

# International Education Journal



Volume 6 Number 1  
March 2005

Published by

Shannon Research Press  
Adelaide, South Australia  
ISSN 1443-1475  
<http://iej.cjb.net>

International  
Education  
**Journal**



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Published by:

Shannon Research Press,  
39 Dorrien Avenue,  
Woodcroft, SA 5162,  
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ISSN 1443-1475

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Designed by Katherine Dix

Printed in Adelaide

March 2005

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# Testing Educational System Typologies using Colombian data<sup>1</sup>

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*International Lending Institutions (ILIs) and Non-Governmental Organisations (NGOs) continuously design and implement Educational System Typologies (ESTs) in order to evaluate a nation's educational performance in terms of quality of life improvements; Traditional ESTs are therefore constantly put at odds by the advent of new ESTs. This study aims to explore the ways in which traditional and newer EST designs relate to quality of life, using factor analysis on Colombian data for the period 1997-2000. Results for the Colombian case show that level-based non-mechanistic approaches are better at describing and promoting the relationship between educational indicators and quality of life assessments.*

Colombia, educational system typologies, quality of life, educational indicators

## INTRODUCTION

The relationship between education and the quality of life can be made explicit from numerous perspectives, for example, economical, psychological, historical, and developmental, by means of different data such as primary sources: identical twin and cohort studies; or secondary sources: using surveys, panel and macroeconomic data and a variety of methods of analysis such as linear regression, controlling for certain variables, econometric models, and multilevel or hierarchical approaches. In the twenty-first century this relationship has become a self-evident truth this paper does not plan to contest. On the contrary, this study uses a typological perspective to illustrate this relationship.

In an effort to reduce the variety that emerges when attempting to evaluate an education system's performance and its contributions to quality of life, International Lending Institutions (ILIs) and Non-Governmental Organisations (NGOs) continuously design and implement Educational System Typologies<sup>2</sup> (ESTs). Even though these efforts can easily be regarded as well-intentioned, when the same entities develop new and improved techniques to accomplish the task, as in the novel framework proposed by the World Bank (2002a) to put together educational sections of Poverty Reduction Strategy Papers (PRSP), one is found to wonder about the ways and the extent to which educational indicators associated with previous (traditional) ESTs relate to the quality of life, in comparison with the indicators associated with newer ESTs. This paper intends to explore

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<sup>1</sup> This article was extensively edited by Dr B. Matthews of the Flinders University Institute of International Education.

<sup>2</sup> Typologies are defined in this context as constructs that intend to typify a system (in this case an education system) by grouping related indicators (that is, education and quality of life measurements) theoretically or logically in order to provide decision makers with a framework for identifying and analysing relevant aspects that best describe the way the system is performing.

the ways in which educational indicators included in traditional and recent ESTs, particularly those proposed by the World Bank, the Inter-American Development Bank (IDB), and the United States Agency for International Development (USAID) contribute to quality of life assessments, using multivariate statistical techniques on Colombian data for the period 1997-2000. The paper also aims to inquire about the differences between approaches, and identify improvements made in EST designs. To accomplish this task, the remainder of this paper describes the ESTs in question, showing how quality of life variables can indeed be helpful educational indicators. It then considers the variables to be analysed, the methods of analysis and the model. Then the results of the statistical analysis are presented and discussed, and finally some conclusions are drawn from the exercise.

## **EDUCATIONAL SYSTEM TYPOLOGIES (ESTS)**

### **Traditional ESTs**

This section is not an exhaustive presentation of all the different ESTs that have been developed, but a brief review of the most popular ones.

The World Bank's typology developed by Carvalho and White (1994) defines the input, process and impact indicators as ways to promote the simultaneous monitoring and evaluation of programs or projects. In the Latin-American context the International Development Bank (IDB) presents a somewhat different typology that according to Vos (1996) comprises four groups: input, access, and output and outcome indicators. USAID (1997) has adopted a Logical Framework typology, which distinguishes three different groups: activity, output, and goal and purpose indicators. These typologies characterise input indicators as means and resources employed to satisfy educational needs; for example, staffing, teaching supplies, and school facilities. However, the logical framework describes these as activity indicators that refer to program budgets or funding as the basis for identifying the cost of inputs.

The process indicators proposed by Carvalho and White (1994) are meant to measure the extent to which a program or project is delivering materials and resources such as the number of schools built, the number of students trained and the textbook availability per student, while the Logical Framework description ranks these variables as output indicators, in the IDB's (1996) typology, these could either be input or output indicators. In other words, since process indicators serve to monitor the implementation or delivery of projects, then some of these indicators may be informative about the delivery of inputs such as schools or text books for example or about the measurable impact of these inputs in terms of desired outputs such as increased enrolment rates; Ridker's<sup>3</sup> (1997) report on African case studies falls into this category. However, from the development impact perspective adopted by the IDB, the improvement of school buildings or the delivery of teaching materials, which the Logical Framework regards as outputs are, in fact, considered inputs.

Because Vos (1996) uses the development impact perspective as the prime criterion for classifying indicators in the IDB's typology, he defines access indicators as those that identify demand factors of potential users: the socio-economic level of the students and families, and the distance from school. The World Bank and the Logical Framework typologies focus almost exclusively on the delivery of social services or the supply side descriptions while the demand side is in some way encompassed in the IDB's access indicators.

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<sup>3</sup> A study performed in Kenya operated by the Internationale Ghristelijke Stichting (ICS) - Dutch non-governmental organisation – offered textbooks and uniforms to rural primary schools in Busia, Kenya. Increased enrolment, improved attendance and reduced dropout rates were observed after the inception of the project, however, no significant differences in test scores were discovered.

The World Bank defines impact indicators as those markers that “the impact on the living standards of the poor” (Carvalho and White, 1994, p.9) thus confining the definition to a segment of the population. These impact indicators resemble the purpose indicators of the Logical Framework (USAID, 1997) or the output and outcome indicators of the IDB nomenclature that Vos (1996, p.4) describes as measuring “the impact of a particular set of policies or projects on the living standards of the population.” However, Vos (1996) distinguishes between output indicators, which try to measure the extent to which immediate objectives are achieved such as increased enrolment and literacy rates, educational attainment, as well as improved quality of achievement in tests, and outcome indicators, which refer to the higher goals of education, for example, better employment, higher productivity, and improved health, in an attempt to approach “externalities” or “indirect impact outcomes” (Vos, 1996, p.5).

In general, stage-based typologies strive to be comprehensive by considering existing inputs and demands that lead to activities, which, in turn, influence demand and accessibility, that together eventually yield project or immediate educational results, as well as indirect impact outcomes (Carvalho and White, 1994). However, stage-based typologies may bring about an underlying ambiguity that gives bureaucrats from aid-recipient countries ample room for political manoeuvring by means of data manipulation.

### ***Inherent ambiguity***

The fact that the same indicator, depending on the typology used, can be considered as an input, a process or an output gives government-friendly analysts the chance to praise non-existent achievements, for example: claiming that after four years in government an increase in the number of students being trained is an exceptional output of sound educational policies, when it might only be the provision of necessary inputs for the system to function properly. Conversely, this same ambiguity gives opposing analysts the chance to demean breakthroughs in overall national educational policies, for example: asserting that after a year in government there have been no changes in already high enrolment rates due to the current government’s negligence to provide more and better inputs, while this situation may be the result of previous and fortuitous educational policies.

### **New ESTs - PRSP framework**

The World Bank’s (2002a) latest contribution in terms of designing education policy components of the Poverty Reduction Strategy Papers (PRSP) provides a comprehensive account of educational and quality of life variables and their inter-relationships. This framework uses what could be called a ‘level-based’ approach, which proposes a “conceptual framework for understanding educational outcomes in general” (World Bank, 2002a, p.5). This conceptual framework starts with key educational outcomes and works back through the individual, household and community factors influencing these outcomes, to government policies and actions at the sector level, within the educational sector, as well as macroeconomic level policies, including non-educational sectors.

According to the World Bank’s (2002a) framework, the key educational outcomes most directly related to poverty reduction are: primary education completion rates, gender disparities in basic education, student learning such as achievement in examinations and adult literacy rates. The factors regarded as relevant in this framework are: (a) in terms of the **individual**, aptitude, motivation, gender, early childhood access to nutrition and stimulation programs; (b) in terms of the **family**, household income and demographics, birth order and parental educational attainment; and (c) with regard to the **community**, infrastructure, for example roads, access to public utilities, schooling costs and distance from schools, availability of health care facilities, regional labour markets and job availability.

Educational sector factors are encompassed in the country's education system performance in terms of efficiency, quality and equity, which are dependent on public and private expenditure. However, the framework warns that key constraints to better system performance may be hindered by pure expenditure analysis and therefore causal factors like supply constraints, weak demand and low learning achievements need to be identified. The two major sources of supply constraints are the shortage of physical infrastructure, or the shortage of teachers both of which relate to community characteristics. On the other hand, weak demand limits enrolment due to household decisions on schooling, household income, parental education, cultural expectations, or high dropout rates in basic education because of more financially rewarding activities which relate mostly to family but also to community characteristics; and high repetition of years at school which can relate to individual, family or community characteristics. These aspects all reflect upon students' learning achievements. Finally, the framework's overall government policies comprise: political stability, labour market conditions, trade policies, and foreign investments (World Bank, 2002a).

There are individual, household and community factors directly related to a country's educational sector performance and this is precisely where the relationships between educational indicators and quality of life variables are most apparent. This is mainly due to the fact that the PRSP Framework, as opposed to traditional ESTs, uses a level-based approach in which the mutual contributions existing among the different levels are clearer.<sup>4</sup> However, the issue concerning the appropriate quality of life measurements for studying these relationships remains. In the Appendix a scrutiny of various qualities of life assessments is given, as well as a justification for considering whether both the Human Development Index (HDI) and the Unsatisfied Basic Needs (UBN) and their components are suitable for the statistical analysis.

## VARIABLES, METHODS OF ANALYSIS AND THE MODEL

Analysing the way indicators comprised in ESTs relate to appropriate quality of life measurements (HDI and UBN) from an empirical viewpoint may help by reducing room for political manoeuvring, on the one hand; and exposing the mutual contributions between educational indicators and quality of life assessments from a typological perspective on the other. This section presents the indicators that have been used as variables for different years in Colombia's departments (states, provinces or prefectures)<sup>5</sup> as well as the statistical model and the methods of analysis used.

### Variables<sup>6</sup>

The quality of life measurements that are used as variables in the model are HDI and UBN in their component form, so that relationship between the particular characteristics with respect to individuals, their households, or their communities may be identified. This means that HDI is considered as life expectancy (variable name: LIEXHDI), with educational (EDUHDI) and

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<sup>4</sup> Traditional ESTs focus on stages pertaining to educational sector performance only, and *a priori* this seems to be a disadvantage because level-based approaches are better at acknowledging interrelations between the educational sector and its surroundings, which provides evidence of how educational indicators can be affecting or be affected by the quality of life of the people in the system.

<sup>5</sup> This study uses Colombia's departments (states, provinces or prefectures) as the unit of analysis. Thirty-two departments plus the Capital (Bogotá D.C.) make up the Republic of Columbia, however, nine of them, namely, Amazonas, Arauca, Guainia, Casañare, Guaviare, Putomayo, San Andrés, Vaupes and Vichada have been excluded from the statistical analysis because they did not provide significant information and had missing data, yielding a total of 24 departments (observations).

<sup>6</sup> Data provided by the Socio-Demographic Indicators System of Colombia's National Planning Department ([www.dnp.gov.co/01\\_CONT/INDICADO/Sisd.htm](http://www.dnp.gov.co/01_CONT/INDICADO/Sisd.htm)).



income (GDPHDI) components. UBN is used to describe housing (HOUUBN), with accumulation (ACCUBN), public utilities (PUBUBN), economic dependency (ECDUBN) and educational (EDUUBN) as components. In addition, unemployment for the age groups 12-24 years (UNE1224) and 25-54 years (UNE2554) are used partly to account for the community factors affecting dropout rates due to lack of labour market opportunities.

The following indicators considered to be associated with traditional ESTs are the percentage of illiterate adults (ILLITS), state examination result categories<sup>7</sup> (ICFES), educational attainment (ATTAIN), enrolment in age groups: 5-6 years (E56), 7-11 years (E711), 12-17 years (E1217), and 18-25 years (E1825), and the departmental proportion of students attending primary schools (REGPRI) and secondary schools (REGSEC), as well as the departmental proportion of teachers (TEACH) and schools (SCHOOL).

As the PRSP Framework is much broader in scope, its relevance has been verified using the proposed key educational outcomes where: an alternative to primary education completion rates is considered, namely, primary schools' efficiency (EFFPRI), and efficiency in departmental secondary schools (EFFSEC.) Both of these indicators should be interpreted as the difference between the proportion of students enrolled and the proportion of students that should be enrolled at each level, which accounts for the proportion of non-normative students included in the system (UNDP-DNP, 2000.) Consequently, the lower the proportion, the more efficient the system is. In general, these indicators qualify the system's efforts to improve normative access, permanence and time fluctuations through the educational structure, and are, therefore, strong negative correlates of repetition (DNP, 2001), which is why efficiency is considered an adequate replacement for completion rates; adult literacy and student learning as achievement in state examinations are also included in traditional ESTs. Finally, educational gender inequalities are omitted because these are not an issue in Colombia.<sup>8</sup>

### *Omitted variables*

From the traditional ESTs stand point, the only variables that are not accounted for in the models are school supplies and facilities due to lack of relevant data. Higher education efficiency and performance variables are not included in the analysis because this sector's behaviour deserves specific considerations. Even though private and public investment in the educational sector have been regarded as relevant by USAID's typology, because they are related to funding and by the PRSP Framework, they are not considered here because this study aims to explore the relationship between educational and quality of life variables at specific points in time from a typological perspective and checks to see if these relationships are stable throughout the period 1997-2000, without consideration for time lag, which for expenditure and cost-effective analyses, is of crucial

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<sup>7</sup> The resulting categories were based on the number of schools in each department that obtained: very high, high, above medium, medium, below medium, low or very low scores in state examinations, so that data are comparable between years. The number of categories was reduced by grouping the proportion of schools in the first three categories into one **high results category**; the proportion of schools with medium scores turned into a **medium results category**; and the proportion of schools in the last three categories were classified into one **low results category**. In order to differentiate between departments with similar proportions in some result categories an ordinal point system was established whereby one point was assigned to departments with the highest proportion of schools in the low results category; two points for those departments with more than 33 per cent of their schools in the medium results category; three points for those schools obtaining medium results; four points for departments in which at least one out of every five schools obtained high results; and finally, in order to reward departments that had the highest proportion of schools in the high results category, five points were assigned.

<sup>8</sup> According to the data considered for the statistical analysis, the percentage of illiterate men is higher than that of women for most years (except 1999) and the average number of schooling years (educational attainment) is almost the same for men and women, and sometimes even higher for the former group (i.e. years 1997 and 2000). In addition, girls' achievement in state examinations is similar to boys' achievement.

importance. Urban-rural differences are also omitted because some of the variables used do not present departmental urban-rural disaggregation.

In total, 23 standardised variables are considered in the models, ten that address quality of life and 13 that refer to education. The distribution of values (whether they are percentages or points) for each of the variables considered is normal or approximately normal among the 24 departments for the years that have been analysed.

### **Methods of analysis and model estimation**

Multivariable statistical techniques allow researchers either to describe or model data and the behaviour of the variables in question according to observed correlations or maximum likelihood, using factor analysis. These techniques help expose relationships that have not previously been anticipated and thereby allow interpretations that would not ordinarily have been considered (Johnson and Wichern, 1998).

#### ***Algorithm***

The algorithm that is utilised, factor analysis, begins by transforming all categorical or qualitative variables into quantitative variables. According to Castaño and Moreno (1994), exploratory studies that apply traditional methods of multivariate analysis should only use quantitative variables. This means that categorical variables such as ICFES should be transformed into quantitative ones before carrying out factor analysis. Variable transformations are performed using the PRINQUAL method.

#### ***State examination (ICFES) transformations***

The PRINQUAL-MAC procedure is used in order to derive quantitative variables from the state examination result categories that have been constructed. This procedure produces quantitative transformations by maximising the average correlations between the variables in the model (Parra and Arellano, 2001), performing calculations that either preserve (Monotone transformations) or change the ordinality of the variables in question (Opscore transformations). In the algorithm designed for this study, the ICFES variable that has been transformed includes all variables considered in the model as OPSCORE transformations, so as to identify variables with negative correlations inside the matrix. These variables plus the variable ICFES have been transformed using the OPSCORE procedure in all models for all years, except 1999<sup>9</sup>, the negatively correlated variables were EDUUBN and ECDUBN while the rest of the variables have used MONOTONE transformations.

#### ***General factor strategy***

Johnson and Wichern (1998) assert that many decisions are made in any factor analytic study; one of the most important decisions is that of the number of common factors retained. Most often, the final choice is based on some combination of the proportion of the sample variance explained, the subject-matter knowledge, and the so-called ‘reasonableness’ of the results. In this study the decision is based on the proportion of the sample variance explained.

Here the factors and the loadings of the variables in these factors for each year were generated using principal component factor solutions, retaining five factors which accounted for most - around 80 per cent for every year - of the total sample variance in the input data.<sup>10</sup> Oblique

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<sup>9</sup> ICFES variable was excluded from the 1999 models because it was the best way to increase the data’s overall sampling adequacy without excluding a considerable number of other variables from the analysis.

<sup>10</sup> For year 1999 only four factors were necessary.

rotations, according to Johnson and Whichern (1998), were appropriate for a factor model in which the factors were in some way interdependent, and this was the case, due to the overlapping found in terms of individual, family and community factors and educational sector performance indicators. In order to check the stability of the factors, and the variable loadings within these factors, the algorithm performed maximum likelihood factor analysis with oblique rotations. Finally, if any variable had to be taken out of the analysis for the sake of increasing the model's overall measure of sampling adequacy (MSA), then a variable with low loadings either in the principal component or maximum likelihood solutions was identified and omitted in the next iteration. This meant that new transformations for the categorical variable ICFES were needed, which examined the results for all years considered.

It should be noted that although the proportion of cases to the number of variables involved in the factor analysis is much lower than is generally recommended, the method of analysis employed has been replicated using both principal components (least squares) and maximum likelihood estimation procedures and the factor structure patterns examined to tease out the linkages that are shown in the data. Ultimately the strength of the analysis lies in the meaningfulness of the results recorded and presented.

## RESULTS AND ANALYSIS

This section presents the results of applying the algorithm previously described to Colombian data for years 1997, 1998, 1999 and 2000.

For year 1997, four iterations were performed in order to reach a stable solution in the principal component (PC) and maximum likelihood (ML) factor analyses. The overall sampling adequacy, after taking variables EFFSEC and UNE2554 out of the model, was 0.579. Five factors were retained explaining 83.7 per cent of the variance contained in the data. Table 1 shows the factor in which each variable had the highest loading for both methods (PC and ML) every year, and the direction of the loading (positive or negative) for each variable, also whether the variable had to be taken out of that year's model for the sake of sampling adequacy (to see actual factor loadings see Table 4 of the Appendix.) In 1998, six iterations were needed before reaching a stable solution in the principal component and maximum likelihood factor analyses. The overall sampling adequacy, after taking the variables: EFFSEC, UNE1224, UNE2554 and E56 out of the model, was 0.654 and the five factors retained explained 85.3 per cent of the variance. Once again, six iterations were needed for a stable solution in both PC and ML analyses using the 1999 data, the overall sampling adequacy, after taking variables: EFFSEC, UNE2554 and ICFES out of the model, was 0.511 and the four factors retained explained 81.4 per cent of the variance. Finally, for year 2000 two iterations were performed in order to reach a stable solution in both factor analyses, the overall sampling adequacy, after the variables EFFSEC and UNE2554 were taken out of the model, was 0.542 and the five factors retained accounted for 81.7 per cent of the variance in the data.

