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# Social and Psychological Factors of Brain Drain and Reentry Among International Students: A survey of the topic

## Abstract

*Empirical findings from research on the brain drain are presented and discussed from the viewpoint of scientists and engineers who have returned to Taiwan after study abroad. Data from a joint project sponsored by the National Science Foundation in the United States and the National Science Council in Taiwan, R.O.C., surveyed returned students. Three basic questions are raised by these data. First, is there a brain drain? Second, why do graduates return home after study abroad? Third, what problems do graduates encounter back home after their return. Implications of these data are discussed.*

## Résumé

*Les résultats empiriques de recherches sur l'exode de cerveaux sont présentés et analysés du point de vue des chercheurs et des ingénieurs qui sont rentrés à Taïwan après des études à l'étranger. L'auteur présente les données d'un projet conjoint parrainé par la National Science Foundation des États-Unis et le National Science Council de Taïwan sur ces étudiants. Ces données soulèvent trois questions fondamentales. Premièrement, peut-on vraiment parler d'exode des cerveaux? Deuxièmement, pourquoi les diplômés se heurtent-ils à leur retour dans leur pays? L'auteur analyse les implications de ces données.*

One of the strongest arguments made by the People's Republic of China and other countries (Branson, 1989) against sending students to Canada and the United States has been the fear of "brain drain." Brain drain has been defined as a permanent loss of skilled or professional graduates who have emigrated to a more industrialized host country where they have received their education. Brain drain presumably benefits the host country with cheap, skilled labour while the international graduates gain opportunities to work for more money than they would receive back home. The crisis of brain drain has been seriously misunderstood. This article will explore three issues in an attempt to clarify the concept of brain drain relative to students from other countries studying in Canadian and/or American colleges and universities.

First of all, is there a brain drain? The answer to this question is, "It depends." How soon after graduation must students come home or how long do graduates have to stay home upon return to avoid being counted as brain drain statistics? Most researchers agree, that while about 90% of all graduates eventually return home after study in Canada or the United States, there are indeed examples of brain drain in science and engineering fields.

Second, why do graduates return home? Factors influencing the decision to return home are complicated and not simple. The best interests of the graduate's family and homeland are a primary consideration in the decision to stay or return home after study abroad. In some cases the graduate can make a stronger contribution back home by staying in Canada or the United States temporarily for practical training after graduation.

Third, what are the problems of reentry? Returning graduates must accommodate the culture shock of changing roles and expectations. These changes create stress and often prevent them from making as great a contribution to their community as they might. The process of coming home can result in the decay of their skills, placement in unsuitable positions, and general dissatisfaction. The quantitative data – numbers of graduates coming home – is much less important than the quality of their reentry accommodation.

#### ***Is there a "brain drain?"***

The education and training of students from overseas is one of the few rapidly growing export industries in the United States (Nacht & Goodwin, 1983; Zikopoulos, 1987). The number of overseas students in Canada and the United States has continued to increase even though the rate of increase has slowed down in recent years. In the United States, the annual percentage

increase dropped to a mere 1.5% for the period from 1983 to 1985. This contrasts sharply with the annual percentage increases of more than 10% in the previous decade (Lulat, Altbach, & Kelly, 1986). International students fill an essential role. Universities in Canada and the United States have come to depend on international graduate students in science and technology. Atkinson (1988), the former director of the National Science Foundation in the United States, suggests that without the large number of international graduate students, research universities would be unable to educate the next generation of scientists and engineers.

Science and engineering has continued to attract large numbers of international students. The National Science Foundation (1985) reported that half of the international university students in the United States are enrolled in science and engineering. The proportion of Ph.D. degrees awarded to foreign nationals in engineering increased from 42% in 1975 to 54% in 1982. In 1980 international students earned 48% of the doctorates in engineering, 25% of the doctorates in physics, and 28% of the doctorates in mathematics. Today international students account for 60% of the doctorates in engineering, 30% of the doctorates in physics, and 40% of the doctorates in mathematics (Atkinson, 1988). Although 62% of these doctoral graduates stay in the United States after graduation all but 12% of these remain in the United States on temporary visas. This suggests that most of them plan to return home after their practical experience.

In 1986 less than 4% of the 601,708 legal immigrants to the United States were granted entry on the basis of their ability to contribute to the economy. This is the so-called "occupational-preference policy" (Lochhead, 1988, p. 40). From that small number half were "highly skilled" while the other half came in as needed skilled or unskilled workers. Immigrants in this category are an important source of scientists, engineers, doctors, nurses, academics, and professionally-trained persons, many of whom have graduated from American universities.

