
Title	Towards an ability-driven education system in Singapore: Problems and opportunities
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Source	<i>REACT</i> , 2002(1), 1-12
Published by	National Institute of Education (Singapore)

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Towards an Ability-Driven Education System in Singapore: Problems and Opportunities

Review by Lachlan E.D. Crawford

Introduction

In December 2001, the Singapore Government established a high level committee to undertake a fundamental review of economic strategy in the Republic in light of sweeping, worldwide economic changes. A number of sub-committees were subsequently established to initiate broad policy reviews aimed at encouraging entrepreneurship; enhancing human capital; developing the manufacturing and service sector; and helping workers to adapt to economic restructuring (*Straits Times*, 4 December 2001).

In concert with this review of economic strategy, the Government is currently examining pedagogical ideas and practices in educational institutions to ensure that schooling remains relevant to the changing socio-economic environment in Singapore. Recently, the Ministry of Education announced the move towards an *ability-driven education system* in an attempt to realize the potential of every member of society in an increasingly knowledge-based economy, where human capital will be the source of economic growth and development (Ministry of Education, 2001a).

This article examines the concept of ability-driven education and discusses a number of problems and opportunities associated with its implementation at the primary and secondary school levels.

What Is an Ability-Driven Education System?

Ability-driven education is premised on the belief that every child has some talent or ability. The scope and scale of talent within each student may differ, but

the Government believes that all students should be given the opportunity to excel according to the combination of talents and abilities they possess. To excel does not necessarily mean to be the best in a narrowly defined area common to all; it means being the best one can be in one's own talent spheres. Within one school organization, there can be many different identified talent spheres each with its own best-in-class individuals (Ministry of Education, 2001a).

This recognition of individual talents and abilities is similar to Howard Gardener's (1983) theory of multiple intelligences. Gardener categorized eight relatively independent dimensions of intelligence which include:

- (a) linguistic intelligence (poet, journalist);
- (b) logical-mathematical intelligence (scientist, mathematician);
- (c) musical intelligence (composer, violinist);
- (d) spatial intelligence (sculptor, navigator);
- (e) bodily-kinesthetic intelligence (dancer, athlete);
- (f) interpersonal intelligence (therapist, salesperson);
- (g) intrapersonal intelligence (self-aware individual).

The concept of multiple intelligences has a distinct appeal. For example, many people are not high in linguistic dimensions, but excel in perhaps spatial ability (sculptors and navigators). Moreover, I am sure that we all know people who do not seem to be particularly "sharp" in a logical-mathematical sense, but who excel in interpersonal relationships with others. This ability serves them well, and in some instances they are more successful than their "brighter" counterparts. Others seem to be very self-aware and appear to capitalize on their intrapersonal intelligence by maximizing their strengths and minimizing their weaknesses. The emphasis in an *Ability-Driven* education system is to recognize and develop these different categories of student intelligence.

Ability-driven education has a number of other connotations. First, it means harnessing the talents and abilities of students. The Government is adamant that education must inculcate in students the appropriate national values and social instincts so that they may be committed to Singapore and actively contribute to the development of the nation. Second, it means harnessing the diverse, creative talents and abilities of the staff in the Ministry of Education and schools to deliver the best educational opportunities to students.

An ability-driven education system also incorporates some measure of *mass customization*. While the Government appreciates that it is not possible to cater to the individual needs of every pupil in school, it realizes that it may be feasible to mass customize educational programmes to cater to groups of pupils with similar needs and inject additional flexibility into the programmes to meet varying requirements within each group. This *mass customization* in the delivery of education is intended to maximize learning efficiency, as opposed to teaching efficiency, taking into account the aptitudes, abilities and learning modalities of the student population.

What the basic definition means in reality is that there will be fundamental changes to the education system in Singapore. Students will be offered a more varied diet in terms of the curriculum, teaching and learning strategies, and modes of assessment. As with any fundamental change in an organization, however, there will no doubt be a number of problems and opportunities associated with its implementation. These are discussed in the following paragraphs.

Curriculum

A major problem for teachers and administrators in an ability-driven education system is to find a balance between the provision of a *core curriculum*, necessary for the development of attitudes, skills and knowledge that children will need to prosper in a knowledge-based economy, and a more *student-centred curriculum* in schools to harness the energy and resourcefulness of teachers and the enthusiasm and creativity of pupils. Interestingly, this dilemma was recognized at the turn of the century by the well-known American educator, John Dewey (1902). He attempted to establish a curriculum that balanced subject matter with students' interests and needs at the University of Chicago's famous laboratory school between 1896 and 1904.

