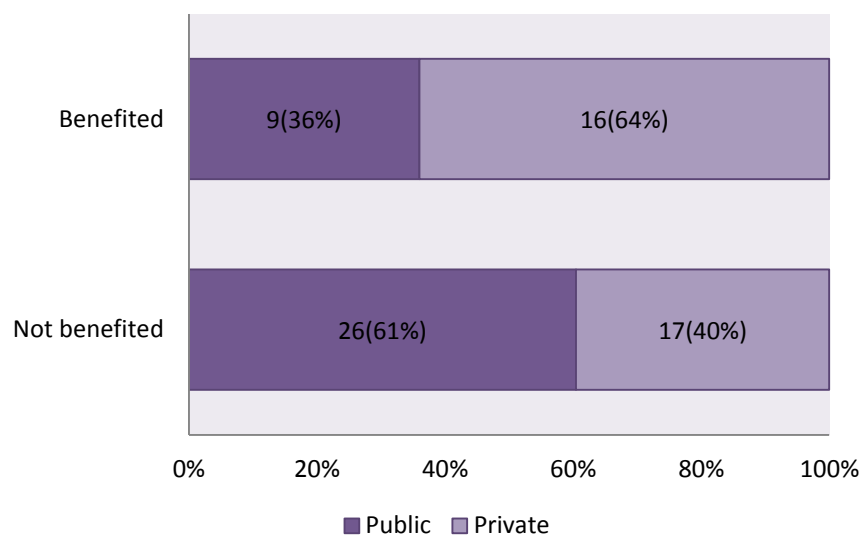
Table 2

*Logistic Regression Results of Having Benefited versus Not Having Benefited from the Stars Policy Predicted by School Type and Region*

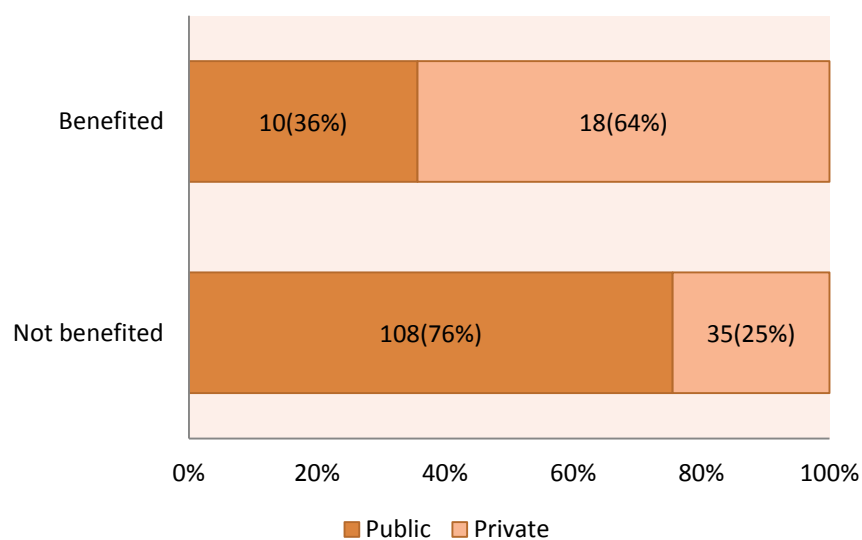
Predictor	<i>In School Numbers</i>				
	<i>b</i>	Standard error	Wald $\chi^2$	<i>p</i>	Odds Ratio
Private school <sup>a</sup>	1.113	.557	4.002	.045	3.045
Eastern region <sup>b</sup>	-20.307	28420.722	.000	.999	.000
Southern region <sup>b</sup>	.339	.601	.318	.573	1.403
Central region <sup>b</sup>	-1.395	.779	3.208	.073	.248
Predictor	<i>In Student Numbers</i>				
	<i>b</i>	Standard error	Wald $\chi^2$	<i>p</i>	Odds Ratio
Private school <sup>a</sup>	1.890	.458	17.025	.000	6.618
Eastern region <sup>b</sup>	-19.812	19048.231	.000	.999	.000
Southern region <sup>b</sup>	.038	.492	.006	.938	1.039
Central region <sup>b</sup>	-1.285	.652	3.880	.049	.277

*Note.* <sup>a</sup>control = public school; <sup>b</sup>control = northern region.