The United States system of immigration is quite different from the "point system" used in Canada, Australia, and New Zealand, for example. The point system favours those who possess education, work skills, and English-language ability, and places less emphasis on family reunification. About half of Australia's immigrants last year, for example, were admitted on economic grounds and only about 30% as relatives of citizens.

Most of the 443,700 legal immigrants (not counting 104,383 refugees) were admitted to the United States because of kinship with an American citizen or permanent resident alien. While the 1965 Immigration and Nation-

ality Act deemphasized skills and occupational characteristics, there is legislation pending to introduce a point system in the United States which will diminish the relative importance of family reunification. If this legislation is enacted, the potential for brain drain is likely to increase.

*Why do graduates return home?*

Spaulding and Flack (1976) reviewed the research on brain drain and identified thirteen important factors. These factors are presented as hypotheses to be tested but with a strong degree of support, as indicated by research cited in Spaulding and Flack (1976).

1. The root of the brain drain problem lies in the home country's attitudes toward its nationals as well as social and economic factors.
2. A relatively small percentage of students sponsored by the United States government, their own government, or by international organizations do not return to their own country.
3. The great majority of international students who do not return to their own country are self-sponsored students.
4. Many international student graduates in the United States, who have not yet returned, would return if appropriate employment were available. (This factor was related to other factors, such as the family.)
5. In absolute figures, the greatest number of international graduates trained in the United States who stay there are in professions where positions do not exist in the quantities needed at home; that is, not enough posts exist to absorb all of the trained nationals in that field.
6. In some countries there is a noticeable leveling off in the migration of trained personnel.
7. Innovation is needed in American and foreign government relationships in studying this problem and to come up with new solutions.
8. Most embassies, and their educational and cultural attachés, do little to keep their nationals who are studying in the United States informed of employment opportunities and needs in their own countries.
9. Some universities and departments encourage outstanding foreign students, particularly doctoral students, to remain at their institutions by offering them teaching or research positions.
10. The administration of United States immigration laws and the laws themselves tend to be ambiguous. This facilitates stays in the United States.
11. Data on brain drain of students and professionals are unreliable due to inadequate statistics and record-keeping and difficulty of identifying student non-returnees.
12. Students from lower-middle and lower classes as well as minority group members are more likely to stay in the United States.

13. Brain drain severely hampers development efforts in the less-developed countries. (This factor was supported by some studies and rejected by others.)

The most comprehensive recent study of brain drain was done by Glaser (1978). Glaser conducted a UNITAR-sponsored multinational comparative study among international students in three industrially developed countries. The study also included those who had returned to eight developing countries after education. From 13 surveys in 11 countries on 6,500 students, Glaser concluded that the students' motives to stay or come home are ambivalent. Most students plan to return home eventually and few plan to emigrate permanently. Glaser also pointed out that the country of origin and particular disciplines are variables that may affect the return rate dramatically.

Most of Glaser's findings confirmed what we already know about brain drain. Other findings by Glaser (1978) were more surprising and are different from currently accepted notions. The following five insights provide examples of his more controversial findings.

1. Level of income is not the strongest determinant of a decision to return to the home country or to remain abroad.
2. A higher level of economic development or rate of growth in sending countries does not necessarily reduce the brain drain.
3. It is the nationals of the more prosperous and growing countries that say they plan to remain abroad or who actually emigrate.
4. Less developed countries have a combination of economic and non-economic incentives inducing individuals to return to a setting where opportunities are greater because competing professionals are few.
5. The culture and family structure of a student's home country may make it difficult for the professional to adjust anywhere else.

Lulat, Altbach, and Kelly (1986) wrote an extensive review of the recent literature on international educational exchange. In total, it suggests that migration might be influenced by the student's field of study. International students at the master's or doctoral level usually do not arrive in the United States with an area of research interest or specialization within their discipline. It is not uncommon for these students to specialize in areas of little relevance to their home country, but with considerable relevance to the host country. This in turn, enhances the market value of their degree within the host country.

In a survey of 124 faculty members on the relevance of United States graduate programs to overseas students from developing countries, faculty

were asked: "What difficulties do you think students from developing countries might encounter in applying the knowledge gained in your graduate program to their professional work back home?" (Baron, 1979). The most commonly cited difficulty was the lack of adequate equipment and technical facilities in the home country, cited by 32%. The problem of cultural differences relating to the implementation of technical and social change in developing countries, including hostility by professional co-workers and resistance to change in less industrialized countries, was cited by 25% of the faculty. Another 25% believed it would be difficult to translate theoretically-based knowledge into practical applications without a supportive environment, that is, by sufficient numbers of professional colleagues in the same discipline. Problems of adequate funding were also mentioned.

