

# Achievement Tests as a Universal Measure of School Success across Nations: A Theoretical Perspective

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## ABSTRACT

Equivalent achievement test standards for students gaining entry into cross-national institutions of learning are a challenge that hinders the international mobility of potential students outside of their home countries. This reviewed article examines the achievement test as a measure for the equalization of cross-national learning standards. The article reviewed studies that investigated the comparisons of achievement standards to arrive at pertinent issues of interest. The article concludes that there are wide variations in education systems, education objectives, schools organization, curriculum content, school characteristics and socio-economic characteristic inter alia. This calls for review in education policies of countries' from entry levels equalizations standards of test results in creating dual or trio entry levels for potential students. The study suggests that host institutions of learning design multiple programs for beginning level learners to cater for observed cross-national gaps in achievement to facilitate the international mobility of students worldwide.

**Keywords:** Achievement test, Cross-national, Standards, Education Policy, Comparison

## 1.0 Historical Development of Achievement Test

Achievement test dates back to the 1840s when Alfred Binet, a French psychologist started devising a concept for testing intelligence which was advanced by Stanford and it become known as Stanford-Binet Intelligence Test. In China individuals who wished to work in the public service used to take a test to determine their knowledge level in Confucian philosophy and poetry (Fletcher, 2009; Syeda & Syeda,

2016). As at 1845 oral test were used in the United States schools before Horace Mann a then chairman for Boston Public Schools Committee brought the idea of writing test which was carried out in Boston Public Schools. Results from the test showed that students were able to reproduce information learned through repeated practice and drills but were unable to respond to items testing for the content taught them satisfactorily (Crocker, 2003; Jennifer, & Ronald, 2012). The success of this first written test led to the introduction of the written test in all cities in the United States (Carole, 2003; Synda & Synda, 2016). Army Mental Tests (AMT) and Army Alpha and Beta Tests (AABT) were types of aptitude tests conducted for soldiers wanting to join the US army during World War I. Scholastic Aptitude Test (SAT) and American College Testing (ACT) then followed in 1926 and become widely recognized standardized tests until recent times (Gershon, 2015; Syeda & Syeda, 2016).

### 1.1. Achievement Test

In contemporary time achievement test essentially is seen as a measure of knowledge acquired from formal learning settings. Achievement tests measure the degree of learners learning in specific curricular areas in which instruction has been received. The tests focus on more concretes learning objectives in the measuring of ability. Achievement tests, therefore, measure acquired knowledge from learning. Achievement tests are classified into; standardized achievement tests and teacher-made achievement tests.

Standardized achievement tests are tests carefully constructed by test experts such as psychologists with very high reliability and are administered and scored under laid down conditions. In addition, the scores are interpreted in terms of established criteria stated in the test handbook. The main purpose of a standardized test is to compare a child's performance to a normative group. This group possesses the entire characteristics that a child has. The test gives information relating to the extent to which the child deviates from the norm group. Teacher-made tests, on the other hand, are structured by teachers in the classroom. For instance, after teaching, a teacher may craft test made up of a few items to test the degree of students' learning in that specific unit. The teacher does not go through an elaborate process as in the crafting of standardized test items. More so, the test may be confined to the specific content covered within a given period. The test may be either objective or essay tests. Teacher-made tests are a means to an end and aid in decision making (Frith & Macintosh, 1984; Payne, 1997).

Stiggins (2007) suggested that the written tests were used in the 1950s as a measure to compare and rank individual schools, districts, states/counties/regions as well as countries. The concept of school achievement has been taken to mean student cognitive performance, rather than other contributions of a school system to individual or social benefit (Blaug, 1978; Merritt & Coombs, 1977; Massialas, 1977). School academic achievement which is determined through achievement test has been a central topic of interest to comparative educators since Marc-Antoine de Jullien first proposed his comprehensive schema for studying foreign educational systems in 1817 (Fraser, 1964).