### A. In School Numbers

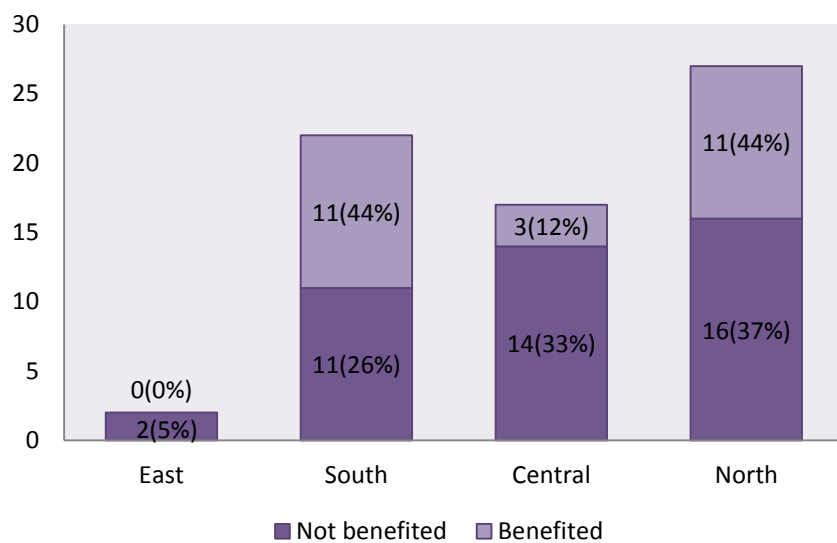


### B. In Student Numbers



*Figure 1.* Frequencies of benefited vs. not benefited schools by school type

### A. In School Numbers



### B. In Student Numbers

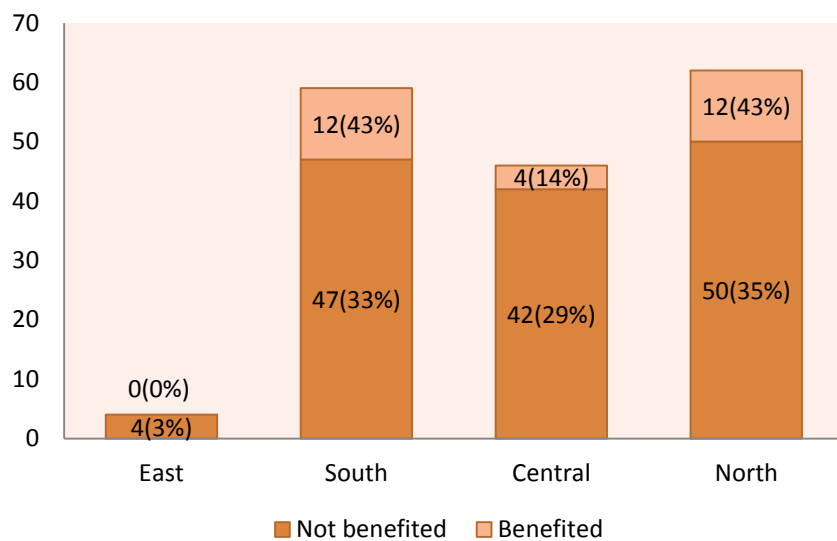


Figure 2. Frequencies of benefited vs. not benefited schools by school region

# 科技部補助專題研究計畫執行國際合作與移地研究心得報告

日期：106 年 8 月 20 日

計畫編號	MOST 104-2410-H-004-143-MY2		
計畫名稱	弱勢者教育提供之有效性：臺灣和英國大數據分析		
出國人員姓名	邱美秀	服務機構及職稱	國立政治大學教育學系教授
出國時間	106 年 6 月 21 日至 24 日	出國地點	英國劍橋大學
出國研究目的	<input type="checkbox"/> 實驗 <input type="checkbox"/> 田野調查 <input type="checkbox"/> 採集樣本 <input checked="" type="checkbox"/> 國際合作研究 <input type="checkbox"/> 使用國外研究設施		