As a result of historical trends and policy assumptions, science in less industrialized countries is strongly influenced by science in more industrialized countries. Thus the training and practice of science, world-wide, is imbued with industrialized-world beliefs about which scientific issues are most worth studying. In the traditional relation between rich nations and poor nations, there is a tendency to mitigate against or even suppress the effective use of technology transferred to the less developed world. As an example, "without relaxation of the developed world's continual and variegated pressure to purchase a solution in the international market, mastery and control over biotechnology will remain largely closed to the less developed nations" (Holtzman, 1985, p. 67). Most graduates come home to change that reality.

#### *What are the problems of reentry?*

When graduates come home after study abroad, there is a tendency to blame them for having changed. Their "adjustment" back home is treated like an illness requiring a cure (Pedersen, 1980). The word adjustment implies a universal standard or ideal to which the person should adjust. A more neutral alternative term would be "coping" or "accommodating" or "role learning" which are becoming more common in the literature about reentry (Klineberg, 1980; Pedersen, 1980).

A student's reasons for returning home or staying abroad change over time. Glaser (1978) researched reasons for returning home among students during their period of study abroad and again after the students had returned home. The reasons for returning home were different as indicated by the following categories ranked from most to least influenced.

At the end of their study abroad the crucial issues were: acquiring new rights, careers of children, education of children, patriotism, maintaining existing rights, quality of jobs, number of jobs, income.

During or after their work abroad following graduation, the crucial issues were: language policies, alienation, patriotism, political conditions, maintaining existing rights.

After their return home the crucial issues were: income, quality of jobs, number of jobs, contribution to profession, careers of children, spouse feelings, education of children, language policy. When the graduate returns home, the importance of ties and obligations outweigh the risk of going abroad, causing them to stay home even if they perceive that things might be better elsewhere (Glaser, 1978, p. 116).

In their study of graduate returnees, Goodwin and Nacht (1986) characterized the problems of reentry as an "intellectual decay" growing out of five specific causes. First, most graduates are captured after their return by administrative duties not requiring their specialized technical training. If the need for administrative jobs decreases these opportunities for employment will diminish and evidence of decay may become even more apparent. Second, there is not a high demand for the skills in which the returnees are trained. Disuse causes skills to atrophy. Third, there is no cultural support system to stimulate and encourage young professionals to stay at the cutting edge of their scientific field. Promotions and incentives are awarded independently of individual creativity, innovation, or research output. Fourth, a current cycle of recession in many countries has caused cutbacks in funding international, intellectual, and professional links; support from secretaries; photocopying, travel money, books, journals, and other resources. Fifth, there are limited interactions between the academic, corporate, and government communities in developing countries. This leads to an intellectual and professional fragmentation.

Another survey of reentry problems among Brazilian returnees from study abroad reached similar conclusions. Gama and Pedersen (1977) found that the Brazilian returnees had more problems accommodating to their professional lives than they had accommodating to their families. In their professional life, returnees experienced difficulty with: coping with the system as a whole, their role as college professors, lack of intellectual stimulation, lack of facilities and materials, excessive red tape, and lack of opportunity and time to do research. In their family lives the Brazilian returnees reported specific value conflict and a lack of privacy.

Glaser (1978) studied 461 scientists and engineers who had returned to Taiwan after study abroad (see Pedersen, 1988). The resulting data largely confirmed Glaser's findings. However, there were several unexpected find-

ings as well. The more "internationally" oriented returnees were more likely to stay in Taiwan than those oriented toward "powerful others." The internally oriented returnees were more satisfied than those oriented toward powerful others. Measures of personal and professional satisfaction were not reliable predictors of whether the graduate would stay or leave. Engineers who were satisfied decided to remain in Taiwan but other scientists decided to stay or leave regardless of their level of reported satisfaction. These data suggest that the decision of graduates to leave or to stay permanently after coming home is complicated by intrapersonal variables as well as by the interpersonal contacts returnees experienced.

The process of uprooting international students, first, by sending them abroad and, later, by returning them back home, results in the disruption of familiar relationships, habits, and patterns. The effect of uprooting depends on the student's psychological maturity, ideological or ethical development, motivation, previous exposure to other cultures, and linguistic ability. Dissimilarity of climate, language, political-economic-social setting, ideology, customs, rhythm of life, housing, food, courtship patterns, religion, race, and degree of discrimination all contribute to the uprooting phenomena.