For the most part, the results show direct and expected relationships throughout the years considered:

- E711 and EDUUBN, have a direct relationship based on the way EDUUBN is calculated. They are always linked together and exhibit opposite loadings because of the way the educational component in the UBN indicator is defined, namely, percentage of households with at least one student aged between 7 and 11 years old not enrolled in school (see the Appendix for an explanation of all variables, the components and indicators). This result corroborates the fact that educational indicators have been developed in the context of quality of life measurements and the basic needs approach (Drewnowski, 1970; Hopkins and Van der Hoeven, 1983).

- ATTAIN is linked with the older age enrolment variables (E1217 and E1825), except in 1997. This makes sense because the higher the proportion of older students enrolled in academic institutions, the more likely a department is to have a higher average number of schooling years for student populations of 15 years and older and, therefore, a higher overall educational attainment. It is interesting to note that maximum likelihood analyses for years 1997 and 1998 linked these variables to state examination results (ICFES), which is also a not unexpected relationship.
- SCHOOLS, TEACH, REGPRI and REGSEC always linked together throughout the years; the departments with the highest proportion of schools also happened to have the highest proportion of teachers and registered students at the primary and secondary levels. This factor, besides emphasising the importance of a department's educational infrastructure, is indicative of the basic educational inputs necessary for a system to work properly.

**Table 1. Variables and Factor with highest loadings from Principal Component and Maximum Likelihood Factor Analyses for 1997, 1998, 1999 and 2000**

Variables	1997		1998		1999		2000	
	PC	ML	PC	ML	PC	ML	PC	ML
EDUUBN	-F4	-F4	F4	-F1	-F3	-F1	-F2	-F5
ECDUBN	F5	F1	-F3	-F1	F1	F4	F4	F4
ILLITS	F5	F1	F4	F5	F1	F4	F4	F2
ATTAIN	-F5	-F1	F2	F3	-F1	F2	F5	F1
TEACH	F2	F5	F5	F2	F2	F3	F3	F3
SCHOOLS	F2	F5	F5	F2	F2	F3	F3	F3
REGPRI	F2	F5	F5	F2	F2	F3	F3	F3
REGSEC	F2	F5	F5	F2	F2	F3	F3	F3
E56	F1	F2	Out	Out	F3	F1	F1	F1
E711	F4	F4	-F4	F1	F3	F1	F2	F5
E1217	F1	F3	F2	F3	F4	F2	F1	F1
E1825	F1	F3	F2	F3	F4	F2	F5	F1
EDUHDI	-F5	-F1	-F4	-F5	-F1	-F4	F5	-F2
LIEXHDI	F1	F2	F1	F4	F3	F1	F1	F1
GDPHDI	-F5	-F1	-F4	-F5	-F1	-F4	F5	-F2
ACCUBN	F5	F1	F4	F5	F1	F4	-F5	F2
PUBUBN	F5	F1	F4	F5	F1	F4	F4	F2
HOUUBN	F5	F1	F1	F4	F1	F4	F1	F4
EFFPRI	F5	F1	F4	F5	F1	F4	F4	F2
EFFSEC	Out	Out	Out	Out	Out	Out	Out	Out
UNE1224	F3	F2	Out	Out	F2	F4	-F4	-F2
UNE2554	Out	Out	Out	Out	Out	Out	Out	Out
ICFES	-F5	F3	F3	F3	Out	Out	F3	F3

(For factor loadings see Table 4 in the Appendix)

UNE2554 had to be excluded from all the models for the sake of sampling adequacy, probably because job opportunities for this age group do not really represent an alternative, more rewarding, activity for younger generations enrolled in basic education. However, some variables did present unexpected or ambiguous behaviours; for example: EFFSEC, was also excluded from the models; and UNE1224, did not show clear associations. Finally, ICFES linked with different variables: in 1997 and 1998 it was linked with older age enrolments; in 1999 it was omitted; and in 2000 it was linked to basic educational inputs. The next section approaches groupings of variables addressing non-intuitive relationships.

## **Relationships between education and quality of life variables**

E56 and LIEXHDI, are always linked together, except in 1998 (see Table 1). According to McMahon and Appiah (2002), this relationship refers to an ‘individual capacity’ because enrolment rates (with a 20 year lag) are key determinants of life expectancy. Frank and Mustard (1994), cited by McMahon and Appiah (2002, p.37), support this by asserting that “education enables individuals to acquire knowledge about nutrition that lowers mortality rates and increases life expectancy,” specifically because “children who received better nurturing in early life are healthier and do better in adult life.” Even though there is no time lag in the relationship between life expectancy and early enrolment rates considered here, it is logical to assume that individuals with high life expectancies probably have high attainments due to high enrolment rates during their school years. This in turn, shows a ‘household dimension’ in the relationship because, according to Bernal et al. (1999), high attainment and enrolments in a family are good predictors of high educational achievement in the younger generations of a household, and thus of high enrolment rates for younger age groups. This relationship reveals that high life expectancies, an individual characteristic, are the connection between high attainments and high enrolment rates from generation to generation, a household characteristic.

Variables regarded as educational outcomes such as ILLITS, EFFPRI, and EDUHDI always had high loadings and were located on the same factors in all four years, with EDUHDI exhibiting a negative loading because of the way the educational component of HDI is defined, namely, as adult literacy. GDPHDI and ECDUBN accompanied and accounted for economic performance. These variables exhibited opposite weights because one was derived from individual wealth (GDPHDI) and the other was related to household poverty (ECDUBN) (see Appendix for a description and discussion of the variables used in the analyses). Finally household infrastructure variables such as PUBUBN, ACCUBN and HOUUBN had high loadings on different factors during 1998 and 2000, and are found in Table 1. These variables together comprised a factor that involved educational outcomes, economic performance and household infrastructure in which variables with positive loadings were indicative of a department’s poor economic situation whereas variables with negative loadings eluded to the assets a department had. The fact that these variables tended to group together showed that literacy, an individual characteristic, and primary school efficiency, a community characteristic, related to economic performance as both individual and household characteristics, and referred to public infrastructure, a community characteristic. In any case this factor merited a closer look, in terms of sub-grouping loadings, in order to clarify the relationship between the variables in it.

## **Results of Sub-grouping Analysis**

This section discusses the results of applying factor analysis to the eight variables grouped in the educational outcomes, economic performance and household infrastructure factor. Table 2 shows the factor in which each variable had the highest loading for both PC and ML factor analyses, and the sign of the loading (to see actual factor loadings see Table 5 of the Appendix). After evaluation two basic sub-groupings have become apparent.

EFFPRI is always associated with PUBUBN, presenting stable and not unexpected results. This factor indicates that Colombian departments with lower proportions of non-normative students in their schools also have fewer households with inadequate access to public utilities. This information corroborates Cerquera et al.’s (2000) findings in terms of departments with low quality of life showing high percentages of households with at least one UBN, and having higher gross coverage rates in primary schools. Thus “departments with high UBN have higher proportions of students enrolled in primary schools that are 12 and older,” (p.24). However, Cerquera et al. (2000) do not identify the specific contributions, in terms UBN components, which

may influence primary education efficiency. Instead, the relationship exposed by the sub-grouping refers to the importance of public infrastructure, a community characteristic, specifically in terms of water and sewerage services, so that departments improve normative access and timely movement of primary level students, a community characteristic.

**Table 2. Variables and factor with highest loading from principal component and maximum likelihood factor analyses for sub-groupings in 1997, 1998, 1999 and 2000**

Variables	1997		1998		1999		2000	
	PC	ML	PC	ML	PC	ML	PC	ML
ECDUBN	F3	F2	F1	F3	F2	-F3	F3	F3
ILLITS	F3	F2	F3	F3	F2	-F3	F3	-F1
EDUHDI	-F3	-F2	-F3	-F3	-F2	F3	-F1	F1
GDPHDI	-F1	F1	-F3	-F3	-F2	F3	-F1	F1
ACCUBN	F2	F2	F2	F1	F1	F2	F1	-F1
PUBUBN	F1	-F1	F3	F1	F3	F1	F2	F2
HOUUBN	F3	F2	F1	F2	F2	F2	F3	F3
EFFPRI	F1	-F1	F3	F1	F3	F1	F2	F2

For factor loadings see Table 5 in the Appendix

ILLITS and EDUHDI had high and opposite loadings on the same factors throughout the years considered because of EDUHDI's definition, as mentioned above. However, the high loadings that are presented by GDPHDI relating to EDUHDI, in both factor analyses and all years, except 1997, demonstrate the connection between the individual characteristics of literacy and income. These confirm Colombia's DNP (2001) assertion that the poorest departments as based on the Human Development Index (HDI) and Unsatisfied Basic Needs (UBN) have the highest percentage of illiterate adults. This is also confirmed by ECDUBN's, a household characteristic, high loading in relation to ILLITS, an individual capacity, for most years and methods. Additionally, HOUUBN, a household characteristic, is linked with ECDUBN in 1997 and 2000.

This section has examined the dynamics of three important relationships: life expectancy and early age enrolment; public utilities and primary education efficiency; and income and literacy, and corroborates results from other studies. In particular, the first and last relationships affect individuals and households, while the second refers to community characteristics exclusively. Additionally, the last two relationships mainly account for collective and individual inequalities between Colombian departments, and show how these inequalities have negative effects on educational indicators. In general, the overall results of the exercise are robust in the sense that they have been checked, are stable over time, intuitive and have corroborated other studies' results; therefore, they are used in the following section in order to discuss the relevance of traditional and new ESTs.

## Relevance to Colombian quality of life

### *Traditional ESTs*

In general, traditional ESTs use stage-based approaches to education that attribute a mechanistic character to the system, in which some resources such as funding, teachers, schools, supplies, and facilities are fed into a black box, where students being trained, their enrolments, scholastic attainments and achievements are measurable items, all of which at completion are expected to transform individuals by improving literacy, leading to higher productivity, better health and a society with benefits that are regarded as externalities.

Traditional ESTs defined input indicators as the means employed to satisfy the educational system's needs. This definition of inputs and the indicators assessing them was validated by the groupings found with Colombian data; however, the factor analysis also regarded registered students or students being trained, as an indispensable input to the system. This meant that Carvalho and White's (1994) process and USAID's output indicators measured the extent to which projects were actually delivering basic educational inputs. Furthermore, it was not clear how these educational indicators related to Colombian quality of life, and this is why it seemed that they were probably just meant to measure cost-efficiency.

However, educational indicators like attainment, achievement, and enrolment rates, that are regarded as outputs by the IDB and purpose by USAID do have effects on the living standards of Colombians, mainly through life expectancy that has been gained from information on early age enrolment rates. This is considered an impact indicator by Carvalho and White (1994) and an indirect impact outcome indicator by Vos (1996), therefore, this approach is also likely to regard the relationship between literacy and income as an externality. Other educational indicators are instrumental in the sense that they confirm definitions among themselves, for example, ATTAIN accounts for E1217 and E1825. It may be argued that this is due to the selection of variables evaluated, however these variables have been selected on the basis of the theoretical groupings defined by traditional ESTs.

In general, traditional ESTs, because of their stage-based conceptualisation, are designs capturing cost-effectiveness through identifiable items, so that high life expectancy is considered an externality, when, in fact, it embodies the link between intergenerational attainments and enrolment rates.

### ***PRSP framework***

Even though this newer EST has only been verified through its key educational outcomes, the results obtained are instructive. They reveal how quality of life variables that are related to educational indicators feedback into the system, specifically when evaluating the household dimension of the relationship between early age enrolment and high life expectancy with regard to other key PRSP outcomes. The fact that educational gender disparities are not an issue in Colombia shows that long-lived Colombian women are the ones who have decided not only to have fewer children (Rofman, 1992), and to provide them with adequate health care, but also to enrol them in schools at an early age.<sup>11</sup> The relationship between public infrastructure and primary school efficiency supports the PRSP framework's approach in the context of strategies and priority programs that stimulate demand and relieve household and supply constraints.<sup>12</sup> Finally, as in traditional ESTs, adult literacy is associated with higher incomes.

The level-based approach that characterises education systems or sectors as an entity that is affected by individual, household and community factors on one side; and by overall government policies on the other, not only allows the mentioned relationships to take place spontaneously, but it also promotes feedback relationships between education and health, education and economics,

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<sup>11</sup> According to the World Bank's (2002b) Colombia Poverty Report, women account for most of the increase in the nation's life expectancy. The difference in life expectancy by sex has doubled in the last five decades, reaching 8.3 years in 1995 with a likelihood of increasing, so women, in general, are the ones who live longer. Meanwhile mothers' educational attainment correlates strongly to reduced infant mortality (Behrman and Stacey, 1997), reduced fertility rates (Greenwood, 1992), and enhanced nutritional status of children (Behrman, 1993) – producing healthier children who do better in life (Frank and Mustard, 1994) especially when sent to school at an early age, which completes a virtuous cycle that links intergenerational attainments and enrolments.

<sup>12</sup> Practical examples of this relationship are children, especially girls, who stop attending classes because schools don't have toilets, or adequate sanitary facilities that may also be missing at home.

and education and politics. This approach takes away the mechanistic character imputed by traditional ESTs and replaces it with an organic one, in which the education system depends on its surroundings, and vice-versa. Moreover, it is our contention that this kind of approach will eventually lead to complex views involving education systems that adapt and evolve.

This framework, however, might use a stage-based grouping that has been corroborated by the statistical analysis, which characterises students trained as an indispensable input regardless of considerations for supply constraints or weak demands. Also, the fact that community characteristics (EFFPRI and PUBUBN) group separately from individual and household ones (E56 and LIEXHDI; GDPHDI and EDUHDI; ECDUBN and ILLITS) may indicate that further disaggregation is needed in the factors affecting educational outcomes. On the other hand, the fact that learning achievement is the only key educational outcome that did not show a clear contribution to Colombian quality of life constitutes an unexpected result that deserves a study of its own.

Moreover, future research may help to determine why UNE1224, ICFES, and EFFSEC did not contribute much to the models, for example, secondary school dropout rates may be related to informal labour markets which would explain low participation in state examinations. Nor do they establish the role of other factors such as time-lagged private or public education sector expenditures and investments, urban-rural differences, participation in higher education, as well as public opinion and perceptions of education, graduate employment and earnings as in industrialised countries (OECD, 1995) play in terms of educational outcomes and enhancing the quality of life in a particular society.

### CONCLUSION

Theoretically and empirically UBN and HDI appeared to be quality of life assessments that provided adequate accounts of factors affecting education outcomes. Most results were expected and reasonable: registered students were defined as inputs without exception throughout all of the years; enrolment and literacy rates appeared to be the best way to monitor the education system performance in Colombia; and new relationships between early age enrolment and life expectancy, and public utilities and primary education efficiency were identified, giving rise to further disaggregation and to a wider range of ideas and relationships that decision makers should take into account when designing educational typologies and policies. Moreover, by favouring mechanistic stage-based approaches to education systems, and thereby neglecting inter-level contributions where the relationship between education and quality of life is most evident, traditional ESTs proved to be more concerned with the short-term measurability of investments, which in turn links with the overlapping of instrumental definitions such as measuring the same thing more than once.

At the present time it is probably easier to be informed, but increasingly harder to be well informed. Public policy decisions, especially those regarding education need to be taken carefully, following ample debate, and detailed scrutiny of the situations at hand. This paper tested various mechanisms for typifying education systems using Colombian data. Even though the PRSP Framework is relevant and makes important contributions to EST designs and educational policy, in-depth research, considering a wider range of factors such as community perceptions and public opinion is needed in order to redesign continuously the systems that promote education.

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## APPENDIX

**Quality of life assessments for statistical analysis**

This part of the appendix considers a range of quality of life assessments and examines their aptness in accounting for individual, family and community factors affecting education system performance being included in the statistical analysis. Parra and Arellano (2001) approach different quality of life and poverty concepts and revise these concepts' empirical assessments in Colombia classifying them into different categories. The authors of this article classify Unsatisfied Basic Needs (UBN) and Poverty Line (PL) indicators as material poverty indicators, which measure the percentage of the population under certain conditions. Meanwhile, the Human Development Index (HDI)<sup>13</sup> and the Quality of Life Index (QLI)<sup>14</sup> are considered to go beyond goods and services. Both of these indicators assign points to the unit of analysis according to each component and are presented as Table 3. They are calculated as national or departmental averages. Table 3 also shows the quality of life variables such as health, education, housing, public utilities and income encompassed in the indicators' components.

**Table 3. Variables and components of Poverty and Quality of Life Indicators**

Variables	Components (Assessments)	Indicators
Health	-Life expectancy	HDI
Education	-Enrolment (7-11 year olds)	UBN
	-Education of the head of the household, and of all members 12 and older	QLI
	-Access to schooling cohorts (5-11 year olds) and (12-17 year olds)	
	-Combined educational attainment	HDI
	-Adult literacy	
Housing	-Inadequate housing	UBN
	-A large number of individuals living in the same room	
	-Physical characteristics of the house (ceiling, floor, and walls materials)	QLI
	-Number of children under 6 years of age and room accumulation	
Public utilities	-House with inadequate water and sewerage services	UBN
	-Access to public utilities (sewerage, water supply and garbage disposal)	QLI
Income	-Economic dependency	UBN
	-Income needed to purchase a minimum number of goods and services	PL
	-GDP per capita adjusted by parity in UD\$ acquisitive power	HDI

(Source: Parra and Arellano, 2001)

A consideration of the quality of life and poverty indicators presented in Table 3 is advantageous because they provide critical information about the individual (that is, HDI components), the family and the community (that is, UBN components) that is needed to account for factors closely linked to the education sector performance and regarded as relevant by the PRSP Framework, such as: health, early childhood development, parental education, household income and composition. A range of community factors also have an impact on education, for example, roads, public services (World Bank, 2002a), education infrastructure (US-AID, 1997), and distance from schools (Vos, 1996).

Specifically, the HDI assesses an individual's capability to live a long and healthy life with access to basic educational and economic resources, therefore it accounts for individual factors like health, adult education and income. While the UBN accounts for individual factors like early childhood development in terms of the 7-11 year age group enrolment. It also involves components relating to family factors, for example, economic dependency and physical characteristics of the household, and access to public services, which refer to community factors.

<sup>13</sup> Developed by the United Nations Development Program (UNDP, 1990).

<sup>14</sup> Developed by Colombia's National Planning Department (DNP, 1998).

Consequently, these two quality of life indicators, namely, HDI and UBN, are considered the most suitable to examine relationships between education and quality of life from a typological perspective.