The standard, academic core curriculum is generally regarded as a common body of subjects that are central to the education of all children (Goodlad, 1987; Riley, 1993). They are usually prescribed by a relevant constituent body, such as the Ministry of Education, and set out in appropriate syllabus documents. At the primary level, the core curriculum has traditionally consisted of the "3R's" – reading, writing and arithmetic – which contribute to the development of literacy and the mastery of arithmetical computation. At the secondary level, the core consists

of science, maths, history, English, foreign languages and, more recently, technical literacy – to cope with computers, electronics, lasers and robots.

In essence, mastery of the core curriculum provides students with attitudes, skills and knowledge which enable them to function intelligently as a member of civilized society and to contribute to socio-economic development. This mastery requires hard work, disciplined attention in class and respect for the legitimate authority of the teacher as a deliverer of the curriculum (Hirsch, 1987).

In contrast, a student-centred curriculum emphasizes students' interests and needs. It is rooted in the educational philosophy of Jean Jacques Rousseau (1762), Johan Heinrich Pestalozzi (1900), John Dewey (1902), and more recently Bertrand Russell (1926) and A.S. Neill (1960). These educators encouraged childhood self-expression and believed that when the interests and needs of the learner are incorporated into the curriculum, students are intrinsically motivated to participate in the teaching/learning process. This does not mean that the student-centred curriculum is dictated by the passing whims or current fads of the learner. Rather, there is a recognition that learning tends to be more enjoyable and successful when the interests of the students are taken into account.

At one level, the student-centred curriculum could consist of numerous course electives, extension courses, mini-courses and alternative courses offered by a particular school for its own pupils. There could even be scope for different subjects such as those suggested by futurist Alvin Toffler (1970) in his imaginative and insightful book *Future Shock* e.g. stages of the human life cycle, significant technologies of the past and future, contemporary social problems and living beneath the sea.

At another level, the student-centred curriculum could be developed by the promotion of "niche" programmes through the cluster school system in Singapore. It would be possible for example for certain schools in one area to offer "niche" programmes in science, art, music, drama, sport, or languages. The schools could attract pupils from other institutions in the cluster and possibly accumulate a cohort of specialist staff to deliver the programmes. This would certainly help in harnessing the creative talents of teachers in an ability-driven education system.

The development of a student-centred curriculum could be coupled with more academic freedom for the staff, i.e. permitting teachers and students to choose subject matter and instructional materials relevant to a particular course. Teachers would not be given complete license of course, as children must be protected from

unsuitable material, but academic freedom would allow for the flourishing of the creative talents of teachers, particularly if this were accompanied by some student input into what constituted the curriculum. At what level of education should students be allowed input into the curriculum is, of course, a matter of conjecture. Conventional wisdom suggests that at the primary stage of schooling, P1 to P6, students should follow a core curriculum and then have progressively more input into a student-centred curriculum as they proceed through secondary school.

This then raises the question of the balance between the core curriculum and the student-centred curriculum at the secondary level. In America, Boyer (1983) suggests that core units required for graduation at the high school level, should be about 66% (two thirds), while Goodlad (1984) would like to see about 80% of the curriculum devoted to the core, with only 20% reserved for the development of individual talents and abilities.

Teaching and Learning Strategies

In relation to the teaching and learning strategies associated with an *Ability-Driven* education system, the problem is to try to find a balance between traditional teaching methods and more student-centred methods. The former are based on the principle of "*educare*" which is the Latin for "*to train*." They generally involve subject-centred and teacher-directed activities in which students are engaged in individual work for the majority of the lesson.

An example of a traditional teaching method is direct instruction, sometimes called explicit teaching. It refers to a systematic method of teaching that emphasizes teacher-directed activities proceeding in small steps (Rosenshine, 1987). Teachers who adopt this model of teaching tend to use the following five basic steps or functions.

1. Begin lessons with a review of relevant previous learning, and a preview of what is to be learned in the current session.
2. Present new material in small steps with clear and detailed explanations.
3. Guide students in initial practice after each step; ask questions and check for understanding.
4. Provide systematic feedback and corrections.
5. Supervise independent practice and monitor seatwork carefully.

This method is often associated with the core curriculum and is accompanied by regular assignments, homework, and frequent testing and evaluation. The

perceived benefits of this approach are that students acquire attitudes, skills and knowledge for survival and employment; academic standards are maintained; and tests and examinations develop character and teach children how to compete.