The most frequently used model to describe the problems of reentry has been the "U curve" described by Lysgaard (1955). This model links adjustment to a time sequence of stages. The process has also been labeled "culture shock" (Oberg, 1985). These stages progress from an initial excitement and optimism in contact with another culture, through a U-shaped curve, to feelings of failure and depression followed by recovery to a new level of excitement and optimism. Gullahorn and Gullahorn (1963) later applied a similar model to problems of reentry that results in the "W curve". This describes both the international student's first accommodation to the host culture and also the later accommodation after returning home again.

The process of culture shock in the U or W curve goes through a series of stages. Peter Adler (1975) summarized these stages into points on an adjustment curve. Each stage can be described in terms of its perceptions, emotional range, behaviors, and interpretation. It is important to recognize that culture shock does not progress neatly in an orderly progression from one stage to the other. Sometimes the experience of culture shock is delayed while in other situations the process may be compressed into a very short time period.

The problems of culture shock can be identified by at least six characteristics that indicate something is wrong (Pedersen, 1988). First, familiar cues to how the person is supposed to behave are missing, or the familiar cues



now have a different meaning. Second, values the person considered good, desirable, beautiful, and valuable are no longer honored. Third, the strangeness of culture shock creates an emotional state of anxiety, depression, or even hostility ranging from a mild uneasiness to the “white furies” of unreasonable and uncontrollable rage. Fourth, the typical symptoms of culture shock are dissatisfaction with the way things are and idealization of the way things used to be. Fifth, recovery skills that used to work before don’t seem to work anymore, leaving the person defenseless and vulnerable. Sixth, culture shock is likely to last for a while as familiar cues are replaced by new and still unfamiliar cues and as the person’s identity crisis is resolved.

There are several ways to help persons experiencing culture shock (Pedersen, 1988). First, the person needs to recognize that transition problems are usual and normal. Second, the maintenance of personal integrity and self-esteem becomes a primary goal. The person has frequently experienced a loss of status in a changed culture back home where the language, customs, and procedures are now strange or unfamiliar. Third, the person must have time to accommodate the new situation without pressure or urgency. The amount of time required will be more for some persons than for others. Fourth, recognizing the crisis of culture shock, and the feelings of depression and failure as problems experienced by many others in similar situations, will give the person hope. Fifth, labeling the symptoms of culture shock will help the people interpret their own emotional response to stress. Sixth, recognizing that familiar coping skills might not work in the changed context is important. Being well adjusted back home does not ensure an easy adjustment in a foreign culture, nor after the students return home. Seventh, while culture shock can not be prevented, preparation for transition can ease the stress of adjustment. Kealey (1988) found that, in many cases, staff of the Canadian International Development Agency (CIDA) who experienced intensive culture shock abroad were ultimately more productive than those who had experienced little or no culture shock. For whatever reason, culture shock teaches lessons that perhaps cannot be learned in any other way.

While the reality of culture shock is widely accepted, the U- or W-curve hypothesis is still controversial. Church (1982) discusses eleven empirical studies in support of the U-curve hypothesis. While these data supported the general hypothesis, there was less support for recovery to the original level of positive functioning. He also discusses five studies that failed to confirm the U-curve hypothesis for a variety of reasons. There was no cross-sectional support for the basic thesis. Church concludes that support for the U-curve hypothesis is weak, inconclusive, and overgeneralized. The stages themselves, the sequence of stages, and the different timing of reaction rates by international students, who face different problems in different

situations, frequently fail to conform to a U-curve shape of accommodation. In spite of these mixed reviews, the U-curve hypothesis and the stages of culture shock continue to be widely used.

Furnham and Bochner (1986), in their book about culture shock, discuss several problems in the U-curve hypothesis. First, there are the many dependent variables to consider as aspects of adjustment, such as depression, loneliness, homesickness, and other attitudes. Second, the definition of a U shape is uneven in literature regarding the testing of the hypothesis, with different persons starting out at different levels of adjustment in the first place and then changing at different rates and in different directions. Perhaps the problem is not in the theory of culture shock and a U curve of adjustment but rather in our ability to measure the complicated variables accurately. Furnham and Bochner suggest a more fruitful direction for future research would be to focus on interpersonal rather than intrapersonal variables. Much of the work on developing training materials to facilitate successful reentry has been developed in Canada. Theoret *et al.* (1979) developed a practical guide for personal and professional reentry planning which is dated but still valuable. Adler (1980) studied the reentry of 200 CIDA returnees who lived outside of Canada for a year or more, developing a “[c]ross-cultural reentry learning and effectiveness model,” which focuses on individuals to explain the process leading to personal growth and beneficial transition as a result of successful or “growthful” reentry. Some of the basic elements of this model are: (1) whether the work overseas was perceived as a valuable learning experience, (2) whether the experience provided skills valuable for home-country work performance, (3) whether the transition back home was easy, and (4) whether the organization back home has developed strategies to make reentry a positive experience.