### Tables With Factor Loadings

**Table 4a. Variables and Factor loadings from Principal Component and Maximum Likelihood Factor Analyses for 1997 and 1998**

1997	PC					ML				
	Factor1	Factor2	Factor3	Factor4	Factor5	Factor1	Factor2	Factor3	Factor4	Factor5
EDUUBN	-0.393	-0.519	-0.063	-0.837	0.550	0.415	-0.288	-0.318	-0.875	-0.379
ECDUBN	-0.280	-0.466	-0.144	-0.356	0.888	0.844	-0.258	-0.212	-0.395	-0.295
ANALF	-0.236	-0.487	-0.130	-0.163	0.947	0.974	-0.150	-0.163	-0.188	-0.363
ATTAIN	0.748	0.558	0.169	0.294	-0.786	-0.789	0.549	0.683	0.146	0.451
TEACH	0.543	0.929	0.127	0.459	-0.616	-0.494	0.370	0.496	0.359	0.890
SCHOOLS	0.165	0.916	0.162	0.239	-0.353	-0.174	0.075	0.121	0.279	0.872
REGPRI	0.370	0.982	0.126	0.367	-0.483	-0.331	0.212	0.307	0.334	0.967
REGSEC	0.504	0.963	0.090	0.388	-0.626	-0.498	0.295	0.463	0.308	0.939
E56	0.770	0.316	0.551	0.604	-0.132	-0.156	0.956	0.449	0.363	0.231
E711	0.476	0.470	0.090	0.936	-0.301	-0.149	0.421	0.414	0.943	0.332
E1217	0.869	0.172	0.242	0.352	-0.159	-0.197	0.613	0.704	0.152	0.150
E1825	0.789	0.329	-0.088	0.436	-0.253	-0.145	0.405	0.942	0.294	0.262
EDUHDI	0.446	0.535	0.156	0.408	-0.902	-0.872	0.281	0.427	0.383	0.388
LIEXHDI	0.767	0.123	0.269	0.191	0.090	0.025	0.665	0.400	0.079	0.090
GDPHDI	0.381	0.575	-0.085	-0.039	-0.807	-0.693	-0.024	0.468	0.053	0.454
ACCUBN	-0.035	-0.188	0.368	-0.152	0.666	0.614	0.170	-0.160	-0.199	-0.139
PUBUBN	-0.112	-0.375	-0.160	0.278	0.726	0.691	-0.007	-0.045	0.115	-0.236
HOUUBN	0.249	-0.180	0.057	0.000	0.757	0.715	0.247	0.071	-0.116	-0.063
EFFPRI	0.002	-0.406	0.343	0.390	0.716	0.676	0.330	-0.154	0.218	-0.343
UNE1224	0.395	0.406	0.817	0.229	-0.361	-0.359	0.512	0.206	0.122	0.288
nICFES	0.433	0.455	-0.424	0.299	-0.476	-0.358	0.188	0.522	0.235	0.376
1998	Factor1	Factor2	Factor3	Factor4	Factor5	Factor1	Factor2	Factor3	Factor4	Factor5
EDUUBN	-0.138	-0.277	-0.549	0.884	-0.193	-0.916	-0.174	-0.397	0.395	0.637
ECDUBN	0.199	-0.215	-0.777	0.753	-0.291	-0.683	-0.278	-0.468	0.649	0.560
ANALF	0.471	-0.342	-0.573	0.929	-0.488	-0.596	-0.435	-0.474	0.816	0.901
ATTAIN	0.021	0.804	0.766	-0.729	0.423	0.668	0.349	0.914	-0.445	-0.477
TEACH	-0.098	0.441	0.584	-0.423	0.969	0.269	0.963	0.404	-0.280	-0.254
SCHOOLS	-0.149	0.027	0.189	-0.216	0.917	0.002	0.907	-0.091	-0.119	-0.222
REGPRI	-0.106	0.323	0.436	-0.344	0.990	0.152	0.996	0.239	-0.198	-0.245
REGSEC	-0.124	0.504	0.597	-0.456	0.960	0.270	0.948	0.464	-0.302	-0.296
E711	0.275	0.251	0.562	-0.698	0.065	0.880	0.055	0.340	-0.275	-0.358
E1217	0.430	0.853	0.163	-0.109	0.010	0.187	-0.019	0.715	0.237	0.067
E1825	0.114	0.863	0.532	-0.202	0.374	0.196	0.301	0.773	-0.024	0.015
EDUHDI	-0.389	0.572	0.648	-0.844	0.524	0.548	0.462	0.658	-0.703	-0.744
LIEXHDI	0.874	0.411	0.219	-0.097	0.067	0.462	0.055	0.380	0.480	0.176
GDPHDI	-0.292	0.502	0.436	-0.780	0.458	0.487	0.381	0.483	-0.559	-0.720
ACCUBN	0.178	-0.172	-0.429	0.706	-0.169	-0.526	-0.165	-0.272	0.443	0.602
PUBUBN	0.127	-0.128	-0.255	0.788	-0.274	-0.583	-0.204	-0.257	0.402	0.782
HOUUBN	0.830	0.071	-0.414	0.556	-0.172	-0.228	-0.156	-0.093	0.968	0.600
EFFPRI	0.365	-0.272	-0.456	0.880	-0.314	-0.573	-0.268	-0.338	0.658	0.789
nICFES	-0.024	0.432	0.863	-0.394	0.402	0.457	0.359	0.524	-0.304	-0.030

**Table 4b. Variables and Factor loadings from Principal Component and Maximum Likelihood Factor Analyses for 1999 and 2000**

1999	PC				ML					
	Factor1	Factor2	Factor3	Factor4	Factor1	Factor2	Factor3	Factor4		
ANALF	0.946	-0.587	0.097	-0.091	-0.028	0.004	-0.377	0.976		
ATTAIN	-0.705	0.635	0.302	0.672	0.245	0.667	0.466	-0.612		
TEACH	-0.471	0.964	0.353	0.253	0.346	0.287	0.939	-0.336		
SCHOOLS	-0.309	0.836	0.224	-0.179	0.211	-0.179	0.847	-0.208		
REGPRI	-0.383	0.948	0.326	0.113	0.312	0.137	0.971	-0.243		
REGSEC	-0.494	0.958	0.343	0.278	0.334	0.305	0.944	-0.347		
E56	0.088	0.508	0.783	0.229	0.662	0.347	0.328	0.128		
E711	-0.065	0.553	0.838	-0.149	0.917	-0.034	0.345	0.016		
E1217	0.011	0.018	0.316	0.836	0.132	0.794	0.001	0.143		
E1825	-0.024	0.063	-0.123	0.906	-0.233	0.846	0.115	0.017		
EDUHDI	-0.823	0.680	-0.023	0.434	0.042	0.325	0.462	-0.841		
LIEXHDI	-0.012	0.134	0.892	0.223	0.697	0.360	0.040	0.157		
GDPHDI	-0.787	0.489	-0.008	0.335	0.041	0.224	0.329	-0.691		
EDUUBN	0.336	-0.581	-0.799	0.194	-0.940	0.097	-0.331	0.231		
ACCUBN	0.725	-0.216	0.122	-0.158	0.072	-0.112	-0.178	0.618		
PUBUBN	0.777	-0.223	-0.118	0.233	-0.134	0.209	-0.099	0.701		
HOUUBN	0.662	-0.326	0.511	0.007	0.262	0.152	-0.196	0.752		
ECDUBN	0.810	-0.638	-0.204	-0.198	-0.357	-0.136	-0.370	0.774		
EFFPRI	0.813	-0.172	0.078	-0.067	0.009	0.000	-0.135	0.673		
UNE1224	-0.616	0.680	0.263	0.040	0.335	0.047	0.455	-0.583		
2000	Factor1	Factor2	Factor3	Factor4	Factor5	Factor1	Factor2	Factor3	Factor4	Factor5
EDUUBN	-0.316	-0.875	-0.398	0.186	-0.464	-0.336	0.216	-0.169	0.082	-0.684
ECDUBN	0.097	-0.310	-0.658	0.769	-0.524	-0.072	0.572	-0.398	0.644	-0.082
ANALF	0.047	-0.126	-0.572	0.877	-0.688	-0.174	0.863	-0.311	0.637	0.041
ATTAIN	0.524	0.259	0.705	-0.426	0.832	0.764	-0.443	0.451	-0.469	-0.041
TEACH	0.066	0.335	0.955	-0.314	0.457	0.230	-0.096	0.897	-0.354	0.048
SCHOOLS	0.050	0.467	0.846	-0.378	0.253	-0.019	-0.292	0.856	0.099	0.212
REGPRI	0.151	0.363	0.968	-0.448	0.444	0.191	-0.328	0.952	-0.101	0.063
REGSEC	0.211	0.374	0.981	-0.478	0.582	0.330	-0.348	0.895	-0.264	0.062
E56	0.693	0.604	0.433	-0.107	0.406	0.610	-0.090	0.176	-0.187	0.457
E711	0.192	0.949	0.369	-0.044	0.174	0.090	0.033	0.196	-0.018	0.953
E1217	0.775	0.176	0.169	0.346	0.517	0.896	0.153	0.076	0.082	0.030
E1825	0.593	0.324	0.269	0.215	0.723	0.838	0.039	0.119	-0.096	0.110
EDUHDI	0.176	0.327	0.618	-0.554	0.910	0.503	-0.637	0.325	-0.580	0.139
LIEXHDI	0.863	0.227	0.160	-0.159	0.286	0.613	-0.213	0.044	0.141	0.098
GDPHDI	0.110	0.207	0.598	-0.567	0.813	0.393	-0.650	0.370	-0.372	-0.034
ACCUBN	0.133	-0.078	-0.045	0.149	-0.645	-0.231	0.325	0.030	0.246	-0.076
PUBUBN	-0.024	-0.062	-0.212	0.861	-0.211	0.106	0.832	-0.079	0.158	-0.028
HOUUBN	0.630	-0.029	-0.294	0.522	-0.364	0.240	0.342	-0.113	0.752	0.078
EFFPRI	0.176	-0.114	-0.411	0.874	-0.278	0.166	0.671	-0.287	0.329	-0.017
UNE1224	0.198	-0.087	0.493	-0.746	0.376	0.158	-0.635	0.376	-0.265	-0.205
nICFES	0.207	0.500	0.587	-0.200	0.408	0.331	-0.025	0.415	-0.256	0.268

**Table 5. Variables and factor loadings from Principal Component and Maximum Likelihood factor analyses for Sub-groupings in 1997, 1998, 1999 and 2000**

	PC			ML		
<b>1997</b>	<b>Factor1</b>	<b>Factor2</b>	<b>Factor3</b>	<b>Factor1</b>	<b>Factor2</b>	<b>Factor3</b>
ECDUBN	0.638	0.435	0.946	-0.616	0.857	-0.484
ANALF	0.743	0.658	0.953	-0.697	0.989	-0.518
EDUHDI	-0.621	-0.644	-0.904	0.713	-0.865	0.825
GNPHDI	-0.870	-0.547	-0.692	0.974	-0.662	0.388
ACCUBN	0.477	0.982	0.578	-0.494	0.618	-0.358
PUBUBN	0.888	0.315	0.650	-0.713	0.680	-0.102
HOUUBN	0.575	0.555	0.793	-0.506	0.729	-0.176
EFFPRI	0.919	0.480	0.591	-0.765	0.679	0.013
<b>1998</b>	<b>Factor1</b>	<b>Factor2</b>	<b>Factor3</b>	<b>Factor1</b>	<b>Factor2</b>	<b>Factor3</b>
ECDUBN	0.779	0.731	0.620	0.429	0.530	0.739
ANALF	0.860	0.699	0.938	0.667	0.680	0.971
EDUHDI	-0.790	-0.587	-0.881	-0.571	-0.552	-0.905
GNPHDI	-0.610	-0.478	-0.856	-0.640	-0.426	-0.752
ACCUBN	0.478	0.961	0.584	0.646	0.313	0.538
PUBUBN	0.372	0.504	0.845	0.661	0.236	0.667
HOUUBN	0.925	0.411	0.540	0.378	0.997	0.655
EFFPRI	0.679	0.740	0.881	0.961	0.535	0.671
<b>1999</b>	<b>Factor1</b>	<b>Factor2</b>	<b>Factor3</b>	<b>Factor1</b>	<b>Factor2</b>	<b>Factor3</b>
ANALF	0.705	0.951	0.637	0.794	0.801	-0.940
EDUHDI	-0.527	-0.932	-0.426	-0.545	-0.662	0.984
GNPHDI	-0.513	-0.801	-0.572	-0.587	-0.510	0.745
ACCUBN	0.952	0.532	0.510	0.537	0.550	-0.524
PUBUBN	0.509	0.557	0.953	0.983	0.395	-0.575
HOUUBN	0.694	0.780	0.175	0.430	0.990	-0.641
ECDUBN	0.403	0.911	0.530	0.625	0.669	-0.828
EFFPRI	0.719	0.621	0.843	0.776	0.539	-0.602
<b>2000</b>	<b>Factor1</b>	<b>Factor2</b>	<b>Factor3</b>	<b>Factor1</b>	<b>Factor2</b>	<b>Factor3</b>
ECDUBN	0.468	0.657	0.927	-0.488	0.436	0.958
ANALF	0.743	0.823	0.827	-0.731	0.652	0.610
EDUHDI	-0.909	-0.541	-0.660	0.978	-0.259	-0.445
GNPHDI	-0.827	-0.568	-0.629	0.794	-0.349	-0.369
ACCUBN	0.790	0.154	0.190	-0.557	0.129	-0.071
PUBUBN	0.349	0.936	0.390	-0.302	0.869	0.261
HOUUBN	0.396	0.331	0.876	-0.289	0.331	0.640
EFFPRI	0.348	0.864	0.660	-0.202	0.809	0.586

## Work and Learning: The implications for Thai transnational distance learners

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*The paper describes a qualitative study concerning the experiences of nine Thai transnational distance learners enrolled in doctoral programs in Australian universities while working in higher educational contexts in their own country. Data were collected from participant journals, an open questionnaire and dialogic email communications. The study revealed that the workplace is an important influence upon the nature and quality of the learning experience largely through issues relating to finance, time management and technology or other resources. Learning, in turn, influences the workplace with individuals operating as educational change agents applying their learning about student centred methods to classroom practice. The findings are likely to be of interest to both Australian and Thai educators as postgraduate distance programs continue to be marketed in Thailand.*

Transnational education, distance education, Thai education, teacher education, online learning

### INTRODUCTION

The paper reports the findings of a qualitative study concerning the experiences of nine transnational distance learners employed as academic staff in Thai higher educational institutions. Each of these learners was enrolled in a doctoral program in one of three Australian universities. The analysis of data collected from journals, open questionnaires and dialogic communications through the Internet indicated that the workplace is an important influence upon the nature and quality of the distance learning experience and that, in turn, learning impacts on workplace practices.

There are a number of reasons why universities should explore the implications of transnational distance learning for Thai teachers. Despite a tradition of Australians and Thais learning from one another (Ma Rhea, 1996), very little literature has been generated on the subject. Also, international education has become Australia's third largest service export industry (Australian Embassy, Bangkok, 2004) with 50 programs being offered to Thai transnational distance learners (Australian Vice Chancellors' Committee, 2003). Given such expansion, universities need to become aware of issues that influence these learners in their own contexts and explore any implications for teaching, learning and quality assurance. Asking Thai educators about their distance learning experiences, empowers them as cultural experts in determining their own needs, interpreting what their learning means to them and how it can be usefully applied.

Local interest in the opportunities of transnational distance learning for Thai teachers has almost certainly originated in the Thai educational reform process (Coldevin and Naidu, 1989). There is also the perception that independent thinkers need to be developed through education in order to improve economic growth in an information based economy (Hallinger, Panomporn, Pornkasem and Umporn, 2000). Enrolments at Sukhothai Thammathirat Open University indicate a demand for flexible learning and this broad climate may have also contributed to a growing official

acceptance of foreign qualifications through distance programs (Gillotte, 2000; Thailand, National Identity Office of the Prime Minister, 1991). Distance education may also appear increasingly attractive to Thais following the Asian economic crisis of 1997 (Shive and Jegede, 2001) as a cheaper option than going overseas.

Technological developments are also obviously a crucial factor in the attractiveness of transnational distance learning for higher education teachers. Marginson's (2003, p.43) observation is that the expected bonanza of Asian enrolments into online distance learning programs offered by Western universities has not occurred because the internet has still not widely penetrated Asia-Pacific countries. It appears that although Evans' (1991) conception a decade ago that distance learning was a Western phenomenon is less true than it was, inequalities of access undoubtedly remain.

'Culture', as a concept encompassing the shared values of individuals that guide behaviour (Brislin, 1993, p.4) and affect language, politics, economics and society (Cryer and Okorochoa, 1999) was naturally a consideration in approaching a study involving transnational research. Given the connection between culture and education (Le and Grady, 1997; Thaman, 1997), researchers and universities need to be aware of what happens when professionals in one culture have designed distance programs in Education for teachers in another. However, despite these concerns, 'culture' did not become a central focus of the research study largely because the literature concerning cross-cultural research has given rise to some broad observations and concerns. Western academics have tended to develop their expertise in the culture of others by cataloguing cultural characteristics (DeBry, 2001; Irwin, 1996) that sometimes appear to support misleading, stereotyped, deterministic assumptions. Theories that Thailand, unlike Australia is reputedly a feminine (Hofstede, 1983) and collectivist society (Triandis, 1995) serve as an example. The implication for learning is that cultures will tend to encourage people, "to be unique and independent or conforming and dependent" (Irwin, 1996, p.34). Crude, stereotyped assertions appear to have been accepted without much questioning though it is possible that their underlying value lies in prompting discussions about what it means to be a 'Thai learner' and indeed if there is any such thing at all.

There are other reasons why cross-cultural judgements should be approached with caution. First, Thai and Australian universities share many curricula approaches and ways of knowing (Ma Rhea, 1996). Secondly, individuals do not always behave in culturally patterned ways (Montecinos, 1995, p.291) and finally, alternative conceptions can so easily be supported. For example, claims of student passivity in Thailand might be set against a Buddhist heritage of dialogic teaching and learning methods from 400AD (Keay, 1980 cited in Peters, 2001). For these reasons, the study adopted an intercultural rather than a cross-cultural approach because the former focuses less on differences and similarities (Irwin, 1996, p.22) in a globalising world and more on what happens when people of different cultures create their own meanings from within shared educational contexts.

Exploring the relationship between work and learning is particularly relevant given that working Asian transnational distance students tend to seek out programs that can be applied to their employment contexts (Tang, 1999, p.100). Historically, a range of traditions related to progressive education and situated learning theories have contributed to research connecting learning and the workplace (Cobb, 2001; Kolb, 1984; Mezirow, 1991; Smith, 2003). Nevertheless, the literature suggests (Argyris and Schon, 1974) that workplaces and universities have traditionally been somewhat estranged though the emergence of student centred learning and the development of transferable skills has clearly kindled initiatives to seek common ground (McGill and Beaty 2001, p.3). In this climate, Boud's (2001) work has attracted some interest, exploring as it does the similarities and contrasts between the contexts of workplaces and universities though some would

doubt that describing 'work' as delivering a service or good for profit adequately distinguishes it from the goals of educational providers.

## **RESEARCH METHODS AND ANALYSIS**

Grounded Theory was used as a methodological approach to the collection and analysis of data in the study (Glaser and Strauss, 1967) because it lends itself well to qualitative and phenomenological research concerned with the lives of individuals from their own point of view (Bogdan and Taylor, 1975). Since qualitative and phenomenological approaches are sensitive to cultural perspectives they were appropriate in a study concerning the experiences of transnational distance learners (Alasuutari, 1995). All data were analysed in the same way using the Constant Comparative Method (Strauss and Corbin, 1994). The nine participants were employed as teachers in disparate Thai higher educational institutions. The sample was fairly evenly gender balanced with five females and four males. Five participants were aged 48 years or older, one was aged between 27 and 41 and the remainder did not supply information about how old they were. Each participant was enrolled in a doctoral program in one of three Australian universities located across three states. Their distance learning programs all involved a study period from about one to three months in Australia and they also received periodic visits from Australian teaching staff.

The data were collected by email through journals, an open questionnaire and a dialogic communication. Email was a suitable means of responding to the pragmatic challenges of time, space, resources and political contingencies although as Firestone and Dawson (1988) pointed out, distance research limits a researcher's ability to get close to participants in their cultural contexts. Asynchronous rather than synchronised online communication was selected since it allowed non-native speakers of English more time for deeper reflection when composing messages. Journals were chosen as a useful way of investigating multiple perspectives through the Internet (Voithofer, Foley and Ross, 2002) although their time consuming nature probably made them less attractive to busy working participants. The open questionnaire was also relatively easy to send, complete and return by email and was more likely to reflect participant views than closed types (Foddy, 1999). The decision to use the reflective journal and questionnaire as a basis for subsequent asynchronous dialogue between the researcher and participant was inspired by Guy's work published in 1997. The dialogic communication activity was also consistent with the practice of grounded theorists who often return to the same participants to find further data to fill specific conceptual gaps, refine ideas and shed light on the emerging theory (Charmaz, 2000).

