
Title	Do you want to do science?
Author(s)	Chang, Shook Cheong Agnes
Source	<i>Seminar on Teaching in Science at the Tertiary Level, Singapore, 8-11 November 1991</i>

This document may be used for private study or research purpose only. This document or any part of it may not be duplicated and/or distributed without permission of the copyright owner.

The Singapore Copyright Act applies to the use of this document.

26.2.1
1. 20.1.1991

DO YOU WANT TO DO SCIENCE?

Chang, Shook Cheong Agnes

Paper presented at the
Seminar on teaching in science at the tertiary level
held in NUS, Singapore, from November 8-11, 1991

DO YOU WANT TO DO SCIENCE?

AGNES CHANG SHOOK CHEONG
National Institute of Education
Nanyang Technological University
469 Bukit Timah Road
Singapore 1025

In an industrialized and technological society like Singapore, parents are aware that a professional career especially in the field of Science and Technology is likely to reap satisfactory monetary rewards later on. Hence many children, irrespective of their personal interests and strengths are often encouraged, cajoled or coerced into making a bid for the few science places in school. It is not unusual to see parents filing outside the principal's office after the final examination at Secondary Two to plead for a place in the science classes for their son or daughter. It is little wonder that the independent schools announced that they need funds to build more science laboratories.

Those Who Fell Along the Wayside

But do all the science students end up in a science related course in the university? In a recent survey carried out on the Postgraduate Diploma in Education trainees at the National Institute of Education, it was found that 69 (44.2%) of the 156 trainees from the School of Arts are former science students. Forty-two (26.9%) of them left the Science stream after Secondary Four and another 27 (17.3%) joined the Faculty of Arts and Social Sciences and the Faculty of Business Administration after their 'A' Level Examination.

Pre-University Agony

Does it mean that those who have persevered and carried on in the science stream sailed through their years in the Junior College and University? Of the 111 science teacher trainees who participated in the survey, a few admitted that they have aspired to be medical doctors but failed to be selected. As many as 55.9% (62) responded that their Secondary School teachers fed them with voluminous notes but only 32% (36) relied on tuition.

Most Junior Colleges organize elaborate orientation programmes for the new JC1 students but few have actually prepared them for the level of work expected. This is reflected in the responses given by 52 (46.8%) participants who had trouble with their studies at the Pre-University level. The four most frequently cited problems are:

- 1 I did not realize that the work could be so difficult and so different from secondary 4 work. (59.6%)
- 2 I had time management problems. (44.2%)
- 3 I could not adjust to the lecture and independent study system. (30.8%)
- 4 I could not handle the kind of questions set in the examinations. (0.8%)

University Blues

More than half of the Science graduate respondents (70, 63%) admitted that they encountered problems in their studies in the University. Again, many of them were not prepared for the level of work they had to deal with. The six problems with the highest ratings are:

- 1 Some of the University courses were very different from the 'A' Level courses. They were so theoretical. (68.6%)
- 2 I had time-management problems. (47.1%)
- 3 I did not realise that the work could be so difficult and so much. (42.9%)
- 4 I was not very strong in the courses I had to take. (40%)
- 5 I could not adjust easily to University life. I had to rely entirely on myself. (30%)
- 6 I could not get much help from my lecturers when I encountered problems with my studies. (24.3%)

It does look like that the organizers of orientations at the Junior Colleges and Universities have to look into more than just socialization and familiarization with facilities and rules. Moving from a secondary school into a junior college and from a junior college into a university needs more than just sufficient entry grade points. Apparently, many students are ignorant of the complex task demands and the independent work expected of them. At the secondary level and even at the junior college level, teachers are expected to produce distinctions in the public examinations. Good and effective schools are evaluated by the percentage of passes and the number of distinctions attained in each subject. Teachers may feel that it is imperative for them to provide detailed notes for the students, inadvertently building up students' dependence on them. Hence 30.8% of the respondents at Junior College level and 30% of the respondents at University level found difficulty in adjusting to independent studies. Tuition was only taken by 32% of the trainees at Secondary level. Nevertheless, long-term tuition can develop dependence in the tutees on the tutors, resulting in low confidence in self-effort.

Time-management seems to be a weak trait in most students from primary to tertiary level. Time-management involves self-awareness, effective planning and discipline. The time-tables in schools are imposed on the students and they do not have to plan their own schedule. Anxious parents in Singapore pack their children's day with tuition, music, ballet, swimming and other lessons so that young children do not have to plan or manage their own time. Youths and young people tend to be optimistic and overestimate their ability to handle many tasks simultaneously and often fail to plan for unforeseen events. All NIE applicants who were interviewed admitted that they gave tuition during their years in the University. Life in the Junior College and University can be hectic and filled with activities, especially for those living in the hostels.

The criteria for admission into the different courses at the University vary and students who may have better grades in a popular course may not get admitted. Instead, they may have to be contented with courses in which they have less confidence but which are less stringent in the admission criteria. Forty percent of the respondents claimed that they were not very strong in the courses they had to take. If a student were to feel incompetent in the subject he had to do, his level of motivation would suffer (White, 1959). Low motivation followed by unsatisfactory grades will further demoralise the learner. If the lack of effort is cited as the cause of the poor grades, the situation can be improved with hard work (Weiner, 1972, 1974, 1980, 1984, de Charms, 1968; Deci 1975). If poor performance is attributed to the lack of ability by the student, he may feel helpless and unable to better his grades. All university undergraduates have high achievement motivation (Atkinson & Birch, 1978) but they will only engage in achievement - related situation as a result of their belief that it will lead to satisfactory grades. Would undergraduates continue to be interested in and work hard on a subject they have consistently received poor grades?

Even though undergraduates are expected to do independent work, they do expect to be given some guidance and a helping hand when they encounter problems with complex and abstract concepts.

Singapore is not short of students wanting to do science for both extrinsic and intrinsic motives. But sustaining the interest of these students in science is a great challenge. As children progress from primary through tertiary education, good performance is dependent not only on cognitive skills but also on affective factors like interest, academic self-concept, motives and values. The survey is carried out on a small sample and hence should not be generalized to all science graduates. Nevertheless, the survey does alert us to the needs and fears of some of our science students in the secondary schools, Junior Colleges and University. Now we need some answers to the following questions: How can these students be helped? Who should advise them? When is the best time to advise the students on the expectations of the different stages in education?

References

- 1 White, R.W. (1959). Motivation reconsidered: The concepts of Competence. Psychological Review, 66, 297-333.
- 2 Weiner, B. (1972). Theories of motivation: From mechanism to cognition. Chicago: Markeham.
- 3 Weiner, B. (1974). An attributional interpretation of expectancy-value theory. In B. Weiner (Ed.) Cognitive views of human motivation. New York: Academic Press.
- 4 Weiner, B. (1980). The role of affect in rational (attributional) approaches to human motivation, Educational Researcher, 9, 4-11.
- 5 de Charms, R. (1968) Personal Causation: The internal affective determinants of behaviour. New York: Academic Press.
- 6 Deci, E.L. (1975) Intrinsic Motivation. New York: Plenum.
- 7 Atkinson, J.W., and Birch, D. (1978) An Introduction to motivation (2nd ed.). New York: van Nostrand.