## 一、執行國際合作與移地研究過程

6/21：論文一發表之後續討論。

6/22：論文二英國資料分析、撰寫分工、初稿。

6/23：論文三跨國資料分析方法、撰寫分工、初稿。

6/24：未來展望：跨領域、科技融入資料分析、研究設計方法。

## 二、研究成果

1. 論文一：分析英國某資料庫，已正式發表期刊論文一篇：Chiu, M.-S. (2017). Extending the internal/external frame of reference model to early-year cognitive abilities for children from diverse backgrounds. *International Journal of Quantitative Research in Education*, 4, 31-51. 討論此論文後續可能的發展。
2. 論文二：分析英國資料，做為新量表確定之初步結果，預計共同發表論文 1 篇。
3. 論文三：多國資料分析，做跨國比較分析，量表進一步效度分析，預計共同發表 1 篇論文。
4. 未來展望：了解學習新科技融入教學、資料分析、研究設計方法。

## 三、建議

- 1、面對面的較長時間溝通，的確可增進彼此合作與信任的深度與廣度，但後續仍需透過網路進行溝通以完成已規畫的事項。適度的跨國移地研究還是需要的，但成本會比用網路溝通高。
- 2、因為合作計畫的引薦，與劍橋電腦與科學相關科系的數位教授進行面對面或網路會議，從而了解未來學習與教學研究的高科技跨領域教學設計、資料分析的可能性。許多科技界的新發展，似乎可藉由教育為內容，做技術上的突破。因此，教育與科技的結合，應該可嘉惠彼此。

## 四、本次出國若屬國際合作研究，雙方合作性質係屬：(可複選)

- ☐分工收集研究資料
- ☐交換分析實驗或調查結果
- ☒共同執行理論建立模式並驗證
- ☒共同執行歸納與比較分析
- ☐元件或產品分工研發
- ☐其他 (請填寫) \_\_\_\_\_



## 五、其他

1. 帶回資料包括合作教授所已收集好的多國原始資料、初步分析結果。
2. 此次的移地研究，除了學術領域的社群網絡得以擴展到該大學的其他學門，也擴展到其他相關部門(例如：出版、評量)。

# 科技部補助專題研究計畫出席國際學術會議心得報告

日期：106 年 4 月 15 日

計畫編號	MOST 104-2410-H-004-143-MY2		
計畫名稱	弱勢者教育提供之有效性：臺灣和英國大數據分析		
出國人員姓名	邱美秀	服務機構及職稱	國立政治大學教育學系教授
會議時間	106 年 3 月 29 至 106 年 3 月 31 日	會議地點	Nagoya, Japan
會議名稱	(中文) 第五屆國際教育、心理學與社會研討會 (英文) the 5th International Symposium on Education, Psychology and Society		
發表題目	(中文) 青少年成就增長：父母教養、性別和社會經濟地位的角色 (英文) Adolescent achievement growth: Roles of parenting, gender and socioeconomic status		

## 一、參加會議經過

註冊、發表論文、參加其他學者的論文發表並進行討論、參與會議安排的學術與交流活動。

## 二、與會心得

1. 此會議名稱為「第五屆國際教育、心理學與社會研討會(the 5th International Symposium on Education, Psychology and Society)」，由「高等教育論壇(Higher Education Forum)」公司主辦，其會議網頁 (<http://www.isepst.org/index.asp>)。與該公司工作人員談，發現此公司為臺灣的公司，工作人員均為臺灣人，主要的會議地點在日本或亞洲各地。
2. 此次會議的與會者，大多來自亞洲各國，包括臺灣、日本、香港、菲律賓、泰國、以色列...等。大多與會者為大學老師與學生，也有中小學校老師來發表論文。
3. 此會議除了教育、心理學，也包括經濟、商業、工程教育，以及與產業結合方面的論文，文。論文發表的進行方式含 paper、poster。會後與各學者討論，也得到更多的了解。