Data derived from journals, open questionnaires and email dialogic communications are all examples of documents containing narrative. Narrative, defined as almost any coherent discourse (Polkinghorne, 1995) has become recognised in social sciences, as an important way of conducting research in the field (Carter, 1993). Narrative data was appropriate as a way to uncover the issues and forces surrounding people that would otherwise be obscured (Church, 1995, p.35). This concealment takes place in a world where "truth is political and knowledge is an exercise in power" but narratives are able nevertheless to question the privileged view of Western ideas and enable diversity to be contemplated (Zepke and Leach, 2002, p.314).

Triangulation, referring to the use of multiple methods, and sources or data, was adopted in the study as a way of reducing the possibility of researcher bias and deepening an understanding of participants and their settings (Taylor and Bogdan, 1984). Investigator triangulation was implemented by using two consultant researchers who open coded data as part of an inter-reliability process revealing an 82 per cent agreement between the consultants and the main researcher. A Thai consultant was also involved in designing the questionnaire so that any potential problematic cultural issues could be avoided. By asking participants if their experiences had been accurately described as suggested by Maykut and Morehouse (1994) theory triangulation



was established and multiple perspectives were brought together in interpreting the data (Leininger, 1994).

Philosophically, the ethical process was loosely reminiscent of Kingsley's (1886) character 'Madam Doasyouwouldbedoneby' with the intention being to cause no harm. With this perspective in mind, the study incorporated a commitment to voluntary participation and informed consent (Corti, Day and Backhouse, 2000), the freedom of withdrawal and an assurance of participant confidentiality (Cohen, Manion and Morrison, 2000). The Flinders University Social Behaviour Ethics Committee provided useful guidelines for developing ethical practices in research and granted approval for the research to take place.

## DISCUSSION OF FINDINGS

The findings of the study suggested that first, the workplace environment was an important influence upon the nature of participant learning, largely through financial, technological and resource issues. Learning was also affected by the way time was managed around work. Secondly, the data indicated that participating Thai transnational distance learners were discriminating change agents, making meaningful connections between learning and their classrooms. The findings are therefore presented under the headings of 'Workplace Influences on Learning' and 'How Learning Influences the Workplace.' It should also be noted that since the original open categories generated from the journal, questionnaire and dialogic communication were largely consistent, they have not been differentiated in the discussion of findings but used as a single data source. Participant comments have been included in discussing the findings as illustrations contributing to the study's credibility.

### Workplace Influences On Learning

#### *The Influence of Workplace Financial Policy on the Learning Experience*

Participant accounts cast the employer as both benefactor and impediment to learning in describing workplace financial policies and practices. For example, while employers supported learning by approving absence from work to attend seminars, teachers maintained that they were required to make up the teaching time lost which clearly made study difficult. Also, although employers supported student learning by providing scholarships, some participants believed that workplace practices and policies could lead to burdensome financial obligations and cultivated feelings of anxiety, inequality and vulnerability. For instance, one participant pointed out that withdrawal from a program for whatever reason would require some students to repay, "...a very large sum of money back to their boss". Anxiety was further heightened when scholarships had to be renegotiated during the enrolment period so participants could not be sure if they would be able to continue in their programs from a financial point of view. Furthermore, some participants believed that teachers working in rajabahts (teacher training colleges) were less likely to receive a national scholarship than university teachers. This perception gave rise to feelings of inequality illustrated by Rung's metaphor of being treated "like the minor wife's children who have been treated unjustly by the government" as the ultimate, national employer.

At least half the participants commented on how poor salaries or inadequate scholarships had led them to undertake additional work during the weekends and evenings to cover the costs associated with study visits. These accounts seemed consistent with British based research indicating that although distance learning theoretically provided greater flexibility, the combination of working long hours and studying tended to contribute to marginalisation and unequal status (Tait, 2003). Although the study visits to Australia were described positively, it is clear that given faculty visits to Thailand and the technology for learning at a distance now available, discussion about their benefits may need to be revisited.

### ***Time Management and the Workplace***

Participant accounts suggested a preoccupation with time management practices that were influenced by the workplace and technology. Their concern was well founded given that managing work responsibilities while learning is crucial to continued enrolment (Tait, 2003). Although cultures manage and conceptualise time in different ways, Thai participants appeared to 'commoditise' time in the characteristic efficiency mode of Western industrial society (Gross, 1984). They prioritised much the same activities as Western students (Kidd, 1983) though in this study, work was clearly identified as the main challenge to accommodating learning quality. Globalisation has no doubt contributed to commonalities between East and West though these broad conceptions are questionable in themselves (Reagan, 2005).

Part of developing an efficient strategy for time management often included a multi-tasking approach to activities such as jotting down ideas or plans when driving to work in the mornings. Others accommodated learning by rising earlier and retiring later. Thus, time management involved learning **around** work rather than being embedded **within** it. Participants viewed time management as a personal responsibility rather than one that might be usefully shared among learner, employer and university as stakeholders in learning success. Given that workplace demands are often described as a barrier to managing time for learning there would appear to be benefits in learners, universities and employers discussing alternative conceptions.

Journal data suggested that the workplace predominantly determined how and when learning happened. It seemed participants needed to paint a picture of their lives to illustrate how the nature and extent of their working responsibilities presented a major challenge to their learning. It is the practicalities of making study possible that seemed to consume participants rather than say, intellectual aspects of the learning activity though these realities didn't necessarily diminish enthusiasm for learning itself. Although particular kinds of work activities were given priority, learning related activities did occur during the working day and were influenced by the technology used.

### ***Technology and Resources in Distance Learning***

Thai higher education institutions as participant employers played a crucial part in the learning by providing networked computers, especially for those who were not connected at home. This is particularly relevant when we consider that 2 per cent of Thais (Shive and Jegede, 2001) have a personal computer with Internet access compared with 89 per cent of United Kingdom students (Johnson and Barrett, 2003). Although geography is theoretically no longer a barrier to a university education (Oravec, 2003), the findings indicated that in fact, access problems may mean that some transnational distance learners are still lagging behind. In keeping with other research (Pennells, 2003) including studies of onshore Western distance learners (Cannon, Umble, Streckler and Shey, 2001), findings in the study identified how learning is hampered by technical problems relating to the number of people sharing computers, the speed of the internet connection, available software and technical support. Participant difficulties in accessing computers were made more problematic because alternative resources (such as books, journals and teaching staff) are not readily available. There is also evidence to suggest that universities may need to work harder to understand the technological context in which transnational students operate. For example, Rung's narrative had a 'welcome to our world' ring about it. During a study visit to Australia, library staff had shown him how to access many of their services but on his return to Thailand he discovered that his workplace did not have the necessary technology for him to take advantage of the services that were theoretically available.

All participants used work computers for learning whether or not they personally owned one. However, more complex activities such as concentrated reading were kept for home or after

working hours. However, although Boud (2001, p.35) distinguishes between work and learning by suggesting that learning takes place at home, this study clearly indicates that what is done where, is in fact more complex. During the day, participants tended to engage in learning activities that did not require intensive prolonged attention and allowed for distractions. Such activities could thus be snatched easily and discretely from working hours. These findings are reminiscent of Kozoll's (1982) research indicating that educators find it hard to sustain focus or become deeply involved in their work because they are constantly interrupted. Such learning activities are also consistent with a tendency to view the learning process, the role of the teacher and the technology as largely being concerned with information transfer. There appears to be an opportunity here for exploring the work of Hallinger, Panomporn, Umporn and Pornkasem (2000) who maintained that Thai students tend to regard educators as sources of information rather than facilitators of student centred learning and discovering whether there is any connection with the use of technology in transnational distance learning.

### **How Learning Influences The Workplace**

Like other Asian distance learners in particular (Tang, 1999), Thai participants sought out knowledge, learning and assessments that could be applied to their work as teachers. The speed of technology has also enabled a more timely, meaningful juxtaposition of theory and practice for these individuals that in the words of one participant, brought them closer, "to the problem and the solutions." This process is reflected extensively throughout participant accounts particularly in how they applied their learning about student centred and critical thinking methods to classroom practices. The participants acquired this learning primarily by observing Australian teaching faculty in action in a way that suggested a process of cognitive apprenticeship.

However, data suggesting that teacher practice was altered through learning should not be seen as evidence to support technicist perspectives, so roundly criticised by Carter (1994) for their naïve expectation that theoretical abstractions can be directly applied to practical situations. The data did not give the impression of educational recipes being followed in a somewhat reductive way. What occurred was a more complex process of reflection upon knowledge and understandings in a juxtapositioning of theory and practice. One participant, Pornkasem, recounted how applications from global to local, theory to practice and learning to workplace are undertaken with consciousness, discrimination and discernment,

*It makes me go to see the wide world of everything I wish to - both good and bad things! I myself have discovered a lot of wisdom from the other side of the globe.... It is beautiful time for me to mix my local knowledge and global one for our peaceful world confronting with globalisation.*

Comments like this help us to understand how these individuals interpreted their experiences of other cultures in relation to the familiarity of their own cultural understandings. Another participant, Pongsin, writing in the context of encouraging surface and deep learning, suggested that change agency presented a challenge within his classroom and the institution. His difficulty may of course be illustrative of the kind of general resistance to change observable in many organisations internationally (Marsick and Watkins, 1999, p.21). Indeed, as Dewey (1921, p.108) also observed, change tends to bring opposition. Pongsin has clearly reflected upon this possibility too since he comments, "*To make any changes even in a positive way, one has to face some degrees of resistance....I wonder whether the same is true elsewhere.*"

Kanya discussed issues such as critical thinking, using 'w or us' pronouns to reflect a Western or Eastern interface. Similarly, Pongsin's journal also revealed how he identified the East with traditional learning and the West with modern approaches and innovation,

*I enjoy learning new concepts and new ideas about education that are common in the western world ...What I mean is that the kind of knowledge in the western world is generally placed in the front line of modern education, but the old tradition in my workplace is predominant.*

It is as though participants subscribed to a state of affairs whereby the “globalisation of knowledge and western culture constantly reaffirms the West’s view of itself as the centre of legitimate knowledge, the arbiter of what counts...” (Tuhiwai-Smith, 1999, p.63). Is it possible, that Westerners have perfected and distributed this perception so effectively that those from other cultures educated by or in the West believe it too? Educational providers need to consider carefully how transnational distance programs may be aiding and abetting this process especially since cultivating a perceived difference between Asia and the West is, after all, big business for Western universities.

### CONCLUSION

Through qualitative data collected from nine Thai higher education teachers, the study draws attention to the ways that the workplace can both inhibit and support the quality of learning through policies and procedures that relate to salaries, scholarships, professional development, technology and other resources. Additionally, participant accounts offer some insights into how workplace resources and practices affect time management. How time is managed ultimately determines what kind of learning takes place, where it happens, and when. For example, analysis of the data suggests that using technology during working hours for transnational distance learning may encourage a kind of ‘snatch and grab’ learning without sustained attention being given to it. Finally, there is clear evidence of participants applying learning from observation, research and assignments to classroom practice particularly in terms of student-centred methods.

This study has adopted an emic research focus concentrating upon the “insider’s perspective” (Miles and Huberman, 1988) within a specific Thai context though there may be the potential for others working in similar areas to explore meaning, gain insights, or judge for themselves, how applicable the findings from this study are to their own research contexts (Greene, 1990).

Using email as a tool for distance research is still an innovative method with huge potential given the rapid growth of internet use in education. However, there is little guidance available in the literature at this time and therefore a greater likelihood of unanticipated issues influencing the methods and analysis of the data. Choosing to receive data through the email involves much more than simply opting for a faster postal system. Electronic mail alters the genre and discourse of text and communication conventions that affect the relationship between researcher and participants and how the researcher responds to the data. Although this paper has focused on the findings of the research study *per se* there is much to be shared and explored in the collection of data by electronic means.

We need to explore the larger supporting structures that make access to technology, and therefore learning, possible (Kreuger and Stretch, 2000). These include an analysis of policies and practice that fund acquisition, affect access or determine appropriate software. Discussions might also take place concerning how libraries in Thai higher education institutions could become more appropriately resourced to meet the needs of postgraduate transnational distance learners and what part Australian educational providers might play in assisting the process. The technological difficulties experienced by Thai transnational distance learners suggests that issues of inequality need to be investigated through comparative studies with student groups based in Australia, on and indeed off campus.

Also, we need to understand more about Thai higher educational institutions as workplaces if we wish to develop our understandings of the experiences of those who work in them. All

workplaces, including educational ones, have their own distinctive organisational cultures that are known to have a powerful influence on employees. Organisational cultures influence human interaction by cultivating dominant values, acceptable behaviour, shared assumptions and beliefs. It is the culture of educational working environments that guide employee understandings about what it is to be a teacher and which methods and practices are likely to be acceptable. So powerful is it that personal and organisational values become one and the same (Owens, 1987). If we want to dig deeper into the challenges of Thai academics who are both learners and change agents we need to fill gaps in the literature about the culture of their workplace environments.

Findings of this study are consistent with those of Boud (2001, p.34) in as much as learning and work influence one another. However, whereas Boud's (2001, p.35) distinction between work and learning is based on the perception that learning takes place at home, the data in this research project clearly indicated that 'what is done where' is in fact more complex. When universities encourage the application of learning to work contexts, as is the experience of the participants in this study, the dividing lines between them are no longer so clear. Finally, to suggest that work based learning or any new hybrid of workplace learning, does not mean that barriers to learning at work have been removed, as Boud and Garrick (1999, p.1) suggest. While working learners find it difficult to devote themselves single-mindedly to either work or learning (Boud, 2001, p.35) it is possible to view the phenomenon as part of the solution rather than the problem; a solution that may bring workplaces, universities and learners together in a shared vision. Universities need to be aware of more than how students have to study **around** their working responsibilities. The influence of the working environment on learning is powerful and involved. It defines how learning happens. In other words, there is a need to consider not simply working **around** the workplace but rather from **within** it and at all levels.

Time management for participants is a concept based on the assumption that when one is engaged in one activity, involvement in another is unlikely. Time is presented in dichotomous and alternative ways. Perhaps learners, universities and employers would be better served by thinking about time spent on different activities from complementary rather than competitive perspectives. What is needed is a merging of the worlds of work and learning that explores what is valued and rewarded in each context (Kazmer and Haythomthwate, 2001).

Applications of learning from Western universities to the Thai workplace should not be taken as evidence of an invasion of local culture by the global phenomena or that a danger exists in learning being applied inappropriately to other cultures (Hallinger and Leithwood, 1996). Such an assumption undervalues the subtlety of the process and the critical discernment of those involved. The study revealed that Thai educators are discriminating transformers of cultural knowledge not naive victims of Western educational indoctrination.

The study appeared to confirm that participants tended to respond to local and global tensions (Evans and Rowan, 1997) by creating, a 'third place' between their own and the educational providers' culture that incorporated learners' new experiences with those that were more familiar (Kramasch, 1993 cited in Farquhar, 1999). The nature of this 'third place' evolved from critical reflection about what might be useful in Thai higher education classrooms at the local level. In addition, there is little evidence of any opposition as such, to educational globalisation or western approaches as Zepke and Leach (2002, p.314) suggest. Instead, narratives indicate a selection of educational concepts in a quiet and dignified way: the Thai way.

Learning for Thai transnational students is largely focused upon the process of making connections between theory and practice as well as the local and the global. For example, when we say 'work influences learning' and 'learning influences work' it becomes clear that the relationship between these two processes is a spiralling one. The study has separated out these two mechanisms though of course, when employee thinking and operating changes so too does an

organisation and vice versa because when learning leads to changed work practices the new environment generates new issues and new questions to be asked. How this interaction between the two occurs was not explored but could prove to be a useful and enlightening avenue for further research for all stakeholders in transnational distance education.

In conclusion, the findings indicate that in order to support transnational distance learners, a balanced approach to both institutional and individual issues surrounding learning is needed and can be achieved through conversations between employers, learners and universities. Universities and employers will need to reconceptualise their roles. It would appear to be accepted that the future for universities lies beyond focusing on the campus (Walker, 1993). The potential of transnational distance learning is also now becoming a familiar concept. However, the contribution of this study lies in highlighting the importance of exploring the role of the workplace in the transnational distance learning experience; the main motivation being that where learning happens will change what it is and what it does.

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# A cross-age study on the understanding of chemical solutions and their components<sup>1</sup>

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*The aims of this study were considered under three headings. The first was to elicit misconceptions that students had about the terms 'solute', 'solvent' and 'solution.' The second was to understand how students' prior learning affected their misconceptions. The third was to determine if students were able to make a connection between their own knowledge and chemistry in everyday life. To achieve these aims, a paper and-pencil test composed of 18 open-ended questions was designed, but only four questions related to chemical solutions and their components. The test was administered to 441 students from different grades that ranged from Grade 7 with students aged 13-14 years to Grade 10 with students aged 16-17 years. As a result of the analyses undertaken, it was found that students' misunderstanding about the concepts of dissolution and conservation of mass influenced their knowledge about the these terms. Moreover, it was found that students had difficulties making connections between their knowledge and life experiences. Furthermore, it was elicited that the examples given by most of students under investigation were limited to particular solid-liquid and liquid-liquid solutions; however, some students in the upper grades referred to solid-solid and gas-gas solutions such as air, nitrogen and oxygen (N<sub>2</sub>-O<sub>2</sub>), and alloy composition. Therefore, it was concluded that although students' conceptions and misconceptions were acquired and stored, they occurred without ostensible links between everyday life and school experiences. Furthermore, depending on the instruction students received and over time, it was deduced that their conceptual understanding showed a steady increase from Grade 7 to Grade 10, except in the case of Item 1. In light of results of this study, some suggestions for future instruction were made.*

Chemistry education, solute, solvent, solution, misconceptions

## INTRODUCTION

Solution chemistry, because of its importance, has attracted attention of many researchers who have focused on different perspectives in solution chemistry and attempted to elicit students' understanding of the concepts involved. These perspectives are presented as follows: (a) the dissolution concept (Abraham, Gryzybowski, Renner, and Marek, 1992; Abraham, Williamson and Westbrook, 1994; Cosgrove and Osborne, 1981; Çalık and Ayas, 2005a; Ebenezer and

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<sup>1</sup> This article was extensively edited by Dr B. Matthews, Research Associate, Flinders University Institute of International Education.

Erickson, 1996; Longden, Black and Solomon, 1991; Smith and Metz, 1996) (b) the nature of solutions (Fensham and Fensham, 1987; Prieto, Blanco and Rodriguez, 1989); (c) solubility (Ebenezer and Erickson, 1996; Gennaro, 1981); (d), the role of energy in the solution process (Ebenezer and Fraser, 2001; Liu, Ebenezer and Fraser, 2002); (e) the effects of temperature and stirring on the dissolution of solids; (Blanco and Prieto, 1997); (f) the conservation of mass during the dissolution process (Driver and Russell, 1982; Holding, 1987; Piaget and Inhelder, 1974); (g) structural characteristics (Liu and Ebenezer, 2002); (h) types of solutions (Çalık and Ayas, 2005b; Pınarbaşı and Canpolat, 2003), (i) the concept of vapour pressure lowering, and the relationship between vapour pressure and boiling point (Çalık and Ayas, 2005b; Pınarbaşı and Canpolat, 2003), (j) electrolytes and electrical conductivity (Çalık and Ayas, 2005b), (k) relationship between surface area and rate of solution (Çalık and Ayas, 2005b) and (l) strategies to overcome misconceptions (Ebenezer, 2001; Ebenezer and Gaskell, 1995; Griffiths, 1994; Johnson and Scott, 1991; Kaartinen and Kumpulainen, 2002; Kabapınar, Leach, and Scott, 2004; Taylor and Coll, 1997). The cited studies have tried to answer several questions: (a) what kinds of misconceptions do students have; (b) how common are the misconceptions; (c) how these misconceptions may be replaced with correct ideas; and (d) suggestions as to what teachers can do to improve teaching-learning environment that would reduce students' misconceptions. These studies have used a number of terms such as preconceptions, misconceptions, and alternative conceptions that students have and these terms also reflect some researchers' view of knowledge. That is, alternative conceptions fit ideas associated with constructivism, and misconceptions that are associated with a positivist tendency (Taber, 2000). However, when these terms are used, they often convey a similar meaning (Coştu and Ayas, 2005; Taber, 2000), but the use of the various terms helps to describe students' confusion with the language and ideas of chemistry (Nicoll, 2001). In this article, the term 'misconception' is used to describe any conceptual difficulties, which are different from or inconsistent with those accepted by the scientific community.