Throughout the nineteenth century, as school systems were developing in the more industrialized nations of the world, researchers travelled the world over to study those practices and policies that might explain differences in the achievements of

students and the contributions of a nation's schools to the well-being of their societies. Researchers and educators described and commented upon schooling in other countries and on their presumed achievements, but were limited seriously by the data available and the lack of developed research techniques of their time.

A century later after the two world wars, new nations as well as old ones again concerned themselves with the potential of their school systems to serve their interests, economic growth, political stability, social development, and educational advancement. Research was stimulated by the desire to learn from foreign examples and to seek standards against which to measure students' achievements.

## **1.2. Cross-National Students Achievements**

With growth in communications through national and international organizations, the accumulation of educational and social data, and the rapid advances in research concepts and techniques, it became possible for cross-national study of educational achievement. Substantial progress was made from the early statistical studies and observations of the later nineteenth-century to the more empirical studies of the mid-twentieth century. Studies of curricula, examinations, textbooks, teacher training, and instructional practices compared across several countries increased as did efforts to assess pupil attainment in such areas as arithmetic and reading through achievement tests (Eckstein, 1977). However, despite it being the main focus as a topic for investigations, achievement was relatively neglected as compared to other aspects of education.

The reasons were that cross-national assessment of students' school achievement was full of challenges of equivalence and comparability, and was made further difficult by differences in national objectives and practices. This was also confused by verbal and conceptual ambiguities. Researchers leaned heavily upon such system variables as retention

rates and promotion procedures from one level of education to another. Enrolment and attendance figures were generally available, while rates were calculated from official statistics, and thus seemingly reliable and objective measures were used. It was accepted that such figures were themselves ambiguous, but for international comparison, they appeared to pose far less challenge than curriculum content, student performance, and instructional methods.

The first concerted effort to study achievement levels according to internationally accepted measures was represented by the massive research project of the International Association for the Evaluation of Educational Achievement (IEA) study. It began in the late 1950's when researchers from a dozen countries convened under the auspices of UNESCO to consider the feasibility of conducting such research. The report on the pilot study (Foshay, Thorndike, Hotyat, Pidegon & Walker, 1962) concerned itself with many of the administrative and methodological challenges involved in international collaboration on this scale, while the mathematics study (Husen, 1967) presented the results of the first completed survey of student achievement in twelve countries.

Subsequent phases of the project brought together six additional school subjects; science (Comber & Keeves, 1973), literature (Purves, 1973), reading comprehension (Thorndike, 1973), English and French as foreign languages (Lewis & Massad, 1975; Carroll, 1975) and civic education (Farnen, Oppenheim, & Torney, 1975). Twenty-one countries participated though not all were involved in each subject. In addition to the achievement data of samples of students at several school grade levels, information was gathered on the students' home and school backgrounds through questionnaires administered to principals, teachers, and the students in each country.

The IEA project was an ambitious attempt along the lines of the Coleman study in the United States and the Plowden

report in Britain to perform simultaneous national replications. The central purpose of this activity was to answer the question What factors best-explained differences in student achievement? (Postlethwaite, 1974;) (Kerlinger, 1986). Evidence from the study show that clear differences in achievement existed. In each subject at each age and grade, the achievement was compared at several levels; among students within countries, among schools within a country, and among countries.

In mathematics, for instance, Japanese students scored higher than those in all other countries at the same age and grade level. Although the differences were not great, younger students at the primary level, from Sweden and Italy performed better in the reading comprehension tests, while lower secondary students from New Zealand and Italy did well. In the same subject, average national scores of older students differed considerably, and this was closely associated with the extent to which countries or nations retained students of the appropriate age-group through the final year of secondary schooling. In English as a foreign language, Swedish students performed better than those of the other nine countries that participated. And in science, secondary school students from New Zealand and Germany came ahead of those from other countries involved in the study.