## 三、發表論文全文或摘要

# Adolescent Achievement Growth: Roles of Parenting, Gender and Socioeconomic Status

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## 1. Background/ Objectives and Goals

This study aimed to identify effective father and mother parenting strategies of involvement and conflict solutions in predicting adolescent achievement growth. Adolescent gender and socioeconomic status (SES) are considered as background factors that take roles in adolescent achievement growth.

## 2. Methods

Longitudinal data ( $n = 4,163$ ) were obtained from the Taiwan Education Panel Survey, which collected mathematics achievement data during adolescent grades 7, 9, 11 and 12 and parenting data during grades 7 and 11. A growth modeling analysis examined grade-7 parenting strategies predicting the start (intercept) of achievement and grade-11 ones predicting the growth (slope), controlling for adolescent gender and SES in both

the intercept and slope.

### 3. Expected Results/ Conclusion/ Contribution

The analysis revealed that the effective parenting strategies for the start of achievement were father ending conflicts without results, mother monitoring, and no mother-adolescent conflicts. The effective strategies for the growth of achievement were father monitoring, mother listening to adolescent voices, and mother resolving conflicts by persuading, forcing or discussing with adolescents with or without solutions. All SES indicators took roles in the start of achievement, and gender and culture-related SES indicators took roles in the growth. The findings suggest that in Taiwan, fathers take fewer but more moderating roles than mothers do in both the start and growth of adolescent achievement. Early adolescence achievement requires mother monitoring without conflicts and father open conflict solutions. Later adolescence achievement growth requires mother acceptance and strong conflict solutions, and father monitoring. Culture may state part of the reasons for the results.

**Keywords:** achievement, adolescence, parenting, SES

#### 四、建議

1. 此次的學者大多來自亞洲，尤其東南亞，由東南亞學者報告的論文，可見其論文水準有更為進步的趨勢。
2. 有一位來自南亞的大學教師，就其國家的工程教育政策、工程發展、國家 GDP 做分析，同時也報告目前其政府與各部門的投入，並預測未來的投入與發展。由此可見東南亞國家的經濟發展與高教發展。
3. 除了工程領域，來自東南亞的論文發表者也包括大學的一般教育學者、心理諮商領域的工作者、中學教師。由此可見近年東南亞國家對高等教育、中小學教育之教學品質提升與研究之投入，包括理工文科社會各領域，值得注意。

#### 五、攜回資料名稱及內容

紙本：會議手冊(紙本)，含會議簡介、會議相關資訊、議程(含時間安排、所有與會者名單、論文名稱等)。

電子檔：議程、各論文摘要。。

#### 六、其他

論文發表之大會證明文件



HIGHER EDUCATION FORUM  
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# Certificate of Presentation

**International Symposium on Education, Psychology and Society**  
**March 29-31, 2017 Nagoya, Japan**

**Mei-Shiu Chiu**  
**National Chengchi University**

*Has attended the conference and presented a paper entitled*

*Adolescent Achievement Growth: Roles of Parenting, Gender and*  
*Socioeconomic Status*

Chief Executive Committee

A handwritten signature in black ink, appearing to read 'Wu Tsao', is written over a horizontal line.