In studies on solution chemistry, only Prieto et al. (1989) reported that the examples given by some students were limited to particular solids that dissolved in liquids. They emphasised that students claimed that the solute was the most important component in the dissolution process and they described the solute as a passive component. Also, they pointed out that only Grade 8 students mentioned the interaction between a solute and a solvent, however, here the meaning seemed to imply a chemical transformation.

As can be seen from the related literature, even though the cited studies on solution chemistry have concentrated on different perspectives, there appears to be an absence of what students understand about the terms 'solution', 'solute' and 'solvent', whether they are able to apply theoretical knowledge to novel situations, whether the students are able to make connections between school and life experiences, and how the instruction that students receive influences their ideas. Thus, the current study has tried to fill this gap. Therefore, the aims of the study are considered under three headings. The first is to list misconceptions that students retain. The second is to elicit how the instruction that students have received affects their misconceptions. The third is to examine whether students are able to correlate their knowledge with everyday life situations.

## METHODS OF ANALYSIS

### The study context

In the Turkish educational system, the first chemistry teaching begins with a brief introduction to physical and chemical changes, as a part of the science curriculum at the age of 10-11 years in Grade 4. Then the introductory material on concepts such as atomic structure and chemical reactions is taught to students aged between 13-14 years (Grade 7) (Tebliğler Dergisi, 2000). The

formal chemistry lessons begin with secondary education at 14-15 years (Grade 9) (Ayas, Özmen and Genç, 2001).

### **Instruments and data collection procedure**

In order to examine students' level of understanding, taking into account their grade levels and comprehension, cross-age and longitudinal studies are often used (Abraham et al, 1994). However, Abraham et al. (1994) have implied that a cross-age study is more applicable than a longitudinal study if there is limited time, and several researchers have carried out cross-age studies with satisfactory results (Blanco and Prieto, 1997; Krnel, Glažar and Watson, 2003; Westbrook and Marek, 1991). Therefore, in this study, a cross-age study has been undertaken.

In this article, a case study research design was used (Yin, 1994). To use this method, a paper and pencil test composed of 18 open-ended questions was developed but only four questions related to solutions and their components directly. Three of the questions were open-ended, but the other one was a two-tier question that consisted of a multiple-choice portion and an open-ended response. Furthermore, a group of chemistry educators and chemists checked the test for validity and reliability and then confirmed the content validity of the instrument. The test items considered in this study are shown in Table 1.

**Table 1. Four test items used in the study**

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**Item 1:** Sugar in water

- sugar is solvent and water is solute
- sugar is solute and water is a solvent
- both sugar and water are solutes
- both sugar and water are solvents

Because.....

---

**Item 2:** What do understand by the terms solution, solvent, and solute? Please explain by filling in the blanks.

Solution.....

Solvent.....

Solute.....

---

**Item 3:** Can you give at least two examples of solutions?  
These examples should be different from the examples given in test.

---

**Item 4:** Some examples of solutions selected from daily life are presented below. Can you fill in the blanks and write their components (solute and solvent)?

<u>Solution</u>	<u>Solvent</u>	<u>Solute</u>
Lime tea	.....	.....
Pickled water	.....	.....
Coca Cola	.....	.....
Cologne	.....	.....

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### **Pilot study**

Forty students from different grades, who were not included in the study, participated in a pilot study. The administration of the pilot study took about 30 minutes. The pilot study revealed that questions on chemical solutions and their components were quite understandable and clear for all grade levels.

### **The Sample**

The sample under investigation comprised 441 students in different grades that ranged from Grade 7 (age 13-14 years) to Grade 10 (16-17 years). There were 105 students from Grade 7, 102 students from Grade 8, 103 students from Grade 9 and 131 students from Grade 10. The sample was selected at random from two elementary schools and two secondary schools in the city of Trabzon in Turkey. The students in the sample had studied the topics under investigation at a fundamental level in Grade 7. The topics were then taught at a more advanced level in Grades 9

and 10. Moreover, all the topics under investigation were taught in first semester and all of the students in the sample passed the courses at a satisfactory level and had begun the second semester. This study was also undertaken during the second semester. The students were given 30 minutes to answer the test and were encouraged to answer all the questions.

### Data Analysis

The open-ended questions listed in Table 1 were analysed under the following categories and headings, which were suggested by Abraham et al. (1994).

- **Sound Understanding:** Responses that included all components of the validated response.
- **Partial Understanding:** Responses that included at least one of the components of validated response, but not all the components.
- **Partial Understanding with Specific Misconception:** Responses that showed understanding of the concept, but also made a statement, which demonstrated a misunderstanding.
- **Specific Misconceptions:** Responses that included illogical or incorrect information.
- **No Understanding:** Repeated the question; contained irrelevant information or an unclear response; left the response blank.

These criteria provided an opportunity to classify students' responses and make comparisons about their level of understanding.

### RESULTS

The results obtained from the test are presented below by taking each item into consideration. Percentages of the obtained responses for each Item are shown in Table 2.

**Table 2. Percentages of responses given to questions**

Items	1				2				3				4			
	7	8	9	10	7	8	9	10	7	8	9	10	7	8	9	10
SU	4	4	4	4	2	2	4	4	2	9	13	13	0	4	10	7
PU	51	40	70	72	18	20	42	45	19	15	32	23	10	8	12	10
PUMS	24	24	19	17	24	24	42	31	11	11	17	14	53	37	57	63
SM	15	19	4	5	5	0	3	5	0	2	9	7	0	4	3	4
NU	6	13	3	2	51	54	9	15	68	63	29	43	37	47	18	16

SU= Sound Understanding      PU= Partial Understanding      SM= Specific Misconceptions  
PUSM= Partial Understanding with Specific Misconception      NU=No Understanding

For Item 1, sound understanding included knowledge that sugar is the solute and water is the solvent because amount of solvent is more than that of solute and the solution phase depends on the presence of a solvent. As can be seen from Table 2, four per cent of Grade 7, 8, 9 and 10 showed sound understanding, the proportion of students' responses categorised under the partial understanding category was 51, 40, 70 and 72 per cent respectively. Moreover, while 24 per cent of Grade 7, 24 per cent of Grade 8, 19 per cent of Grade 9 and 17 per cent of Grade 10 had partial understanding with specific misconceptions, and the proportion of students' responses classified under specific misconception category was 15, 19, four and five per cent respectively. Furthermore, six per cent of Grade 7, 13 per cent of Grade 8, three per cent of Grade 9 and two per cent of Grade 10 students did not respond to the question. Some examples from the given responses for Item 1 are presented in Table 3.

In Item 2, sound understanding is as follows: a solution is a homogenous mixture of two or more substances in a single state, and the solvent is described as the dissolving medium in a solution, amount of which is more than that of solute, finally, the solute is named as the substance

dissolved in a solution and occurs as an amount that is less than that of solvent. As can be seen from Table 2, while two per cent of Grades 7 and 8, and four per cent of Grades 9 and 10 show sound understanding, the percentages of students' responses categorised under partial understanding are 18, 20, 42 and 45 per cent respectively. Moreover, the percentages of partial understanding with specific misconception category are 24, 24, 42 and 31 per cent respectively, whereas those in the specific misconception category are five, zero, three and five per cent respectively. Furthermore, 51 per cent of Grade 7, 54 per cent of Grade 8, nine per cent of Grade 9 and 15 per cent of Grade 10 have not provided answers to this item. Some examples of the responses given for Item 2 have been shown in Table 4.

**Table 3. Some examples from the responses given for Item 1 (X shows the kinds of responses are identified at each grade)**

UL	Examples	Grade			
		7	8	9	10
SU	• Sugar is a solute and water is a solvent because amount of solvent is more than that of solute and the state of the solution depends on that of the solvent.	X	X	X	X
	• Sugar is the solute and water is the solvent because amount of liquid is more and that of solute is less. As a matter of fact, sugar dissolves into water. That is, the formed solution depends on a large amount of solvent. Furthermore, the amount of solute is less than that of the solvent.		X	X	
	• Sugar is the solute and water is the solvent because the formed solution phase depends on the solvent that is larger in a solution and that is why it is called a solvent. The other substance occurs as a small amount, thus it is named the solute.				X
PU	• Sugar is the solute and water is the solvent because sugar dissolves into water.	X	X	X	X
	• Sugar is the solute and water is the solvent because water is one of the best solvents.	X	X	X	X
	• Sugar is the solute and water is the solvent. Because the amount of water is large, it is named the solvent. Hence, water dissolves the sugar.	X	X	X	X
	• Sugar is the solute and water is the solvent. Because the water dissolves the sugar, water is the solvent. Nevertheless, the fact that the sugar dissolves in water, it is named the solute.			X	X
PUSM	• Sugar is the solute and water is the solvent because the liquid matter dissolves the solid.	X	X	X	X
	• Sugar is the solute and water is the solvent because sugar becomes solute by dissolving in water.	X	X	X	X
	• Sugar is the solute and water is the solvent because solid matter is always the solute and the liquid is a solvent that has a property that dissolves a solid.	X	X		
	• Sugar is the solute and water is the solvent because when a sugar cube is put into a beaker which contains water, a chemical reaction takes place.			X	X
	• Sugar is the solute and water is the solvent because sugar dissolves in water. Nevertheless, water is a solvent.	X	X		
SM	• Water is the solute and sugar is the solvent because water ruins the structure of sugar, therefore, sugar decomposes into its own ions.	X	X	X	X
	• Water is the solute because sugar disappears into the water.	X	X	X	X
	• Sugar and water are both solute and solvent. Nevertheless, at the beginning of this process, both of them are solvents and then become solutes.	X	X		
UL=Understanding Level		SU= Sound Understanding		PU= Partial Understanding	
PUSM= Partial Understanding with Specific Misconception				SM= Specific Misconceptions	

Sound understanding in Item 3 incorporates in some examples such as acids, bases, alloys and mixtures. As can be seen from Table 2, while percentages of students' responses classified under sound understanding are two, nine, 13 and 13 per cent respectively, 19 per cent of Grade 7, 15 per cent of Grade 8, 32 per cent of Grade 9 and 23 per cent of Grade 10 students indicated partial understanding in accordance with the same sequence. Moreover, the percentages of students' responses categorised under partial understanding with specific misconception are 11, 11, 17 and 14 per cent, those in the specific misconception category are zero, two, nine and seven per cent

respectively. Furthermore, 68 per cent of Grade 7, 63 per cent of Grade 8, 29 per cent of Grade 9 and 43 per cent of Grade 10 students did not provide examples in the test or left the questions unanswered. Meanwhile, examples from the responses given for Item 3 are shown in Table 5.

**Table 4. Some examples from the given responses for Item 2 (X shows that these kinds of responses are identified at this grade)**

UL	Examples	Grade			
		7	8	9	10
SU	• Solution is a homogenous mixture of two or more substances in a single phase. Solvent is called the dissolving medium in a solution, the amount of which is more than that of solute. Solute is named as the substance dissolved in a solution, as the amount of it is less than that of solvent.	X	X	X	X
	• Solution is a homogenous mixture, which consists of a solute and a solvent. Solvent is a component phase of the solution that depends on its state and occurs in a large amount in a solution. The amount of solute is less than that of solvent., As well, the substance dissolved in a solution is called the solute.			X	X
PU	• Solution is a mixture of two different substances. Solvent has the property that can dissolve a substance in its medium. Solute disperses within another substance.	X	X	X	X
	• Solution is a homogenous mixture composed of a solute and a solvent. Solvent occurs as a large amount in solution and dissolves substances, which have similar properties. Solute is a substance that the solvent dissolves.	X	X	X	X
	• Solution is a homogenous mixture composed of a solute and a solvent. Solvent: The best well-known solvent is water and dissolves a substance by decomposing its own ions or molecules.	X	X		
	• Solution is a homogenous mixture composed of a solute and a solvent. Solvent is the largest amount in a solution. Solute has a small amount in a solution.	X	X	X	X
PUSM	• Solution is a compound composed of a solute and a solvent. Solvent dissolves the substance which is added. When a solute is put into solvent, it decomposes.	X	X	X	X
	• Solution is a compound composed of a solute and a solvent. Solvents are liquids, which decompose to their own ions. Solute is a substance whose ions or molecules separate from each other.	X	X		
	• Solution is a mixture composed of a solute and a solvent. Solvent is a substance that is used to disperse a solute in 100 ml water. Solute is a substance that dissolves in 100 ml water.			X	X
	• Solution is a homogenous mixture composed of a solute and a solvent. Solvent is a substance that melts the solid one and decreases the mass of a solid. Solute is a substance whose mass decreases.	X	X	X	X
	• Reaction between solute and solvent yields a solution. Solvent is a substance that dissolves the other one. Solute is a substance dispersed by solvent.	X	X	X	X
SM	• Solution is a term used for homogenous and heterogeneous mixtures. Solvent is a substance that enables a solute to decompose its own ions. Solute is a substance which the solvent decomposes into its own elements.	X			X
	• Solution: Combining of two substances constitutes a new one. Solvent helps the substances decompose into their own molecules, thus, a new one emerges. Solute is decomposed to its own molecules and then melts.	X		X	X
	• Solution: After combining of two the substances, a new different substance forms. Solvent is a substance that enables a solute to lose its own properties. Solute disappears and loses its own properties into the solvent.	X		X	X
UL=Understanding Level		SU= Sound Understanding		PU= Partial Understanding	
PUSM= Partial Understanding with Specific Misconception				SM= Specific Misconceptions	

Sound understanding in Item 4 is as follows: (for each of the examples, the first named substance is the solvent and the second is the solute) Lime Tea: Water, and Lime and/or essence of lime, Pickled water: Water, and Salt and/or Vinegar, Coca Cola: Water, and CO<sub>2</sub> or gas, Cologne: water and alcohol or ethanol. As can be seen in Table 2, the percentages in the sound understanding category are zero, four, 10 and seven per cent, those in the partial understanding category are 10, eight, 12 and 10 per cent respectively. Moreover, the percentages of students' responses categorised under the heading partial understanding with specific misconception are 53, 37, 57

and 63 per cent respectively, zero per cent of Grade 7, four per cent of Grade 8, three per cent of Grade 9 and four per cent of Grade 10 have demonstrated specific misconceptions. Furthermore, 37 per cent of Grade 7, 47 per cent of Grade 8, 18 per cent of Grade 9 and 16 per cent of Grade 10 did not answer the question. Some examples from the responses given for Item 4 are shown in Table 6.

**Table 5. Some examples from the given responses for Item 3 (X shows that these kinds of responses are identified at this grade)**

UL	Examples	Grade			
		7	8	9	10
SU	Sugar in tea, and ammonia in water	X	X	X	X
	Soda (drink that includes both water and several mineral salts), and sugar in lemonade	X	X	X	X
	An alloy of Zn and Cu, and solder			X	X
	An alloy of Zn and Cu, and steel			X	X
	Vinegar, and a mixture of $N_{2(g)}$ - $O_{2(g)}$			X	X
PU	Tea	X	X	X	X
	Lemonade	X	X	X	X
	Soda (a kind of drink that includes both water and several mineral salts)	X	X	X	X
	Air			X	X
	Ammonia in water	X	X	X	X
	Alloy			X	X
	A mixture of acetone and nail polish	X			
A solution of $H_2SO_4$			X	X	
PUSM	Drink made of water and yoghurt, and sugar in tea	X	X	X	X
	Drink made of water and yoghurt, and soda	X	X	X	X
	Mud, and lemonade	X	X		X
	Piece of chalk in water, and lemonade	X	X		
	Olive oil in water, and tea	X	X	X	X
SM	Drink made of water and yoghurt		X	X	X
	Mud, and olive oil in water		X	X	X
	Piece of chalk in water		X		
UL=Understanding Level		SU= Sound Understanding		PU= Partial Understanding	
PUSM= Partial Understanding with Specific Misconception				SM= Specific Misconceptions	

## DISCUSSION

The findings show that students have difficulties describing and using the terms solution, solvent and solute. Stavy (1990) maintains that the various types of knowledge exist in the cognitive system of the children and compete with acquired knowledge, which may be available in the cognitive system. Therefore, this process is a struggle in which the strongest knowledge dominates. Thus, this study's findings indicate that even though some students in the sample have an accurate understanding of chemical processes, their knowledge of solubility concepts should be greater. As a matter of fact, the present study reveals that students' misconceptions about solubility concepts may even outweigh their knowledge about the information under investigation. Therefore, this study is in agreement with Stavy's (1990) result. Moreover, some of the students in the lower grades tend to confuse both solute and solvent concepts with information concerning liquids and solids. This may stem from the knowledge their teachers impart because teachers are the prime source of instruction in the educational context.

An interesting finding that has been identified in the responses of students in the lower grades implies that sugar and water are both solute and solvent. Nevertheless, at the beginning of this process, both of them are solvents and then both of them become solutes. This reveals that students in the lower grades are not able to distinguish solutes from solvents. Moreover, as can be seen from Table 2, some of students in the upper grades claim that when a cube sugar is put into the beaker, which contains water, a chemical reaction takes places. This may also be the source of confusion between hydration and hydrolysis. That is, students may try to explain the interaction



between a solute and a solvent by means of the hydration process; however, they seem to be confusing hydration with hydrolysis. Prieto et al. (1989) stated that only Grade 8 students refer to interaction between solute and solvent, however, their meanings were similar to a chemical change. Thereby, present study's findings are consistent with Prieto et al.'s (1989) research findings.