Though some educators responded to the fact that students from their own country performed higher or lower than students from other countries in some subjects, the researchers insisted that national averages could not be regarded as the results of an international competition, for obvious reasons. Their quest was for the associated factors that might explain the differences to be observed. The six volumes on achievement in the subjects cited above contain a host of data and interpretations relating to their own areas, but three additional IEA publications reviewed the project as a whole in a technical report on the methodology (Peaker, 1975), a summary discussion of the findings (Walker, 1976)

and a review of the findings in relation to differences of school-system structure and organization and socio-economic characteristics of the twenty-one nations involved in the study (Passow, Noah, Eckstein, & Mallea, 1976). The project confirmed and extended that much was known about the factors affecting student achievement include; home background, comprising essentially of the educational and social status of parents, by far the most influential force; school characteristics of various kinds; and features of the national educational system. However, the relative significance of individual factors and groups of variables were found to vary considerably among different countries, age levels, and subjects of study, providing new evidence as why achievement levels vary for countries.

With regard to teachers and instruction, the database and the research model of the IEA Project enhanced the systematic study of teacher characteristics and instructional methods. Avalos (1980) contended that neither higher academic qualification nor longer pre-service preparation of teachers were in themselves important in explaining differences in student achievement although they might be in conjunction with other variables. The same author also found that differences in instructional method were not influential, although she found discovery methods more effective than expository teaching at higher levels of intellectual achievement.

This study is substantiated by two additional works (Husen, 1978; Simmons & Alexander, 1980). Although neither found clear and consistent significant relationships among teacher training, several other school-related variables and achievement, Husen's analyses firmly rejects the null hypothesis that the sixteen teacher-related variables studied are unrelated to achievement. Four characteristics are rather more important than others; qualifications, experience, amount of education, and knowledge. In addition, two demographic characteristics are important under specified

conditions; teacher's sex and teacher's age; older teachers may be more successful with older upper secondary students.

Finally, positive teacher expectations, so far as they could be identified tended to produce positive results. Simmons and Alexander (1980) found that teacher certification and academic qualifications were not so important at primary and lower secondary as at upper secondary levels and in certain subject areas notably science. However, in their search for evidence to influence educational policy decisions in less developed countries, they found that teacher experience did have a positive effect on academic achievement in the lower grades although it was not so significant at upper secondary levels.

In general, they concluded that gross expenditures on teacher salaries and school facilities were not significant, but that teacher motivation as indicated by time spent on preparation and by membership on curriculum-reform committee was a positive factor in student achievement. Moreover, Simmons and Alexander found that the amount of homework done, the physical conditions at home and the amount of reading done were all important predictors of student achievement. The conclusions were that increasing the quality and quantities of most of the traditional inputs such as teacher training and expenditure per student to schooling were likely to increase student achievement. However, affective skills taught by the schools maybe more important than cognitive skills, especially for post-school benefits that are higher earnings and satisfaction at work.

Some writers have raised the question, why do the IEA study and similar large scale surveys, such as the Coleman report did not throw more light on the influence of home and school factors on student achievement. In light of this Heyneman (1976) further analyzed data from one less developed country, thus Uganda and compared it with evidence from the IEA study and came out with the conclusion that although home background

appears more influential in the developed countries, the effects of schooling on cognitive achievement appear relatively greater in the case of less developed countries. Still, with reference to practice in less developed countries, Heyneman (1978) reviewed the published evidence on the relationship between the availability of textbooks and academic achievement. Research covering twelve countries including the IEA Study and Heyneman's own investigations in Uganda, and a number of other works were reviewed. The availability of books is a consistently good predictor of academic achievement. The author concluded that although the reasons why the associations are stronger in some cases and weaker in others are not at all clear. He suggested that investment in reading materials is likely to improve cognitive achievement in less developed countries.