# 科技部補助專題研究計畫出席國際學術會議心得報告

日期：106 年 8 月 20 日

計畫編號	MOST 104-2410-H-004-143-MY2		
計畫名稱	弱勢者教育提供之有效性：臺灣和英國大數據分析		
出國人員姓名	邱美秀	服務機構及職稱	國立政治大學教育學系教授
會議時間	106 年 6 月 28 至 30 日	會議地點	University of the West of Scotland, Paisley, Scotland, UK
會議名稱	(中文) 2017 國際高等教育教學與學習協會 - 蘇格蘭西部大學會議 (英文) 2017 International Higher Education Teaching and Learning Association – University of the West of Scotland Conference		
發表題目	(中文) 以校內排序進入大學來增收弱勢群體：在臺灣醫學生為例 (英文) Basing University Admission on Within-School Ranks to Increase Inclusion of the Disadvantaged: The Case of Medical Students in Taiwan		

## 一、參加會議經過

6 月 28-30 日：註冊，發表論文，參加 keynote speech、其他學者的論文發表、會議安排的學術與交流活動。

## 二、與會心得

- 1、此會議為 2017 國際高等教育教學與學習協會 - 蘇格蘭西部大學會議 (2017 International Higher Education Teaching and Learning Association – University of the West of Scotland Conference) 「<http://uwshetl2017.uws.ac.uk/>」，主辦為 University of the West of Scotland。這是第一次參加蘇格蘭大學所舉辦的學術會議，辦得很用心，其 E 化程度很高，包括用此會議所屬的 app，可用 app 預定參加場次，個人名牌用某機器 scan 即可記錄何人參加何場次，令人驚嘆。另外，該會議也與某期刊結合，論文 peer 審查很嚴，通過審查修改後，可成為期刊論文。這次會議，也動用了大量的該校學生參與服務工作，另外，該校的餐飲、住宿、出版等相關產業，當地的組織(含博物館、教堂、文化古蹟、合唱團等)也加入服務工作，近似整個學校與社區均投入辦此會議。事後，也有多方的線上問卷與 email 詢問參與相關活動的意見，以做為未來舉辦相關活動的參考，可見其用心。
- 2、此次與會的學者絕大多數為大專院校教師，少部分為研究生(或兼具大專老師的身分)，來自全世界(美、非、歐、亞、澳、非洲)與各領域，主要是教育，其次是其他各學門(例如：理、工、醫、藝術)。
- 3、此會議的 keynote speech 主要是請各教育學次領域的學者，討論大學如何增加 diversity 和 inclusion 的議題，大會主題「Creating Inclusion and Diversity in Higher Education」。與其他學者的討論中得知每個大學在增加 diversity 和 inclusion 的做法和理念，既拓展了思考，也增進對不同文化與學校脈絡的了解，收穫良多。
- 4、我的論文發表，收到不少回饋，包括不同國家的相關政策、文化思維，與資料收集策略的討論，進而深思此議題所面對的持續、未解挑戰。

## 三、發表論文全文或摘要

# Basing University Admission on Within-School Ranks to Increase Inclusion of the Disadvantaged: The Case of Medical Students in Taiwan

## Abstract (limit 50 words)

This study investigates whether the ‘Stars University Admission Policy’ basing on student within-school ranks increases the inclusion of medical students in Taiwan. The results of data cross-referencing and logistic regression revealed that the policy widened the participation of students from non-elite schools but failed to benefit the disadvantaged.

## Presentation proposal (limit 500 words)

**Purpose.** This study investigates whether the ‘Stars University Admission Policy’ or ‘Stars Policy’, which bases on student within-school ranks to recruit university students, can increase the inclusion of medical students in Taiwan. The Stars Policy formally starting from 2011 aims to increase inclusion and diversity in higher education and fulfill the ideal of educational equality by widening student participation from diverse high schools, especially those from disadvantaged regions of Taiwan. The Stars Policy assumes that all high schools should be equally good with equally able students and have an equal number of students entering the most top-achieving universities and departments (mainly medical departments), by which ‘stars’ come from almost all high schools, rather than from a limited number of traditionally elite public or private high schools. The Stars Policy, therefore, sets student ranks within each high school as the first criterion for entering universities and the second criterion is General Scholastic Ability Test (GSAT) results. On the other hand, the ‘Application University Admission Policy’ uses the GSAT results as the first criterion for entering universities and the second criterion is interview results.