**Table 6. Some examples from the given responses for Item 4 (X shows that these kinds of responses are identified at this grade; for each of the examples, the former is solvent and the latter is solute)**

UL	Examples	Grade			
		7	8	9	10
SU	• Lime Tea: Water, and Lime, Pickled water: Water, and Salt, Coca Cola: Water, and Gas, Cologne: Water, and Alcohol		X	X	X
	• Lime Tea: Water, and Essence of lime, Pickled water: Water, and Vinegar, Coca Cola: Water, and CO <sub>2</sub> , Cologne: Water, and Ethanol		X	X	X
PU	• Lime Tea: Water, and Lime, Pickled water: Water, and Salt	X	X	X	X
	• Lime Tea: Water, and Essence of lime, Pickled water: Water, and Vinegar, Cologne: Water, and Ethanol	X	X	X	X
	• Lime Tea: Water, and Lime, Coca Cola: Water, and Gas, Cologne: Water, and Alcohol	X	X	X	X
	• Pickled water: Water, and Salt, Coca Cola: Water, and CO <sub>2</sub> , Cologne: Water, and Alcohol	X	X	X	X
PUSM	• Lime Tea: Lime, and Water, Pickled water: Salt, and Water, Coca Cola: Water, and Gas, Cologne: Water, and Alcohol	X	X	X	X
	• Lime Tea: Water, and Lime, Pickled water: Pickled and Water, Coca Cola: Gas, and Water, Cologne: Water, and Alcohol	X	X	X	X
	• Lime Tea: Water, and Lime, Pickled water: Water, and Pickled, Cola: Water, and Gas, Cologne: Acid, and Lemon	X	X		
	• Lime Tea: Water, and Lime, Pickled water: Water, and Vinegar, Cola: Gas, and Lemon, Cologne: Nitrogen, and Sugar	X	X		
	• Lime Tea: Water, and Lime, Pickled water: Water, and Pickled, Cola: Water, and Gas, Cologne: Alcohol, and Gas	X	X	X	X
SM	• Lime Tea: Lime, and Water, Pickled water: Salt, and Water, Cola: CO <sub>2</sub> , and Water, Cologne: Alcohol, and Water		X	X	X
	• Pickled water: Pickled, and Water, Cola: CO <sub>2</sub> , and Water, Cologne: Alcohol, and Lemon in Water		X	X	X
	• Cola: CO <sub>2</sub> , and Water, Cologne: Alcohol, and Lemon		X	X	X

UL=Understanding Level

SU= Sound Understanding

PU= Partial Understanding

PUSM= Partial Understanding with Specific Misconception

SM= Specific Misconceptions

As noted in Table 4, some students attempted to use the '100 ml water' criterion to describe both solute and solvent, at upper grades. This showed that some students retained ideas about the solubility topic; hence, they tended to use their algorithmic abilities to explain what they had learned. Moreover, some of the sample referred to the increase or decrease in the mass of the solute. Haidar (1997), Holding (1987), and Stavy (1990), reported that students had difficulties understanding conservation of mass or matter. Thus, the present study demonstrated that the misconception about the conservation of mass constituted a barrier to further learning. This finding furthered Schmidt's (1997) hypothesis, that there was a logical connection between students' misconceptions and their current state of knowledge. Moreover, Prieto et al. (1989) reported that students saw the solute as the most crucial component of dissolution process, and even though some of them used the word solvent, they tended to regard it as a passive component. In this study, some of each sample, except for Grade 7, believed that the solvent had an active role and the solute has a passive role during dissolution process as noted in Table 4. On that point, the current study did not agree with Prieto et al.'s (1989) findings.

Students had difficulties making connections between their knowledge and everyday life experiences (see Tables 5 and 6). Moreover, the examples given by most of students in the investigation were limited to particular solid-liquid and liquid-liquid solutions. However, some of the students in the upper grades referred to solid-solid and gas-gas mixtures and solutions such as air,  $N_2-O_2$ , alloys and solder. This might have resulted from their chemistry experience or the instruction they received in which chemistry was taught at a more advanced level. Furthermore, some students, apart from Grade 7, had misunderstandings about heterogeneous mixtures and suspensions. These mistakes revealed that these students were not able to distinguish between homogenous and heterogeneous mixtures.

### CONCLUSIONS

One of the aims of the Turkish secondary science curriculum is to increase students' scientific literacy (Ayas, Çepni, Johnson and Turgut, 1997). Scientific literacy includes the following fundamental dimensions: (a) understanding key concepts and principles of science; (b) having the capacity for scientific ways of thinking; and (c) using scientific knowledge and ways of thinking for individual and social development. Therefore, assuming that scientific literacy shows that some of the sample under investigation appear to lack some of these ideas and are unable to apply their knowledge to novel situations; it may be concluded that although students' misconceptions affect one another directly, students' knowledge appears to be stored in a somewhat fragmented manner without relevant links between everyday life and knowledge acquired through school experiences.

When we look at students' level of understanding by considering the sum of the percentages in 'sound understanding' and those at 'partial understanding' categories, there are some discrepancies. From Grades 7 to 9, there are similarities between responses to Items 3 and 4 that increase with grades, but the level of understanding of Grade 10 students shows a decline in comprehension. In fact, Grade 10 students perform at a higher level than both Grades 7 and 8, but they score lower than Grade 9 on these items. On Item 2 there is steady improvement with grade, and on Item 1, the level of understanding of the sample shows a 'U shaped' developmental curve. Taking the scores into consideration, it is inferred that in spite of the fact that Grade 8 students have not attended chemistry courses, they perform at a higher level than Grade 7 students, except on Item 1. Therefore, it may be concluded that this variation results from students' everyday knowledge. For example, in the case of Item I, it is possible that in order to explain the terms under investigation, the Grade 7 teacher may use a sugar-water solution; thus, Grade 7 students may have memorised and be familiar with these statements, and therefore, they may score higher than Grade 8 students. However, depending on the instruction the students have received and natural improvement with age, it may be generalised that students' conceptual understanding reveals a steady increase when it is compared with that of Grade 7, except in the case of Item 1.

### IMPLICATIONS FOR PRACTICE

Posner, Strike, Hewson and Gertzog (1982) have stated that the use of four conditions of the conceptual change model might be able to replace conceptual misconceptions held by students with a scientific one. The first condition that involves dissatisfaction with existing knowledge is most important because the effectiveness of the others relies on its quality. Thus, if teachers wish to devise their own strategies by means of a conceptual change model, they need to understand their own students' conceptions and common misconceptions. Thus, they may use the present study's findings as the first step to design the other stages and guide learning.

Many researchers agree that learning is the interaction between pre-existing knowledge and new knowledge (Driver and Easley, 1978; Zietsman and Hewson, 1986). Since learning builds on the pre-existing knowledge, the learning and teaching environment should contain an advanced level

of organisation and thus, teachers should try to make connections between pre-existing and new knowledge. In this way, they may identify their own student' misconceptions and then organise their courses at a more effective level by taking into consideration of the idea that misconceptions are a barrier to further learning (Herron, Cantu, Ward and Srinivasan, 1977; Novak, 1988). Therefore, teachers should recognise this study's results and use them in their classes.

Curriculum developers, teachers and teacher educators should work together with researchers to design materials that help students to develop scientific ideas and enable them to make connections between life and school experiences. Also, after collaboration, the effectiveness of the improved materials should be investigated, tested, revised, and pursued. Thus, the materials should exist in the Turkish science curriculum that could be implemented at all schools throughout the country. Moreover, some students who do not plan to continue at school should become scientifically literate and conversant with some of the important ways in which science, mathematics and technology depend upon one another. In this way, teachers, curriculum developers and teacher educators are likely to pay more attention to this idea and seek to improve the educational environment.

Some of the phenomena that students encounter are significant in chemistry teaching; one is solutions that students come across in their everyday life. In addition, some students also have significant misunderstandings about chemical processes. This shows students' lack of understanding of their own experiences and observations. Therefore, in the teaching-learning environment, we need to provide students with skills to interpret and express their own knowledge. To do so, it is necessary to devise strategies that provide students with the means to express their views as analogies, laboratory activities, and arguments. Furthermore, some tasks could be designed to help students understand the nature of solutions., This may prevent the acquisition of the bias that solution chemistry is difficult to learn. Moreover, examples related to solution chemistry should not be restricted to solid-liquid and liquid-liquid solutions, as the more examples that are given, the greater the opportunity for students to make connections between everyday life and school experiences.

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# Women and education in Saudi Arabia: Challenges and achievements

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*The historical socio-economic and political conditions of Saudi Arabia are an essential aspect of understanding a woman's position in Saudi society. The persistence of women's exclusion from public life in contemporary Saudi Arabia is one of the most heated debates not only among Muslims but also worldwide, as Saudi society comes under more and more scrutiny internationally. In 1980, there were more female graduates in the humanities than male. University women could study most of the same subjects as their male counterparts except those, which might lead to their mixing with men. This paper explores some of the restraints and achievements of women in the field of education in Saudi Arabia today.*

Illiteracy, literacy rate, women's rights, education, Saudi Arabia, oil wealth

## INTRODUCTION

### Geographical and Cultural Context

Saudi Arabia is a country in Southeast Asia with a population of approximately 19 million people. The country was established in 1932 by King AbdulAziz Ibn AbdulRahman Al Saud. The country covers about 900,000 square miles. Arabic is the official language and Islam is the official religion. Saudi Arabia has a literacy rate of about 62 per cent, which is the lowest literacy rate in the Gulf nations. In Saudi Arabia, female literacy is estimated to be at 50 per cent, and male literacy at 72 per cent (UNDP, 2003). According to the 1992 census, 4.6 million of Saudi Arabian residents were foreign workers. This explains why in Saudi Arabia women constitute seven per cent of the work force in 1990 and four per cent in 2003. However, the Saudi literacy rate in 1970, in comparison to the literacy rates in the Middle East and North Africa, was 15 per cent for men and two per cent for women. This rate was the lowest in these regions, with only Yemen and Afghanistan ranking lower. Thus, the steep rise in literacy rate by the 1990s, as shown above, must be seen as a considerable accomplishment in the time period. Additionally, recent statistics by the UNESCO show an estimate and projection for adult illiteracy for population aged 15 to 24 years for 2015 is 2.9 per cent for women and 2.7 for men, and the illiteracy rates for those 15 years and older in 2005 are expected to be 26.7 per cent for women and 14.2 per cent for men, and in the year 2015 are expected to be 17 per cent for women and 9.5 per cent for men (UNESCO, 2002). Many scholarly sources portray women's education, since it started, as being highly valued in Saudi society (Zurbrigg, 1995, p.82).

### The Position of Women in Saudi Arabian Society

In recent years, no sector of Saudi society has been subject to more debates and discussions than the women's sector and their role in the development process. Moreover, issues regarding

women's rights and responsibilities in that development have been equally controversial among both conservatives and progressives in Saudi society. Before exploring women's education in Saudi Arabia, it is important to review some of the political and social events that have contributed to Saudi women's position in their society. In the past 50 years the Middle East region has endured some major challenges that have affected all Middle Eastern nations and particularly the Gulf nations. Saudi Arabia, like other Gulf nations, both directly and indirectly, has experienced some major social upheavals. First and foremost, the discovery and production of oil<sup>1</sup> in 1930s was a major occurrence in the country. The oil-generated revenue in the early 1970s introduced large-scale changes, including the opening of education to both boys and girls. The economic upheaval arising from the increased income from oil gave rise to a trend towards education abroad, and a change in lifestyle, and these two changes affected the whole structure of society (Yamani, 1996, p.265). Oil and its resulting wealth had an unimaginable impact on Saudi Arabia in an extremely compressed period of time.

The Iranian Shi'a revolution in January 1979 that overthrew the Shah and the newly established Islamic (Lacey, 1981) government in Iran strengthened Saudi Arabian religious leadership. In addition, the Mecca uprising on the 20th of November 1979 was inspired as many analysts allege, as a result of Khomeini's example in Iran and the successful defeat of Iranian royals by religious clerics. Shortly after that the first Gulf War took place, which involved Iran and Iraq, and the second Gulf War in which Iraq invaded Kuwait in 1990. Just recently, of course, the United States has waged war against Iraq. Each of the incidents mentioned has affected women and challenged Saudi society, a society that until then had experienced very little change in its policies toward women.

The American presence in Saudi Arabia began with the production of oil in 1979 and the establishment of ARAMCO (Arabian American Oil Company) in Dhahran, a city on the east coast of Saudi Arabia where most American companies are located. American engineers and oil executives brought their families and built many companies and Western-style houses, schools and compounds. Foreign migrant labour accounted for 43 per cent of total workforce in oil companies in the mid 1970s (Yamani, 1996, p.265). American women were shopping, unveiled, in malls and driving cars, something Saudi women were forbidden to do. Saudi women soon began asking for some of the same rights as their American counterparts. Some discussions took place on a formal level. However, with the Mecca uprising of 1979 such discussions came to a halt. Saudi Arabia arrived in the 1980s with a more complex society, eager to enjoy the fruits of advancement on all social and economic levels. At the same time there was a determination to preserve the country's religious and social traditions (Huyette, 1985). This balance between the two has been difficult to maintain, especially with regards to women's professional space.

Moreover, during and after the Gulf War of 1990 (or 'Desert Storm' as it was called in the United States) the American presence was highly visible in the Saudi Arabian capital city of Riyadh and on the east coast close to the Saudi-Kuwaiti borders with the participation of American troops in the war, American women in service were seen driving cars. Not only did Saudi women see American women driving military cars in Riyadh and Dammam; they also

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<sup>1</sup> The first important well discovered in 1938 and major production started shortly after World War II.

saw their Kuwaiti sisters who had fled their country enjoying a freedom denied to Saudi women themselves (that is driving cars). All three Wars affected the whole region in different aspects.

Women's schooling at all levels – elementary, secondary, high school and university – remained under the Department of Religious Guidance until 2002, while the education of boys<sup>2</sup> was overseen by the Ministry of Education. This was to ensure that women's education did not deviate from the original purpose of female education, which was to make women good wives and mothers, and to prepare them for 'acceptable' jobs such as teaching and nursing that were believed to suit their nature<sup>3</sup>. The General Presidency for Girls' Education, which has not enjoyed the same prestige as the Ministry of Education, was heavily influenced by religious conservative scholars. The historian, Lacey, who spent four years living in Saudi Arabia researching the story of the Saudi Kingdom concluded, "reform in Saudi Arabia had never been a simple matter, [and will never be given the religious mentality of people]" (1981, p.363). In 2002, the General Presidency for Girls' Education and the Ministry of Education were amalgamated as a result of requests from both the general public and the government after a fire in March 2002 in an elementary girls' school in Mecca resulted in the death of 15 young girls. The Saudi press reported that the presence of the Committee for the Promotion of Virtue and the Prevention of Vice, or religious police, in that incident contributed to the high number of deaths among the girls. The press, who witnessed the fire, maintained that the religious police discouraged the firemen from entering the girls' school, stating that since both the girls and their teachers may not be wearing their *hijab* [headscarf] it would be sinful to approach them. The issue was widely discussed in the Saudi press and also covered by the foreign press. "This caused a widespread public outcry and prompted a debate about the religious police role in such cases" (Prokop, 2003, p.78). This incident raises many questions not only about the responsibilities of the religious police but also about the General Presidency of Girls' Education. In fact, public dissatisfaction with the General Presidency for Girls' Education had been evident before the fire when women's education had been granted a lower budget than that of their male counterparts. The number of girls' schools housed in old, and therefore unsafe rented buildings were on the rise. The resulting amalgamation provoked a revolt among religious conservative scholars who approved of women's education only under the direction of *ulama*<sup>4</sup> (conservative religious scholars).

This paper analyses Saudi women's education since its beginnings in the 1960s. The objective of the paper is three-fold: first, to highlight the current status of women in Saudi society in general and, in education, in particular; second, to differentiate Islamic teachings from the literal and narrow interpretations of Quranic text that cause tensions around women's education

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<sup>2</sup> Boys schooling was also a challenge in that Crown Prince Faisal, at that time, and his wife Iffat had to introduce the boys school in a courageous and slow manner. The couple located the school in the city of Taif to avoid disturbance (Lacey, 1981).

<sup>3</sup> Many Saudi women and men consider women's nature to be different from that of men; therefore, they are not allowed to work in the same jobs as men. That is why only certain jobs (i.e., teaching and nursing as opposed to engineering) are open to women. The notion that women are only able to work in segregated spheres where they cannot be seen by strange men is still dominant.

<sup>4</sup> *Ulama*, some resources refer to religious conservatives scholars by calling them *ulama*. Conservative religious scholars are those who believe in one interpretation of Quran. However, the word *Ulama* is the plural for *alim*, derived from the word *ilm*, which means knowledge. *Ulama* refer to a group of people (usually men) who are scholars in religious knowledge and thus can be said about conservatives and progressive interpreters.



in Saudi society; third, to stress the progress achieved so far in women's education as well and to explore the changes in women's education that will be vital to the economic survival of the country in years to come. In including the foregoing I am not talking about the sexism women face; as Smith (1987) states, "we are not talking about prejudice or sexism as particular bias against women or a negative stereotype of women. We are talking about the consequence of women's exclusion from a full share in the making of what becomes treated as our culture" (Smith, 1987, p.20). This paper is not about stressing the patriarchal nature of Arab society in general and Saudi society in particular; rather, it is about explaining the consequence of excluding women from public life and constraining their educational choices. Women's issues in Saudi society are often mistakenly connected to Islamic teachings.

Unlike liberal feminists who do not consider the inequities of class, race, ethnicity, and disability, and unlike Marxist feminists who see the disappearance of gender inequality as contingent upon replacing capitalism with Marxism, I consider women's issues from a different standpoint (Elliot & Mandell, 1998). Women's issues in Saudi society and the gender inequalities that are obvious in its education system are institutionalised and difficult to dislodge through individual action. Women's inequality is traditionally structured in the society. "The rationale for a need to focus on women's achievements in higher education is considered a key social development indicator measuring women's status and conditions in any country" (Rashti, 2003, p.2). This suggests that Saudi women devise their own strategies to challenge gender inequality and achieve social justice not only in education but in all life matters, especially given the complexity of women's issues and concerns in what is so called "Third World" Islamic patriarchal societies.

The uniqueness of Saudi women's situation is derived from their presence and yet non-presence in the public sphere. For instance, Smith, a Western feminist, suggests that gender inequality appeared to be rooted in women's traditional absence and silencing in public life. There is a similar case with Saudi women. As Doumato states "...girls were taught enough to buy into an assigned role, a role in which they were subordinate to men, but not enough to challenge it" (2000, p.93). This comes from the normalisation of gender differences in the curriculum content at all school ages for both boys and girls. Gender ideologies that can be attributed to traditional and socio-economic values gained legal force in Saudi society by being associated with Islamic teaching. Until recently in 2001, Saudi women were considered an extension of their male guardians. A woman's identity first appears in relation to her father's family's identity card. Later, if she marries, she will be added to her husband's card or, in the case of her father's death, to that of her nearest male kin. In Saudi society in general, it is believed that the role of women was basic to maintaining the structure of the family and therefore of society (Alireza, 1987). The deeply embedded and complex nature of gender inequality in Saudi society should be taken into account.

Additionally, the practice of seclusion of Arab Muslim women is a comparatively recent phenomenon. Historically, Muslim Arab women participated in all aspects of life politically, socially, and economically, as is briefly discussed in the section on women's education. Having grown up in Saudi society, it is clear that women's training and education "ensure that at every level of competence and leadership there will be a place for them that is inferior and subordinate to the positions of men" (Smith, 1987, p.34). This is what's called "glass ceiling" and it pertains to many Arab Muslim societies as well as some Western societies. Women do

not have power in any position and are subordinate in both the private and the public sector to male individuals who may often have inferior qualifications to their female counterparts.

In Saudi society “women need to learn to relate to one another and treat each other as sources of knowledge” (Smith, 1987, p.35). Since Saudi women, as all women in any given society, differ in their class, race, and cultural background for them to challenge gender inequalities there is an urgent need to cross borders and ignore their cultural and class differences. These women unite and collaborate with each other to overcome male dominance in their society. The use and the acceptance of only a sole religious interpretation of Quran (extremism<sup>5</sup> or fundamentalism), to promote the authority of men is a pressing issue. In the conservative religious scholars views women are often considered to be irrational and incomplete beings. As Smith (1987) suggests, men were provided with a licence to exclude women’s voices in Western society. In some cases Islamic and religious texts are being interpreted literally, which provide some conservative religious scholars to silence women’s voices in the name of Islam. However, recently religious ideology has become a tool for Saudi Muslim women who are learning how to study Islamic ideology in depth and to apply it to women’s issues<sup>6</sup>. Women are learning to use the so-called, ‘legitimate language’, religious language, a language that cannot be challenged by their male peers to attain their goals. Saudi women are also directed towards studying Islamic law and Shar’ia so they can speak in the name of Islam. This is a powerful way to confront the *status quo*.

### **THE SOCIAL STATUS OF WOMEN IN SAUDI ARABIA**

A study of women and education in Saudi Arabia must take into account social and political events in recent years: Saudi Arabia was formally proclaimed a country only 70 years ago. Since that proclamation, many unique changes have taken place (Yamani, 1996, p.265). In 1979, a Muslim extremist who was a former theology student led an attempt to seize the holy mosque in Mecca. He was attempting to officially put an end to what he called “Western influence” in the country. In 1978, a year before the siege, newspapers and magazines were publishing articles written by both men and women discussing women’s rights to participate in public life. Issues such as women’s right to drive, where women could and should work, and the types of education appropriate for women were all hot topics (Doumato, 2000). However, discussions around increasing women’s freedom and mobility through education and work were perceived from the very beginning by the religious groups as dangerous “Western ideas” (Arebi, 1994, p.17).