Miner (1981b) developed a debriefing program for returned CIDA employees and spouses in some detail. He also developed a rationale for debriefing/reentry programs comparing approaches of different programs and models with workshop designs. Harker and Leverty (1982) developed a debriefing program to help returnees to Canada articulate their perceptions and recommendations, and help families obtain closure on the experience.

### ***Conclusion and recommendations***

Many of the recommendations by Glaser (1978) and Spaulding and Flack (1976) are still relevant and meaningful, as confirmed in research by Goodwin and Nacht (1986) and Pedersen *et al.*, (1988). However, several recommendations drawn from these and other sources can be made to assist counsellors working with international students:

- . Increased communication with students abroad regarding changes in the job market and the closing gap between living standards in comparison with the United States is advisable. There are some data supporting this conclusion with regard to national policy. The migration of graduates might even enhance economic development.
- . More information is needed showing the relationship between migration and national development.
- . A new national level institution is needed to analyze the data and their relationships might be established as an International Institute of Education.
- . In those specialized cases where graduates with specific skills are needed for national development, the students need to be more clearly identified and given encouragement.
- . The coordination of educational resources at home and abroad with national priorities in science and technology needs to be clarified and, where necessary, subsidized by the government.

Higher education policies need to be brought into harmony with national goals as an investment in the future.

- . Several studies recommended that "centers of excellence" be established. Multilateral cooperation between nations on international educational exchange should be encouraged.

High priority fields, such as science and technology requiring study abroad, need to be identified and incentives provided to students choosing these areas for study.

- . Some studies recommended preferential treatment be given to those intending to come home. However, long term reentry is extremely difficult to predict.
- . Government incentives might, however, favour older applicants, already at a more advanced level in their career for shorter periods of study abroad.
- . Establishing regional educational centers or joint programs with foreign universities might prove beneficial.

Both immediate and delayed return needs to be considered in analyzing the migration issues of brain drain on higher education from abroad. Inducements and incentives to return and stay are important.

- . Incentives might include opportunities for professional development, employment, advancement, adequate working conditions, international contact, adequate housing and status, or recognition of value. These might

be implemented both formally through government subsidies and less formally through professional organizations.

- . Special inducements are particularly important for those scientists and engineers in high priority areas for national development.
- . Where return is prevented for financial reasons, the government may consider financial incentives, low interest loans, or supplementary income sources.

Most of the studies do not recommend policies which would restrict migration, even when the brain drain of scientists and engineers is considerable, although several suggested the possibility of an emigration tax and citizenship sanctions for non-returnees.

- . Restricting migration has not worked where it has been tried and may even have the effect of increasing migration in high priority areas.

More regional cooperation by both the government and private sector would facilitate the coordination of needs and resources between universities, governments, and industry. An essential aspect of this recommendation is to emphasize manpower planning with specific goals and coordinated with available resources.

- . Programs in science and technology in the United States might be made aware of the home country's manpower requirements so that their academic programs could be tailored accordingly.

Institutional exchanges of faculty might further enhance that coordination.

- . Increased cooperation through regional and multinational associations might further enhance coordination and reduce professional isolation for returnees.

Finally, a "brain plan" is required to put the real or presumed danger of brain drain in perspective. Such a plan would seek to answer the question: "Is there a brain drain? If so, in what areas?" Reliable and comprehensive data are needed on the immediate and eventual migration of graduates and the implications of those data for the country. Such a plan should also answer the question: "Why do graduates return home?" This will require feedback from graduates who have returned and mutual participation in negotiating incentives beneficial to both the country and the graduates.

Such a plan should also answer the question: "What are the problems of reentry?" Several studies emphasized the importance of counselling the

student before leaving home, while studying abroad and after coming home. Counselling could reduce the impact of culture shock, and improve job placement and job information accuracy while increasing the motivational level of returnees to stay. If the graduate is better prepared to deal with the problems of reentry then the investment of international education in the future will pay valuable dividends for both the sending and receiving countries.

Research reported in this manuscript was supported by the National Science Foundation (U.S) grant # INT8420095.

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*Detail of "The Family"*