With regard to sex and achievement, sexes perform differently in given school subjects; what was known to be true in certain instances were found to be true internationally. Boys do better than girls in civic education, mathematics, and science, with the exception that, in some countries, girls excel in biology. On the other hand, girls tend to do better in foreign languages, reading comprehension, and literature. These findings add to what is known about sex differences in education as found in studies in literacy skills estimated by United Nations statistics, enrolment and attendance figures, curricular and vocational choices, and achievement in specified school subjects (Finn, Dulberg, & Reis, 1979).

Male teachers appear to be more successful with their students' science achievement, while their female colleagues are better able to enhance their students' foreign-language performance (Husen, 1978). As one comprehensive review of the topic makes evident (Finn, & Dulberg, & Reis 1980), patterns of achievement are inextricably bound up with behaviour models suggested in schools by teachers and textbooks, by curriculum exposure, by

academic supports, and by vocational expectations and opportunity all of which are deeply rooted in society's ideas and practices.

In a four-nation study of reading achievement test, (Johnson, 1974) boys scored higher than girls in Nigeria and England, while the reverse was true of samples of primary pupils from Canada and the United States. In a selection of IEA data Passow, Noah, Eckstein, and Mallea (1976) suggested that in those more developed economies of the world where the primary school teaching is perceived as a career for females, primary school achievement in basic skills of mathematics and reading comprehension tends to be lower than where primary school teaching is seen as a career for either sex. Comparative study demonstrates that school-achievement differences between the sexes are not easily reduced, even as social practices develop, economic conditions change, and school practices vary.

How particular school policies affect achievement is often rooted in fundamental differences of philosophy, political ideology, and social values. The controversy over the effect of classroom grouping policies or the merits of selective versus comprehensive schooling cannot be assessed with respect to student achievement alone, for they are also involved with political and social effects. These and many similar issues have been studied both in one-nation case studies and in cross-national investigations. Passow, Noah, Eckstein, & Mallea (1976) discussed associations between such issues and student achievement as having no clear associations between such factors as national average class size, forms of compulsory schooling.

With the question of the effect of selective versus comprehensive secondary schooling, the IEA study produced national achievement norms for each participating nation in different subjects for students at different levels. On the whole, achievement norms were demonstrably lower in those

countries that retained larger proportions of their youth in the education system by means of non-selective transition from primary to secondary levels and by providing various forms of comprehensive secondary schooling. It was expected, therefore, that such countries would have a wider range of student ability in the samples tested at the middle and the upper secondary school levels and that national averages would consequently be depressed in comparison with those countries restricting advancement through the school system.

However, as IEA analysis demonstrates that, if comparisons are made among the top five to nine percent of achievers in each country, the differences among countries are sharply reduced. The best students tend to achieve very similar levels in different countries regardless of whether the school system is more selective or more comprehensive.

The issue of how increased access to more schooling may affect achievement is one of the current concerns of researchers in the world. So also are the issues of how to provide for cultural, linguistic, and other exceptional groups whose achievement levels are demonstrably below national norms and whose participation in the mainstream of national life is limited. However, as these examples of policy questions indicate, student attainment in basic skills such as reading the native language or in standard school subjects is one way of defining the outcomes of different school policies.

School achievement may also be considered as the capacity of the school system to produce what the educators, citizens, and the leadership of a nation deem important. To evaluate the performance of an education system calls for some understanding of the goals, costs, demands, and needs of the nation for which it provides. Although societies may agree on certain broad social and personal objectives of education, the many varieties of practice, organization, and criteria for evaluation among the schools of the world indicate that

the ends, the means, and the processes connecting them may vary considerably (Coombs & Luschen, 1976). Coombs and Luschen propose four criteria including comparatively; effectiveness, efficiency, responsiveness, and fidelity to assess system performance. They acknowledged the existence of many output measures, some more useful than others, but noted the problems involved that may explain why so little has been achieved in comparing the achievements of school systems relative to their particular respective priorities and objectives. They conclude with a number of hypotheses suggestive of policy-oriented research.