Many political analysts have opined that the Mecca siege was fuelled by the government stance on women’s rights and role in the development of the Saudi nation. In 1979, “Western influences,” as some conservative religious scholars argued were more obvious since women

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<sup>5</sup> A claim can be made to differentiate between extremists and fundamentalists that is based on the meaning of the two concepts (Alghamdi, 2002). The Fundamental of some thing is the basics of it; however, saying that may imply that Islamic fundamentalists are those who are the most knowledgeable of Islamic teachings. Whereas an extremist, as defined in the Longman’s dictionary, is someone who has extreme political opinions and aims and willing to do unusual or illegal things to achieve them. Thus, Islamic extremists are those who are regarded in Islam as ‘heretics’ because of their excessive piousness. Those who violate the principles of Islam, a religion of peace, are considered extremists (Kuroda, 2001).

<sup>6</sup> Some Muslim women for instance, Riffat Hassan and Ali Shaheen were able to challenge interpretations that excluded women.

not only went to school but also started to enter universities. However, some historians argued that Mecca siege was not all about women's freedom; it had a great deal to do with asserting the extremists' views on all aspects of life. Nevertheless, women issues became the focus in any discussion about progress. A woman's right to participate fully in the development of the nation was forbidden. In addition, after that television stations were prohibited from broadcasting images of unveiled women. Women were also banned from conducting their own businesses without a male representative, preferably a family member<sup>7</sup>. Nonetheless, a recent survey shows that approximately 16,390 businesses are owned by women and women own 40 per cent of the nation's private wealth. However, these women were not, until recently, allowed to deal with that money unless through a male relative representative. According to Saddeka Arebi, in Islamic history, a fifteen-centuries-old tradition shows many examples of independent Arab female entrepreneur<sup>8</sup>.

These events significantly shaped the women's movement in Saudi Arabia for the next 20 years. Universities and colleges for women continued to be built throughout the nation. However, conservative religious scholars continued to pressure society to bend to their requests, especially those related to women. The general public also indicated that a Saudi woman's place is in her home. The percentage of women working outside the home, according to the 1999 census, is five per cent and these women are in the teaching and health sectors (Shukri, 1999, p.28). As a result, Saudi women continually encounter limitations and restrictions at both educational and professional levels. Few women are recently<sup>9</sup> gaining access to pursue professions other than teaching and medicine. Additionally, only recently has women's segregation been discussed publicly.

### **THE STRUGGLE FOR WOMEN'S EDUCATION: AN ONGOING BATTLE**

The advent of formal public schooling in Saudi Arabia dates to the 1960s, when the first official primary school for girls opened its doors in Riyadh (AlMunajjed, 1997). Prior to this, informal schooling took place for both boys and girls, the aim of which was to teach religious rituals. The goal of education was to learn the Quran, the Hadith [Prophet narrations], and Sunna [Prophet Mohammad's customary behaviour and opinion on various issues drawn from the Hadith], to know how to pray and to follow the rules of behaviour of the Muslim community. These tasks required memorisation but not necessarily reading (Doumato, 2000). This is why many illiterate men and women can read the Quran. Thus, education of both sexes in the Kingdom of Saudi Arabia first took place in the *Kuttab*, a class of *Quran* recitation for children, which was usually attached to the local mosque. The teaching of girls also took place in private tutorials, which occurred in the homes of professional male or female Quran readers. Education for girls stopped at puberty, "when strict seclusion at home began and veiling in public became mandatory" (Altorki, 1986, p.19). However, the first founder's opinion of women's education was encouraging. Abdul Aziz, the founder of the Saudi Kingdom, expressed his support for women's education. In a conversation with St. John Philby, a British explorer who converted to

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<sup>7</sup> This edict was still in force until recently.

<sup>8</sup> Khadija, the first of the Prophet Mohammad's wives, was an independent entrepreneur who also proposed to her male worker, none other than Mohammad himself. She continued her business after she married him (Arebi, 1994, p.17).

<sup>9</sup> In the past two years

Islam and eventually became a close friend and adviser for the first king, Aziz, stated: "It is permissible for women to read" (Al Rashid, 1976). According to Doumato educational resources were dedicated mainly to boys:

In the atmosphere of religious revivalism [that took place in the mid eighteenth century] in Riyadh [the capital of Saudi Arabia] one might have expected, since Wahabi belief recognized women's right to a religious education, that women would attain access to religious learning to a degree comparable with that of men, but this was not the case. Doumato. (2000, p.38)

Karmi also points out in her article *Women, Islam and Patriarchalism*,

that all Saudi Arabia women's education figures showed a marked improvement on what had been the case 20 years before. Nonetheless, the differences between male and female school attendance are striking. (Karmi, 1996, p.71)

Women's education did not change the patriarchal nature of Saudi society. Women in every field are subordinate<sup>10</sup> to men.

But the history of women's initiatives to achieve education reaches back to as early as the 1940s. Lacey relates that around this time, when the Ministry of Higher Education began sending a few bright young Saudi men<sup>11</sup> to continue their studies abroad, a bright young woman by the name of Fatina Amin Shakir wanted to have the same opportunity. She applied for a Ministry of Higher Education grant to study abroad, but the Ministry rejected the application saying that it was immoral to allow young single women to study abroad. Fatina and her father appealed to King Faisal, who was known to be a supporter of women's education. Fatina eventually became one of the very first Saudi women to hold a PhD. Her thesis, which focused on the modernisation of Third World countries, featured an interview with King Faisal, the man who had made her dream come true (Arebi, 1994; Lacey, 1981). Fatina Shaker, a female Saudi anthropologist and perhaps the first to obtain a PhD degree from an American university (Purdue), believes that denial of women's rights is rooted in the hegemony of social practices, dubbed by Fatina as customary laws or traditions, rather than rooted in Islamic essence (Arebi, 1994, p.217).

According to Lacey (1981), in September of 1963 the government had to send official forces to break up demonstrations in Buraydah, where much of the opposition to girls' education took place<sup>12</sup>. The citizens of this town had to be forcibly restrained from demonstrations when they heard of the plan to educate women. The former King, Saud started the informal schooling and

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<sup>10</sup> Recently, a Saudi woman was (in the summer 2000) assigned the highest positions ever held by women in Saudi Government, one as the assistant undersecretary of Education Affairs appointed to Al-Jawhara Al Saud.

<sup>11</sup> One of the first men sent to Egypt was Abdullah Al Teraki who later became Saudi Arabia's first Minister for Oil and Petroleum.

<sup>12</sup> Yamani presents a very interesting thought relating to the history of Saudi Arabia and anthropology. Women of Hijaz [the western province of Saudi: Mecca Jeddah and Madinah] have a more heterogeneous character than that of other regions and provinces in the country. She posits that since many of the residents are settlers who moved after hajj from different parts of the Islamic and/or Arabic world to become citizens of the holy land they may have no tribal backgrounds. Hijazi women are more apt to go outdoors and express themselves publicly, a phenomenon reserved for men in other provinces characterised by a tribal background. To Yamani "whether upper or middle class the role of women in the kingdom of Saudi Arabia can only be seen in the context of their patronymic group and of the national purpose and not as one section of society struggling for its right in isolation from men" (1996, p.265).

Faisal managed to convince tribal bedouins of the importance of formal schooling for women (Huyette, 1985, p.74). It was Iffat Al Thunayan, King Faisal's wife, who pushed enthusiastically for the education of women in Saudi Arabia. She transformed her wish that women be allowed to pursue science, language, and other subjects into a reality. Saudi Arabia was the last country in the Gulf nations to introduce secular education. Iffat established the first girls' school in 1956. In his book *The Kingdom* Lacey reported, "such circuitous manoeuvrings were not devised solely to sidestep the opposition of the religious sheikhs. Dragging Saudi Arabia society into the twentieth century alarmed ordinary people as well" (Lacey, 1981, p.364). The prospect of Saudi girls travelling through the public streets every day to attend school aroused alarm in the extremely conservative Saudi society. Yet, Faisal and Iffat were so committed to educating girls that they planned for the first women's academy located in Jeddah, the first of its kind in the country. The academy was named, *Dar Al Hanan*, "The House of the Affection." Faisal and Iffat suggested its name as an inspiration coming from the Quran commandment to care for girls (Lacey, 1981). Since King Faisal took into consideration the economic realities of the people, prior to the oil boom, government granted education in Saudi Arabia is free at all levels, though not compulsory (Boudy, 1999, p.19).

In 1957, the local press got a green light from officials and King Faisal to explain the objectives of *Dar Al Hanan*. One of the main aims of the school is to raise good mothers based on Islamic essence and modern educational theories. Iffat argued with many conservative religious scholars saying that the place where a child learns religion and manners is in the home, therefore the spirituality of future generations would be improved through mothers who had received schooling and education. In 1960 a national committee consisting of members of the conservative religious scholars insisted on controlling and supervising the education of girls throughout the country. In response Iffat, who had planned ahead, established the first girls' college in Riyadh called *Kulliyyat Al Banat*, or the Girls' College. Additionally, as part of her educational efforts, Iffat established what is called *Al Nahdah AlSaudiayh*, a Saudi progressive association that provides free classes in Riyadh for illiterate women, classes on hygiene and childcare, and courses on foreign languages and typing. All classes are funded and run by members of the movement. *Al Nahdah* has provided Saudi women with opportunities to participate in their society and to fulfil their role outside their homes as independent identities.

Though King Faisal supported women's right to achieve their goals, he was not able to convince his public at the beginning. When he sent the official force to Buraydah in 1963 to keep the girls' school open, he did not force the parents to take their daughters to school, though he ruled that girls' schooling be mandatory and obligatory, a ruling that continues to the present time. Fatina's interview with the King indicated that for Faisal, tradition should be made allies of development. He rejected the idea that in order to modernise Saudi Arabia its past would have to be erased, and he believed that slow and steady change was better than violent, disruptive attempts to force change. King Faisal obviously understood the background and the traditional thinking of his people. At the same time he saw a need to enlighten his people's understanding of Islamic teachings regarding women's education. Whenever King Faisal faced resistance he would ask, "Is there anything in the Holy Quran which forbids the education of women?" He further stated, "We have no cause for argument, God enjoins learning on every Muslim man and women" (Lacey, 1981, p.368).

The conservative religious scholars have approved the education of girls only with certain conditions and constraints. Girls' schools are surrounded by high walls and backup screens

behind the entry area doors. Each girls' school, college or university is assigned at least two men who are usually in their 50s or 60s who are responsible to check the identity of those who enter the school, deliver and pick up the mail and generally to safeguard the girls inside the school until they are picked up by their fathers or brothers. To date Physical Education and fitness facilities are not available for women. School buses for women have not escaped the rigid rules. Since women are not allowed to drive, the buses are driven by elderly men. Girls enter the bus from the back door and are usually supervised by a female relative of the driver.

Indeed, the opening of official schools for girls met with fervent opposition. Non-religious education of girls was considered useless and even, according to certain conservative religious scholars, dangerous. However, the public took a generally favorable position toward the enrolment of girls in school. By 1981 the number of girls enrolled in schools was almost equal to the number of boys. The administration of girls' education was controlled by the Directorate General of Girls' Education, an organisation staffed by conservative religious scholars 2002. The purpose of educating a girl, as stated by the Directorate General, was "to bring her up in a proper Islamic way so as to perform her duty in life, be an ideal and successful housewife and a good mother, ready to do things which suit her nature as teaching, nursing, and medical treatment" (Alireza, 1987).

But this changed to some degree after the fire at the girls' school in Mecca. The religious police, as some call them, are recently given less control. Many of their rights and responsibilities, so long ago taken for granted, have been reconsidered. In fact they have been officially forbidden to interfere in the work of police or firemen. The interference was subject to criticism in some newspaper with regards to their obstruction during the elementary school fire in Mecca where 15 girls perished when religious police refused to allow firemen to enter the school because girls and women may not be wearing their veil (Al-Sari, 2003).

Historically, progress in Saudi society is rarely smooth or effortless for various reasons. Some religious conservative in charge of girls' education, insisted that the time Iffat wanted to be devoted to teaching girls science, language and liberal arts should be instead dedicated to teaching religious subjects. Iffat succeeded in getting over a quarter of a million women enrolled in Saudi schools and colleges by the end of 1970 (Lacey, 1981). Iffat's contribution to women's education in Saudi Arabia is particularly significant in as much as she has always insisted that her beliefs on women's education are derived from the Quran and the Hadith. Iffat has repeatedly quoted Quranic verses that state that women and men alike should attain knowledge. In interviews conducted by Lacey, Iffat maintained that God would judge women as he would judge men, with no preferences for either sex. Men and women, said Iffat, were equal in the eyes of God. King Faisal supported his wife, maintaining that Saudi Arabia's future included equal education for men and women.

According to the Saudi anthropologists Altorki<sup>13</sup>, the first girls to go to school in Saudi were from families that lived abroad. In its first year there were 15 young girls attending Dar Al Hanan. Ever so slowly the idea of educating girls began to attract certain prominent Hijazi families of Mecca and Medinah<sup>14</sup>, especially those who appreciated King Faisal and Iffat's

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<sup>13</sup> The first generation of Saudi women to obtain PhDs in 1973 from the University of Berkeley in California, are now teaching at the American University in Cairo.

<sup>14</sup>The two cities closest to Jeddah where the next girls' schools to be established.

educational plans for girls. The largest infrastructure of the Arab world was built around the 1960s. The hiring of teachers from different Arab countries made education possible for Saudi society in a very short period of time (AlMunajjed, 1997, p.80). Moreover, in its early stages the disparity in educational achievements between females ran along class lines slightly more than was the case for boys. The first women to get a PhD or advanced degree from Europe or the United States were of a high status. Initially only high-class women had opportunities to be educated.

Although occurrences at the political and social level have had a great impact on women's progress in Saudi society, they have not prevented women from pursuing education. In fact, many families sent their children to private interior schools in Egypt and Lebanon, and more recently Jordan and Syria, for formal schooling prior to its introduction in Saudi Arabia (Arobi, 1994). Many upper class families, who refused to wait until Saudi universities opened their doors to women sent their daughters to study abroad. Today many still send their daughters to study abroad when the fields in which they wish to specialise (that is, journalism, engineering and aviation) are closed to them at Saudi schools.

Since women's education in Saudi Arabia officially began, educational levels have increased rapidly. The number of women's institutions has grown from 15 in the 1960s to 155 in the 1970s (Al Mohsen, 2000). Al Mohsen points out that women's education started with arts and education; all other fields were available only to men. 1986 statistics show that in 1970 the total number of girls in elementary schools was 246,559. That number had increased to 649,509 according to the 1989 UNESCO statistics. In secondary schools 185,902 girls graduated in 1982 and in the year 1986 the number had increased to 255,766. The first girls' college was established in 1970 in Riyadh and admitted those with secondary level schooling. Approximately 10 similar colleges with the same requirements opened by the 1980s. Subjects included the arts, education, general science and sciences such as biology, mathematics, religion, Arabic, geography, history, English, psychology and home economics. Library sciences were exclusively offered at Riyadh's college (Al Malik, 1987).

The first university that has a women's campus was Riyadh's King Saud University, which opened in 1979. Subject areas included Arabic, English, history and geography. In the 1980s women's campuses at King Saud University added colleges for public administration, medicine, dentistry, nursing, and education. The Jeddah campus of the University of King Abdulaziz, admitted women to economics in 1967, and the Dammam City campus of the King Faisal University in 1978 opened a centre for women which included colleges of medicine, nursing, agriculture, nutrition, home economics and education. King Saud University in Riyadh has two campuses one in Al-Qaseem (a city 400 kilometres from Riyadh) and a second one Al-Joof, a city on the northern part of the country.

King AbdulAziz University has branch campuses in Madinah<sup>15</sup> with women and men's campuses offering mathematics, biology, medicine, computer sciences, and humanities. The College of Interior Design of Architecture followed in 1982 (GPWE, 1990). In 1975 Saudi women were allowed to enter medicine, and the first admission of women to the Faculty of Dentistry occurred in 1980 (Jawad, 1998, p.28). In all universities women have attended segregated campuses, and subjects were more limited than those for men.

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<sup>15</sup>The second holy city after Mecca.

In 1971, Umm Al-Qura University in Mecca admitted women to all departments except Physical Education, the training of judges and Islamic Economics. The University of Imam Prophet Mohammed Ibn Saud in Riyadh, a religious university, opened four of its departments to women; these were Shar'ia (the Islamic law derived from the Quran and the Hadith, D'awa (the spreading of the message of Islam), Al Ageda (belief of Islam), and Itejahat Mu'asera (contemporary attitudes) (GPWE, 1990). Recently in 2002, King Khalid University in Abha<sup>16</sup> admitted women to computer sciences, biology and English. Some of these university campuses have residential accommodations for female students who do not live within travelling distances. These campuses must submit to the same rigid rules as all other women's institutions and workplaces in that they are all guarded by men or security police. The one university in Saudi Arabia to which women are not admitted is the King Fahad University of Petroleum and Minerals in Dhahran. Currently, there are as many as seven universities<sup>17</sup>. Each student is paid approximately \$300 CDN for science and medicine, and approximately \$270 CDN for liberal arts per month.), over a hundred women's colleges across the country, over fifty community colleges. A number of private universities and colleges have also been established in the last 2 to 3 years.

Inspired by Iffat's initiative, her daughters established a private non-profit college for women in Jeddah (the first one) called the *Wisdom College*, or *Dar Al-Hekma* College, which opened in September 1999. It is expected to reach a total enrolment of 1500 students by 2005. The college's modern campus sits on 25,000 square metres of land in Jeddah. Academic programs include a college preparatory program, a general education core curriculum, and academic majors in interior design, business information systems and special education. The college plans to develop broader specialisations in other areas of study such as e-business and health care. All courses are taught in English except Arabic and Islamic Studies. In fact, the college implemented the Texas International Education Curriculum, guidelines and objectives from one of Texas' educational institutions.

Through its current three undergraduate academic programs, the College offers BA and BS degrees to a current student body of approximately 200. The design utilized the American model for academic programs and administrative organization. More than 20 project teams involved over 75 experts from Texas universities and elsewhere and an equal number of Saudi experts to develop the academic programs, administrative structure and procedures, information and communications technology systems, and library and support services. Initial policies and procedures were developed for admitting students, hiring faculty and staff, and planning and managing college operations. (Texas International Education Consortium, n.d.)

According to Mona AlMunajjed (1997) in her book, *Women in Saudi Arabia Today*, the fact that the government has been actively supporting women's education is evident in the hundreds of schools for girls and the women's campuses at almost all universities. The government has not restricted its efforts to the younger generation. Literacy courses are being offered to older women. The government supports these classes financially, administratively and technically. Women beyond elementary school age or older are enrolled in adult education programs. These courses are available in many if not all districts across the country, and contribute to the rising

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<sup>16</sup>The capital city of the southern provinces

<sup>17</sup> Owned by the government to which students pay no fees.



literacy rate among women. These initiatives have created more jobs for female teachers. Finally, as has already been noted, the numbers of women attending higher education to pursue masters and doctorate level degrees are continually on the rise. Statistics show that in 1990 women represented 47 per cent of the total undergraduate enrolment at colleges and universities in Saudi Arabia.

Yet, the share of budget appropriations for women's education is only 18 per cent of that for men. Higher education involves limitations and vocational education for women is non-existent. Women are still not admitted to engineering, law, pharmacy, geology, petroleum, and political sciences, and do not enjoy full access to the facilities such as some libraries and recreation centres. Al Mohsen (2000, p.22) states that:

Despite the increased record of support, the Saudi government policy of sexual segregation has saddled women with facilities substantially inferior to those available to their male counterparts.