**Research questions.** 1. Which high schools are benefited by the Stars Policy for medical students? 2. Do high school types (public or private schools) and regions (ranging from advantaged to disadvantaged) distinguish the Stars-Policy benefited from non-benefited high schools for medical students?

**Method.** The data sources included government high school lists, university admission lists, and high school announcements from the Internet. The data were cross-referenced and -validated to identify each medical students’ names, high schools, universities, and the university admission policies that the students used to enter their medical departments.

**Study 1 results.** The first data analysis identified students with their schools as being benefited by the Stars Policy if the high schools had students entering medical departments in the first year of implementing the Stars Policy but not by the Application Policy one year before the Stars Policy implemented. The results indicated that the Stars Policy benefited 25 high schools, including 9 community (non-top-achieving in a region) public schools and 16 struggling private schools, among which 9 were private vocational high schools with small numbers of students aiming to enter universities.

**Study 2 results.** The second analysis used logistic regression to distinguish the benefited from non-benefited high schools and students. The results revealed that private schools had (an odd ratio of) 3 times more chances and private school students had 7 times more chances to be benefited by the Stars Policy than public schools and their students did. The school located in disadvantaged regions, compared with the most advantaged region in Taiwan, were not benefited

**Conclusion.** The results imply that the Stars Policy widens the participation of students from non-elite schools. However, the findings that private schools were benefited and the disadvantaged region schools were

not benefited suggest that the Stars Policy increases inclusion and educational equality in a way that fails to benefit the disadvantaged for students pursuing the most top-achieving department (i.e., medicine) in Taiwan.

#### 四、建議

1. 此次的學術會議是由大學學者負責，包括行政工作與科學專業內容，另外，也組織了大學、社區的力量，提供支持，即使如此，負責的學者，看來工作量與壓力均大。已許久未見此模式了，早期有，近日少見。大學結合社區力量的全力投入，應該有其文化、社區背景-看似此會議是做為該大學、社區爭取某項榮譽的一項活動指標。一件事的完成，總要有上、下一致的目標與行動力方可達成。
2. 這次會議的主題是「Creating Inclusion and Diversity in Higher Education」，這可能要從文化觀點來看。蘇格蘭和大多與會學者母國的文化是：他們的家長大多不認為學生一定要進高等教育。此文化應該是不同於台灣，台灣高等教育目前已是近 100% 的入學率，以滿足家長的期待，算是走得很快，但，台灣也面臨了新的挑戰。教育考量文化因素，應該是必要的。