Eckstein (1977) summarized the argument that; teachers, curriculum makers, and educational policymakers, however, usually wish to know something more specific. They are more interested in those variables over which they have some control than in those less amenable to their decisions. They need to know the effect of varying particular items upon achievement under specific circumstances. They are less interested in influencing achievement on an average, national basis than in say rural as compared with urban settings, boys vis-à-vis girls and students in poor neighborhoods as distinct from those in privileged communities. What provides the largest increments to achievement for low achievers, average and high achievers? The answer to this and similar questions requires analyses that partition the national samples singly and across groups of nations so as to investigate relationships among variables for specified groups of students, for example, rural and urban, poor and wealthy, high achievers and low achievers. "The potential of the IEA studies to inform policymaking in education was neglected because insufficient attention was given to policy questions and because the authors did not take care to express their findings inappropriately concrete form" (pp. 354-355). It needs to be noted that in both Trends in International Mathematics and Science Study (TIMSS) and in previous IEA

studies, the curriculum was measured as a complex construct with several aspects, each linked to a context or level of educational activity, for example, the implemented, intended and attained curriculum.

### **1.3. International Mobility of Students**

Several millions of learners around the globe study outside their home countries annually in recent times. Education has become a large industry with great potential like other trade businesses. Education of late goes beyond import and export of textbooks of standardized achievement test such as Test of English as a Foreign Language (TOEFL) and Graduate Record Examination (GRE) but also by many other areas (Liston & Reeves, 1985; Naidoo, 2007). OECD report showed that 2.9 million students around the world were admitted to tertiary institutions to study abroad in 2006 (OECD, 2008). It is predicted that more than 7 million students will be admitted abroad by 2025 (Bohm et al. 2002; Perraton, 2004). In the long-term, “internationalization of education is likely to have an increasing impact on countries’ balance of payments as a result of revenue from tuition fees and domestic consumption by international students. In the short run, monetary costs and benefits are reflected in the current account balance” (OECD 2008, p.350).

Due to the long-term benefits anticipated to accrue to host countries of international students some nations have more interest in admitting foreign students. Tertiary institutions for instance greatly depend on revenue which is generated from tuition fees charged foreign students. Some higher institutions of learning, therefore, give some scholarships and financial support to international students’ as an incentive for attracting more of them. That can promote the reforms at the institution level. These reasons have accounted for internationalization of education as both host and source countries benefit from it (Wang, 2008).

In spite of the observed benefits of cross-national education, it is not all students who are willing to attend school abroad that gain admission abroad to actualize their vision as a result of cross-national achievement test standards differences and the employment of standardized achievement tests such as TOEFL and GRE as the standardized entry criteria at the higher education level. For example in a study to determine students intending to study abroad, Zheng (2003) reported that 51.5% of participants in the study planned to continue their studies abroad. It is however obvious that not all 51.5% of the respondents had their dreams come through for various reasons including cross-national achievement test results differences.

### **1.4. CONCLUSION**

After reviewing different studies the paper concludes that comparison of cross-national achievement of students through achievement, testing has some positive implication for the education systems globally. However, it imposes enormous limitations on students’ international mobility and requires to be handled in a more careful manner by the host and source countries of cross-national education worldwide. This international students’ mobility has appreciable benefits, and countries need to take full advantage of students’ internationalization as well as avoid the situation that will further disadvantage students from less developed economies and weak education systems as this would only widen the development gap between advanced economies and less developed economies. The study, therefore, suggests that host countries of international students review their educational institutions’ entry level policies to accept more international students who are willing to study broad so as to reap the benefit of internationalization of education as well as improve the human capital of less developed economies. Moreover, the increased number and variety of variables that influence

achievement couple with how little a large number of the variables contribute to academic achievement require that education policymakers work collaboratively to harvest the gains from each variable in order to realize a phenomenon total effect of the benefits on an entire education system globally.

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