In comparison, more student-centred methods of teaching tend to promote active, independent learning and interest driven enquiry. Five of these methods of teaching are outlined below.

Activity-Centred Approach

Teachers using the activity-centred approach present purposeful activities that are relevant, as lifelike as possible and tied to students' needs and interests. They can include group games, dramatizations, story projects, field trips, social enterprises and visits to interest centers. All of these involve problem solving and active student participation. They also emphasise socialization and the formation of strong school community ties. In this approach, students actively (mentally and physically) interact with knowledge and each other to construct meaning and new knowledge for themselves (Fosnot, 1996).

Project-Based Learning

Advocates of project-based learning pose challenging problems that encourage students to be actively engaged in exploratory, hands-on experiments. They are often conducted in conjunction with computer simulation activities that require higher order thinking skills in an interdisciplinary manner. Projects are assigned by the teacher, in collaboration with students, and the final 'product' could be in the form of multimedia presentations, instead of the traditional written report.

Individualised Instruction

Proponents of this method try to provide a one to one student/teacher or student/computer relationship. Students are allowed to proceed at their own pace and the instructional materials are carefully sequenced and structured. For every student, an individual plan is prepared for each child or subject based on a diagnosis of the student's needs. Objectives are stated in behavioural terms and specific proficiency levels are identified. Learning tasks are individualized and student's progress is continually evaluated (Glaser & Resnick, 1972).

Computerised Instruction

Many teachers see computers as adding a challenging and stimulating dimension to classroom learning. Patrick Suppes (1968) an early innovator of computer use in schools coined the phrase “computer-assisted instruction (CAI).” He defined three levels of CAI: practice and drill, tutoring and dialogue. At the first level, students work through computer drills in spelling, reading and foreign languages, and simple computation. At the second level, the computer acts as a tutor, taking over the function of presenting new concepts. As soon as students show a clear understanding, they move on to the next exercise. The third and highest level, dialogue, involves an interaction between student and computer. The student can communicate with the machine, by giving responses and asking new questions. In turn, the computer is able to understand the questions posed by the student and can react appropriately.

Students at Raffles Institution are using a variation of this type of computerized instruction. In line with the school’s strategic thrust, *I-Learning*, a virtual school project has been introduced whereby pupils stay home for a period of time and access their lessons online via portals. I-Learning seeks to entrust pupils with the responsibility for their own learning. It is also an effective vehicle for incorporating technology into the teaching/learning process of the school (Ministry of Education, 2001b).

Instruction via Video and Satellite Systems

Advances in video technology and satellite systems have brought valuable tools for instruction into schools. Teachers have discovered considerable value in the use of videotapes, videodisks, CD-ROMS, satellite links, telecommunications and cable television to teach foreign languages, English, science, history, geography and even the arts (music drama, dance, creative writing and visual arts). In addition, many videos are designed to be interactive: that is, they respond to the student’s input. The term *interactive video instruction* has been applied to realistic simulations and action-reaction situations that are presented as part of an instructional programme. The programme can tell the viewer if a response is right or wrong, or the viewer can be offered a choice of options and the programme will then display the outcome of the option chosen. Interactive videos can be used either for individual lessons or for instruction in small groups (Ornstein, 1991).

The internet is also becoming more popular as a medium of instruction. At Anglo-Chinese Independent School, for example, students are using the internet for self-directed study, which ensures active and independent learning, and interest-driven enquiry, while students at Xinmin secondary school have been exploring the use of online journal writing, online worksheets and self-directed use of the Internet for projects (Ministry of Education, 2001b).

The perceived benefits of these student-centred teaching strategies are that students acquire self-discipline; they learn better because they learn what they want to learn; and they develop creatively in an atmosphere of experimentation.

Assessment

In the on-going attempt to develop an *Ability-Driven* education system, variations in the curriculum and teaching methods could justifiably be accompanied by variations in the forms of student assessment, which are an integral part of the teaching/learning process. There are two possibilities here. The first is a variation in terms of students who sit for Singapore's formal assessment examinations; the second is the introduction of alternative forms of assessment.

Variations in Examination Candidature

Formal assessment examinations are often used for the purpose of determining a student's level of performance relative to the performance of other students of a similar age and grade and subsequently for placement or certification purposes, for example, the Primary School leaving Examination, 'N', 'O', and 'A' levels. They are also used to ensure academic rigour and the maintenance of standards.