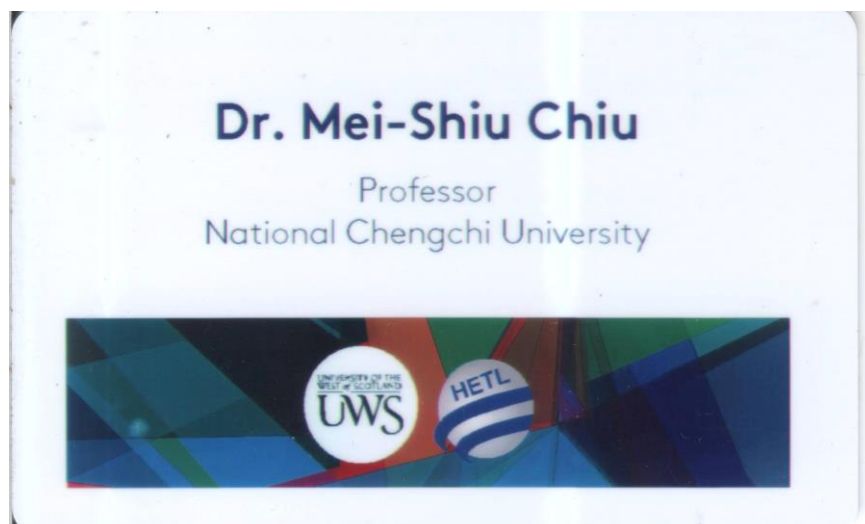
#### 五、攜回資料名稱及內容

紙本：會議手冊(紙本)，含會議簡介、會議相關資訊、keynote speaker 的簡介與演說主要內容、議程(含時間安排、所有與會者名單、論文名稱等)。

電子檔：議程與其 app。

#### 六、其他

大會電子名牌





104年度專題研究計畫成果彙整表

計畫主持人：邱美秀					計畫編號：104-2410-H-004-143-MY2				
計畫名稱：弱勢者教育提供之有效性：臺灣和英國大數據分析									
成果項目					量化	單位	質化 (說明：各成果項目請附佐證資料或細項說明，如期刊名稱、年份、卷期、起訖頁數、證號...等)		
國內	學術性論文	期刊論文			1	篇	Chiu, M.-S. (2017). Identifying effective e-teaching and general mathematical teaching profiles to predict student mathematical cognition and affect by latent profile analysis. 臺灣數學教育期刊 (Taiwan Journal of Mathematics Education), 4(2), 69-94.		
		研討會論文			2		邱美秀 (2016)。Longitudinal effects of teacher assessments on student self-concepts for ethnic minority, disadvantaged and advantaged students。論文發表於2016台灣心理學年會暨學術研討會，國立成功大學，台南市，2016年10月15-16日。 邱美秀 (2017)。Early numeracy activities: Effects on mathematics achievement and emotions and influences from parental knowledge, parental value, and child gender。論文發表於台灣心理學會第56屆年會，中正大學，嘉義，2017年10月14-15日。		
		專書			0	本			
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國外	學術性論文	期刊論文	7	篇	<p>Chiu, M.-S. (2016). Using demographics to predict mathematics achievement development and academic ability and job income expectations. Open Journal of Social Sciences, 4, 103-107. <a href="http://dx.doi.org/10.4236/jss.2016.47017">http://dx.doi.org/10.4236/jss.2016.47017</a>.  <a href="http://file.scirp.org/pdf/JSS_2016080416413878.pdf">http://file.scirp.org/pdf/JSS_2016080416413878.pdf</a> Open access</p> <p>Chiu, M.-S. (2016). Effects of teacher assessment and cognitive ability on self-concepts: Longitudinal mechanisms for children from diverse backgrounds. Saudi Journal of Engineering and Technology, 1(4), 180-189. DOI:10.21276/sjeat.2016.1.4.9. <a href="http://scholarsmepub.com/wp-content/uploads/2016/12/SJEAT-14180-189.pdf">http://scholarsmepub.com/wp-content/uploads/2016/12/SJEAT-14180-189.pdf</a></p> <p>Chiu, M.-S. (2016). Engaging internationally diverse students by integrating the teaching of reading and writing and using writing via ICT tools for assessment. Scholars Bulletin, 2(11), 625-636. DOI: 10.21276/sb.2016.2.11.6. <a href="http://scholarsbulletin.com/wp-content/uploads/2016/12/SB-211625-636.pdf">http://scholarsbulletin.com/wp-content/uploads/2016/12/SB-211625-636.pdf</a></p> <p>Chiu, M.-S. (2017). Extending the internal/external frame of reference model to early-year cognitive abilities for children from diverse backgrounds. International Journal of Quantitative Research in Education, 4, 31-51. <a href="https://doi.org/10.1504/IJQRE.2017.086497">https://doi.org/10.1504/IJQRE.2017.086497</a></p> <p>Chiu, M.-S. (2017). High school student rationales for studying advanced science: Analysis of their psychological and cultural capitals. Journal of Advances in Education Research, 2, 171-182. <a href="https://dx.doi.org/10.22606/jaer.2017.23005">https://dx.doi.org/10.22606/jaer.2017.23005</a> Open access  <a href="http://www.isaacpub.org/images/PaperPDF/JAER_100039_201707311354105328">http://www.isaacpub.org/images/PaperPDF/JAER_100039_201707311354105328</a></p>