Typically, these examinations involve the use of standardized instruments, which are designed by test specialists and administered, scored and interpreted under prescribed conditions to assess skills, content knowledge and learning processes. The instruments include true-false, multiple choice; matching; fill in the blank; short, open-ended answer; paragraph response to specific questions; paragraph response to open-ended questions; and essay.

The Ministry of Education is already exploring variations in terms of candidature for the 'N', 'O', and 'A' level examinations. For example, from 2004 more academically-able students in the Normal (Academic) stream will be allowed to sit for one or two 'O' level subjects at the end of Secondary 4, a month after they finish their 'N' level examinations. One advantage of this arrangement is that it

will allow students to focus on fewer 'O' level subjects the following year and thus ease their workload. At the same time, Normal (Academic) students will have a more extensive variety of examinable subjects to choose from. In 2003, they can decide to do Computer Applications, which is now offered only to those in the Normal (Technical) stream. In the following year, Additional Mathematics will be offered as well. Education Minister Teo Chee Hean, declared that the opening up of options and choices for Normal Stream students is in line with the Ministry's move to 'mass-customise' the education system to cater to the different abilities and learning needs of students (Straits Times, 12 January 2002).

In addition, the Government is considering the proposal that some students may proceed to junior college without sitting for their 'O' levels and just take their 'A' levels. The reason for such a move is that talented students can benefit from a less structured system and use the four years, from Secondary 3 to the second year of junior college, to engage in broader learning experiences, to conduct research, embark on field trips and conduct project work.

Yet another proposal is that other students may be allowed to sit for different examinations, such as the International Baccalaureate, a pre-university programme that allows students to take up to six subjects with three or four studied in greater depth. The International Baccalaureate also includes a compulsory subject called the theory of knowledge, which covers philosophy, religion and logical reasoning. Four independent schools in Singapore have submitted proposals to run such programmes for their students in the near future (Straits Times 26 January 2002).

Variation in Forms of Assessment

The second possible variation to assessment procedures is to strike a balance between the formal assessment examinations for placement purposes, as described above, and alternative forms of assessment. The latter directly measure performance through real-life tasks (Wiggins, 1996-1997; Worthen, 1993). They attempt to tap higher level thinking and problem solving skills, by emphasizing real world applications and focusing on the processes learners use to produce their products. Two examples of alternative forms of assessment are *performance assessment* and *portfolios*.

Performance Assessment

In a performance assessment situation, students are asked to demonstrate their knowledge and skill by carrying out an activity or producing a product (Airasian,

1997). The term originated in content areas such as science where students were required to perform or demonstrate a skill in a hands-on situation rather than recognizing a correct answer on a teacher-made standardized test (Hiebert & Raphael, 1996). Performance assessments are now often used in the form of oral examinations, art exhibits, musical recitals, athletic achievements, proficiency testing in language, and hands on demonstrations in vocational areas.

Portfolios

Portfolios are purposeful collections of students' work that are reviewed against pre-set criteria (Stiggins, 1997). They can include essays, poetry, journal entries, artwork, and videotapes of performance collected over a period of time. They reflect developmental changes in the learning process and involve students in design, collection of materials and evaluation of the final submission.

Alternative forms of assessment have a number of important advantages.

- (a) As they reflect the extent to which goals are met, they effectively describe content mastery.
- (b) They encourage students to help each other and promote peer relationships, particularly when portfolios are submitted as group projects.
- (c) They support intrinsic motivation.
- (d) They encourage students to attribute success and failure to effort rather than innate ability.

A number of schools, including Raffles Institution and River Valley High, have incorporated a wide range of assessment procedures to prepare pupils for the demands of a varied curriculum such as project-based enquiry, practical assessment, and poetry and drama presentations (Ministry of Education, 2001b).

Conclusion

The advent of an ability-driven education system in Singapore, designed to realize the potential of all students in the nation's schools, will herald a challenging and, indeed, exciting era for teachers, pupils and administrators. In this era of significant change, there are a number of implications, which can be drawn from this article for school personnel.

Implications

1. Students will be offered a more varied diet in terms of the curriculum, to harness their interests and abilities, and to maximize their potential.
2. This variety may be developed through a core curriculum and a student-centred curriculum.
3. Teachers will be obliged to find a balance between the provision of a core curriculum, to provide attitudes, skills and knowledge for social and economic development, and a student-centred curriculum to cater for individual academic pursuits.
4. Teachers will also need to employ a variety of teaching methods to create learning opportunities that will ensure that students preferences are catered for.
5. Variations in modes of assessment will need to be explored to 'mass customise' the education system to cater to students of different abilities.

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