				<p>4. pdf</p> <p>Chiu, M.-S. (2017). Repeated field teaching: preservice teachers' changes in teaching efficacy and theories of mathematics teaching. Journal of Advances in Education Research, 2, 241-252.  <a href="https://dx.doi.org/10.22606/jaer.2017.24005">https://dx.doi.org/10.22606/jaer.2017.24005</a> Open access  <a href="http://www.isaacpub.org/images/PaperPDF/JAER_100040_2017110914313318900.pdf">http://www.isaacpub.org/images/PaperPDF/JAER_100040_2017110914313318900.pdf</a></p> <p>Chiu, M.-S. (2017 accepted). Equality or quality? Using within-school ranks to admit disadvantaged medical students. Journal of Applied Research in Higher Education. (MOST 104-2410-H-004-143-MY2)</p>
		研討會論文	4	<p>Chiu, M.-S. (2016). From assessment to constructivist perspectives of ICT use to cater internationally diverse students. Paper presented at the 8th Biennial of European Association for Research on Learning and Instruction (EARLI) SIG 1: Assessment and Evaluation, Munich, Germany, 24-26 August.</p> <p>Chiu, M.-S. (2016). Using demographics to predict mathematics achievement development and academic ability and job income expectations. Paper presented at the 6th Conference on Creative Education, Suzhou, China, 27-29 July.</p> <p>Chiu, M.-S. (2017). Adolescent achievement growth: Roles of parenting, gender and socioeconomic status. Paper presented at the 5th International Symposium on Education, Psychology and Society, Nagoya, Japan, March 29-31</p> <p>Chiu, M.-S. (2017). Basing university admission on within-school ranks to increase inclusion of the disadvantaged: The case of medical students in Taiwan. Paper presented at the 2017 International Higher Education Teaching and Learning Association - University of the West of Scotland Conference,</p>

							Paisley, Scotland, June 28-30.
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其他成果 (無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。)			移地研究：因為合作計畫的引薦，與劍橋電腦與科學相關科系的數位教授進行面對面或網路會議，從而了解未來學習與教學研究的高科技跨領域教學設計、資料分析的可能性。許多科技界的新發展，似乎可藉由教育為內容，做技術上的突破。將以此做為下一階段研究的基礎。				

## 科技部補助專題研究計畫成果自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現（簡要敘述成果是否具有政策應用參考價值及具影響公共利益之重大發現）或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

☒ 達成目標

☐ 未達成目標（請說明，以100字為限）

☐ 實驗失敗

☐ 因故實驗中斷

☐ 其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形（請於其他欄註明專利及技轉之證號、合約、申請及洽談等詳細資訊）

論文：☒ 已發表 ☐ 未發表之文稿 ☐ 撰寫中 ☐ 無

專利：☐ 已獲得 ☐ 申請中 ☒ 無

技轉：☐ 已技轉 ☐ 洽談中 ☒ 無

其他：（以200字為限）

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性，以500字為限）

1、已正式發表期刊論文8篇，國際學術研討會4篇、國內學術研討會2篇。

2、相關演講1 次。

3、對弱勢學生的學習、教學、社會脈絡進行各方面的了解、探討有效能的教學方法。

4、進行外國資料的分析與比較。

4. 主要發現

本研究具有政策應用參考價值：☐ 否 ☒ 是，建議提供機關教育部，  
（勾選「是」者，請列舉建議可提供施政參考之業務主管機關）

本研究具影響公共利益之重大發現：☒ 否 ☐ 是

說明：（以150字為限）

本計畫已正式發表期刊論文8篇，對台灣、英國、國際與公開的資料進行有關弱勢學生的有效教育措施分析，研究結果能對未來教育發展提供研究與實務上的反思與建議。

本計畫所產生的期刊論文之一，對繁星計畫進行公開資料的分析，也對相關國內外政策與研究做出反思，可供相關政策之參考。