Moreover, women do not receive the same quality of education as men because teachers for men are better trained. More than 34 per cent of men teaching at men's universities hold doctorates compared to only three per cent of those who teach at women's universities and colleges (AlMunajjed, 1997). Saudi women are not able to enjoy the 200 libraries mostly affiliated with schools, universities and religious institutions or the 70 public libraries except through a male relative liaison or restricted visiting hours. Libraries for women only are extremely small and often poorly equipped (Arebi, 1994). This explains, in part, some of the challenge Saudi women have to overcome in order to do research. In March of 1989, women finally gained access to King Abdul Aziz General Library in Riyadh. They expressed their gratitude, to the second-highest political authority in the country, for giving women such a 'great gift'.

Additionally, it is of significance to mention that the position of women in the Middle East and Saudi Arabia, in particular, cannot be attributed to the presumed intrinsic properties of religion. Such a conception is too facile (Shukri, 1999, p.3). Scholars in the West who debate the status of women's education in the Middle East are often unfamiliar with Islam as a religion, or its ideologies in relation to education. Yet, many assume that Islam as the dominant religion of the region is the key reason behind some prohibitions against women's education, it also discounts Islamic teachings that promote the education of both male and female, and Quranic verses that call upon the use of the intellect to obtain understanding.

### **Women and Education in Islamic Teaching**

In discussing Islamic teaching with regards to women's education, it is important to differentiate between the normative teachings of Islam and the diverse cultural practices among Muslims. One of the most common criticisms levied against Islam is that it treats women unjustly. Yet, in actuality Islamic teachings express great respect towards women. Moreover, traditionally women have had a prominent role in society. "Women in Islamic societies have reached political heights unparalleled in the most advanced Western nations" (Ragab, n.d, p.5). Arab history notes that one of the wives of the Prophet Mohammed, Aysha, led an army of 30,000 soldiers, cooked for them and helped medicate them. Aysha discussed and negotiated various issues and political matters with Prophet Mohammed, who freely acknowledged her wisdom. It is also noted in Islamic historical documents that one sixth of the Hadith record

Aysha as being part of the chain of transmission of the sayings and traditions of the Prophet. This is greatly appreciated among Muslims today. As noted before, Khadija, the first of Prophet Mohammed's wives, managed a successful commercial endeavour and was the first prominent businesswoman in Islam (Badawi, 1995). Fatima, Prophet Mohammed's daughter, is cited in many historical documents as being politically active. Sukie'na, Prophet Mohammed's granddaughter, was a well-known mathematician. More recently, Benazer Bhutto, a Muslim woman, was the prime minister of Pakistan. Nobel Prize winner Shereen Abadi from the Islamic republic of Iran is also a Muslim women's lawyer and a political activist (Al Sari, 2003a, 2003b). Many other examples in the history of Islam negate the claims of religious conservatives regarding women's education. However, while some literal interpretations of Islamic texts accord respect and honour to women, others justify the oppression of women. Unfortunately, literal interpretations of the Quran are those that have strongly influenced unjust behaviour towards women, especially with regards to education. Essential Islamic teaching, however, strongly encourages the education of women in religious, economic, political and social domains. The Prophet Mohammed's views on education are evident in statements such as, "The search of knowledge is a duty for every Muslim male and female", and "seek knowledge from the cradle to the grave" (this phrase is attributed to Prophet Mohammed).

Over the years, however, certain pre-Islamic customs have reappeared and gained a foothold (Jawad, 1998). Cultural customs that deny women equality have become entrenched in the Muslim culture to the point where they are often accepted as Islamic rules. Yet, many of the customs or rules adhered to today cannot be found in Islamic texts (for example, the belief that women should not drive cars or that women should not pursue Law or Engineering). "Modern Muslim feminists and human rights activists are arguing that [these practices are] not the real voice of Islam" (El-Solh and Mabro, 1994, p.120). In the past three decades, Saudi women have begun to reclaim some of their educational goals in spite of opposition. One of many prominent Muslim Saudi women and the first ever to be allowed to issue Fatwa<sup>18</sup> [a strictly male domain] is Dr. Fatima Naseef, a religious lecturer and informal marriage counsellor. In a personal interview in 1994 she stated, "Yes we have women Professors and women Deans here. But all decisions, big or small, are made by authorities at the men's university" (Goodwin, 1994, p.216).

In Saudi Arabia some of the highly selective and narrow interpretation of Islam espoused by conservative religious scholars have had a restrictive impact on women's education (Jawad, 1998; Alghamdi, 2002). "Saudi Arabia policies towards women's education and work represent a clear example where Islam has been used to first deny then discourage women's education" (Jawad, 1998, p.28). Many in Saudi Arabia also believe that Saudi women's education will allow them to be actively involved in their society, both at home and in the marketplace. Advancements in Saudi women's education, therefore, requires at least in part that both educators and moderate religious conservative religious scholars alike affirm women's strong participation as leaders in the history of Islam, and that Muslim become aware of their religion's original intention to educate and liberate women. Saudi educators need to teach a history of Muslim women in which is rich in women's political and social advancement. Furthermore, Saudi women and men must be educated about Muslim women's contributions to

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<sup>18</sup> Religious ruling

various fields. Finally, progressive religious scholars must cooperate in presenting the essentially liberating Islamic teachings regarding women, especially as they relate to education.

### **PROGRESS ACHIEVED IN SOCIAL CHANGE FOR WOMEN**

Knowing the structure of Saudi Arabian society and understanding the role of tradition and religion is vital to understanding social change in the country, especially as it relates to women. The role of King Faisal and Iffat in the struggle for women's education challenges this belief. Political decisions have always been the decisive factor, especially in matters related to women (Arebi, 1994, p.51). Other analysts of women's status in Saudi Arabia believe that it is related to the relatively short exposure of Saudi society to the West and its culture. How can one expect the country to be modernised in such a short period of time? This suggestion, in particular, denies the tradition of women's education deeply embedded in the religion of Islam. Islam granted women not only the right to education, but also the right to inherit, own property, and full participation in all aspects of life (AlMunajjed, 1994, Yamani, 1996) long before women in the West enjoyed such privileges. Another analyst suggests that restrictions of women's education in Saudi Arabia have to do with the tribal character of the Arabian family. Abo-Lughod (1986) explains how in tribal societies family honour is dependent on women behaving with modesty, chastity and deference to men. Controlling women through mechanisms such as segregation ensures that women do not defy the authority of male relatives by making friends with strange men. While this contention seems to fit for some cases, it cannot be generalised to the entire issue of women's education. In fact, not all-Saudi families are tribal. A high percentage of people who have Saudi citizenship are descendants of migrant workers and religious pilgrims who decided to remain in the country (that is, people from Africa, India and other Arabic nations). This theory is especially deficient when one considers other Gulf nations such as Kuwait and Bahrain that, though consisting of tribal families, do not restrict women participation in public life.

The case of Saudi Arabia is unique in that the country did not undergo colonisation<sup>19</sup> and that restrictions on the women's movement can be attributed to a social and tradition cultural boundaries more than religious. Some conservative religious scholars are influential and promote a narrow and restricted interpretation of Islamic teachings. However, their power has recently restricted since the fire in the elementary school in Mecca 2002 (Al-Sari, 2003). Many religious scholars consider still protested against the amalgamation of the Girls' Presidency with the Ministry of Education in 2002. The only opposition to Saudi system advocates reform is a party calls itself 'The Movement of Islamic Reform in Arabia' [MIRA]. The party's views on women's rights and education are similar to the Taliban, which is considered the most repressive regime with regards to women; Saudi women, therefore, do not look to the party for support.

Saudi women and men who have been educated in the West return to the country with different visions for the future. Many Saudi support women's rights and seek to support progress. Others who support women rights seek to implement change and feel that the restrictions on women have been reaffirmed instead of diminished. However, evidence is to the contrary.

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<sup>19</sup> Some part of the country has never been colonised, especially Najed-currently Riyadh and Eastern provinces. However, Hijaz and Southern provinces were under Turkish (Ottoman) rules until Oct 1924 after Shareef Husain's departure (Lacey, p.192).

Despite all these obstacles the number of women's educational institutions as well as the number of women students has been steadily growing, their illiteracy rate has been substantially declined, and they consistently do better on standardised school tests and achieve higher grades than their male counterparts. (Kapiszewski, 2001, p236)

Technology is helping this trend. While traveling to other countries is not an option for many Saudi women who cannot afford the expense of travelling<sup>20</sup>, through technology the world has come to them. Satellite dishes and more recently, Internet access, have allowed Saudi society to view others not only in Western and European nations but in neighboring Arabic countries. Saudi women see Omani women as ministers and they see that in Qatar women are deans at many universities. Saudi women are now seeking to be part participants of the parliament.

The Gulf Wars have also drawn world attention to the events in the Gulf nations and to the status of women in that part of the world. Ironically, the events of 9/11 brought to light again and more powerfully than ever before the issue of women's rights in Saudi society. In the aftermath of 9/11, the Saudi system in general and its religious education system in particular became the focus of much criticism. One question put forward by Prokop captures the essence of that criticism. Prokop asked to what extent the education system had been shaped and used by religious, political, and socioeconomic forces and interests.

Saudi's critical position in the Middle East stems from the fact that it is the guardian of the two Holy mosques in Mecca and Madinah. It is in the best interests for the United States to ensure stability in that part of the world<sup>21</sup>. American interest in the Gulf because of oil reserves is well known. American-Saudi relations would not be important to either side if not for Saudi oil. Thus, it is of interests to both sides that the country is in complete autonomy and full control of its lands and its people.

In the Saudi context, strong leadership is synonymous with the country's unity, something the family of Saud has managed to provide. No other tribe was able to stop the bloodshed that went on for hundreds of years between warring tribes on the Arabian Peninsula. The unexpected peace and wealth enjoyed by many inhabitants who lived before and after the Saud's government has engendered a great appreciation among Saudis. When the Ministry of Higher Education started sending young Saudi men and women to obtain an education it was hoped that these students would implement change and with their progressive ideas challenged some conservative religious scholars and their rigid ideals. This has not been an effortless case. Progressives and liberals have recently given a chance to present implementation of development plans and openly discuss their progressive ideas.

The conservative religious scholars have powerful influence in public policy, which cannot be ignored. For instance, in 1994 the Council of conservative religious scholars successfully suggested the urgent need to withdraw from the conference of United Nations Population and Development in Cairo due to their disapproval of conference topics, which included birth control, abortion, equality between men and women, and co-education (Yamani, 1996). According to the conservative religious scholars these topics were against the laws of God and against the laws of nature. This occurrence exemplifies the power of conservative religious

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<sup>20</sup> Another fact is that woman, traditionally and culturally, inhibited from traveling alone without a male relative.

<sup>21</sup> Since this is the cradle of the Arab world.

scholars. During his lifetime King Faisal tried to persuade the conservative religious scholars and conservative groups to listen to others with different views.

The recent advancement for women, the history of education in Saudi Arabia indicates that the structure of the educational apparatus and the content of teaching have been formulated to preserve the country's religious foundations. However, recently women's rights<sup>22</sup> came under international community scrutiny. Despite all the challenges, women's education in Saudi Arabia, has opened new horizons for Saudi women:

On the private level it has increased women's negotiating power within the family. It has also given them greater mobility: hundreds of thousands of girls and women go out daily to either school or work...on the public level, education has made it possible for thousands of women to enter the labor force. (El-Sanabary, 1994, p.145)

Today, with the majority of Saudi women being educated and illiteracy declining uneducated women will soon be a small minority. However, the percentage of Saudi women in the workforce remains the same. Doumato (2000) attributes the lower percentage of women in the workforce to segregation between the sexes. This, however, is not the only culprit. The main problem for many Saudi women, especially businesswomen, is tradition and above all conservative views on women's participation in nation building. This is the case, although the market is also overburdened with foreign workers whose positions could be filled by female university graduates (Doumato, 2000). Taking into consideration the religious background of Saudi society and the difficulty of implementing changes, the suggestion has been made to establish a Ministry of Women's Affairs to study in depth Saudi society to determine its needs for future development. It is hoped this Ministry would also implement changes based on studies of educated, moderate Saudi women who appreciate the need for change.

Some questions still remain. If the education of Saudi women is proven to be a significant success, is that allowing them to move toward the international dialogue of women's rights in the world? Is Saudi, the country with the highest oil reserve in the world, moving toward gender equality in its society? Some events indicate yes, others no. For example, when the United Nations Fourth World Conference 1995 on women, met in Beijing, one of the only countries without an official delegation was Saudi Arabia. The reason for this is that the conservative religious scholars condemned the goal of the conference, which was equality between the sexes. Saudi women<sup>23</sup> are not officially delegated by any ministry to attend any conference where they can have contact with men. This was a contradictory stance considering women and men are in contact with each other in Saudi hospitals, malls and other public areas. Women from other Gulf nations with similar segregation rules and the obligatory veiling rule (that is, Oman and Qatar) participate in NGOs (non-governmental organisations) with their Islamic veil. Islamic *hijab* is never an impediment to women's participation in any educational experience.

Though Saudi women wield social influence and wealth, and there are an increasing number of women involved in business huge enterprises (Azzam, 1996, p.221). Women's visibility at the official level concerns many academics and progressive activists, male and female. The restrictions on women's education and freedom in Saudi society flow from a combination of

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<sup>22</sup> Saudi Government also in 2001 signed a United Nations pact aimed at ending all forms of discrimination against women.

<sup>23</sup> In the year 2002 few women attended international conferences as representative of the country.

many factors as already noted. But one significant issue is that “the conservative religious scholars tendency that utilises women in the game of power has been geared towards enhancing the view of woman as a ‘gate of Westernisation’” (Arebi, 1994, p.18). Some Saudi conservative religious scholars often use women’s issues as a pawn in the struggle between tradition and modernisation. The chief aim of this group is to control not only women but also the entire Saudi society. This also explains the continuous rejection by some conservative religious scholars of any progress relating to women’s issues, and the constant references the Westernisation of women by Western ‘infidels’ and ideologies. Therefore many columnists, both male and female, who discuss women issues openly in the press, are being attacked in electronic chat rooms and referred as secularists, Western agents, and enemies of God.

On a positive note, the government has become aware of the need to improve the education system and, increase women’s participation in order to ensure economic survival. There is a high drop-out rate among boys, and given that “over 40 per cent of Saudis finish their education before reaching secondary school and that there is a huge gap between the output of the education system and the requirements of the domestic labour market (Roy, 1992; Saudi Ministry of Planning, 2000, p.179). An important question remains unanswered; how do the restrictions on women’s education affect its economy, especially given that more Saudi women than men are highly educated and represent more than 50 per cent of university students (Doumato, 2000)? The problem of expatriate workers, whose presence has increased by 1.5 per cent during the last ten years, is disturbing on many levels (Saudi Ministry of Planning, 2005, p.158). This problem needs to be addressed as it presents a serious challenge to the country’s economy and social ideology<sup>24</sup>. It remains to be seen whether some restrictions of women’s education continue in the face of these challenges.

Although the education of women is important, the dignity and value of being a wife and a mother should not be diminished by the concept of equality and educational opportunity. There is no either-or binary in Islam with regards to women’s social participation and education. There is no contradiction between being a mother and a professional working outside the home. Women deserve to be able to make this choice. This means that women’s education in Islam is not at all contradictory to concepts such as chastity and dignity, which are highly esteemed and sacredly guarded in Islam (Jawad, 1998). Education among Saudi women has been strongly encouraged by their illiterate mothers. In many cases it was these women who demanded classes in reading and writing for their children and adult literacy classes (AlMunajjed, 1997, p.80). They advocated for many years for adult education programs that did not start until 1973 (Boudy, 1999, p.19).

At the core of the issue of women’s education is the underlying concept of sex segregation. For many Saudi women, sex segregation, does not imply a lesser social status (Huyette, 1985, p.118). I have discussed sex segregation with many educated Saudi women. With regards to the women’s employment rate they suggest that because of segregation women having access to more jobs and do not have to compete with men. Sex segregation of women in Saudi Arabia gives them a professional advantage since there is no competition with male counterparts for jobs in women’s schools, banks and universities (Fakhro, 1996, p.257). For instance, although

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<sup>24</sup> Many of these workers have criminal records in their own countries or carry infectious diseases and that been recently discovered after causing many national problems.

there is no university training for women in business and bank managements, women only banks exist in Saudi; mathematics graduates can become bank workers after obtaining a diploma in business management and computer training. In her article "Some Observations on Women in Saudi Arabia"<sup>25</sup>, an anthropologist Yamani explains how Saudi women recently gained more freedom by using the legitimate language of the nation that cannot be challenged by Islamic ideologies. This is an empowering advance for women's status in the country. Using Islamic tenets women are challenging some conservative religious scholars that if they want women to be segregated they need to create more women-only spaces. Women are now asking for women's hospitals, women's malls and women's representatives in all government's levels.

Other issues at stake in regards to Saudi women's education are hidden problems in girls' schooling that need to be investigated. One problem in certain regions of the country is high drop-rates among girls after elementary school level (Jawad, 1998). This, in particular, raises questions about other issues. For instance, some young girls are forced to marry at a very young age. Parents can force their girls to marry at any age. There is no law to prevent parents or a guardian from having their girls marry. This problem varies depending on the socio-economic level of the region and the traditions of the local tribes. This is an issue for researchers, and not only in the field of educational research level but also on educational policy level. There is no law in the country, as yet, that prohibits male guardians (for example, father or brother) from taking girls out of school, no law making education mandatory to high school. These requirements need to be brought in by government. There is also no law to determine the age at which girls can marry.

Women's status in education in Saudi Arabia has been changing, and the Ministry of Higher Education has considered sending talented women abroad to finish their studies in high-demand subjects. Moreover, recently the government supported the election of a Saudi woman, Thoraya Obaid, as an executive of the United Nations. Obaid, the first Saudi Arabian Executive Director of the United Nations' Population Fund (UNFPA), enjoys a reputation as a fighter and a pioneer for the education of women (Qantara.de, 2003). Saudi women' achievements in education are considerable. In reading Saudi newspapers one is fascinated by the number of highly educated women participating in the public affairs and requesting more room for their initiatives. Newspapers published in both Arabic and English have a great number of female writers. Indeed, the names of Saudi women are increasingly connected to appeals for more participation in public arenas and more respect for women in general. Furthermore, Talal Ibn AbdulAziz, the King's brother, continues efforts to change the status quo and to supports women's participation at all levels of Saudi society. Today he is the head of the region's most important organisation, The Arab Council for Childhood and Development, head of Arab Gulf Program for the Support of Humanitarian United Nations Organisations (AGFUND) and Rector of the Arab Open University, which serves not only Saudi citizens but the entire Arab world. At the Open University Talal hired two progressive Saudi women who hold doctoral degrees and support progress on women's issues<sup>26</sup>.

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<sup>25</sup> In the edited book *Feminism and Islam Legal and Literary Perspectives*.

<sup>26</sup> The first woman was Maha Orkubi, a professor of special education and was a Dean of AlHekma College for four years. The second Saudi elected women was Dr Smira Ibrahim Islam professor of King AbdulAziz University and a member of trustee for Arab Open University.

## CONCLUSIONS

It is practically impossible to discuss women's education in Saudi Arabia without introducing the social and political forces that have shaped women's status not only in education but in society in general. Women's role in education in Saudi Arabia's conservative society, instead of serving as a tool for social change, serves as a force for conservation. Education entrenches and supports the prevailing class and gender structures and conforms to socio-economic and political expectations, and control mechanisms. As El-Sanabary (1992, p.149) suggests, education in Saudi Arabia is a 'microcosm'. Despite the fact that the society and the tradition favour men's education over women's, the disparity between boys and girls in the unequal distribution of educational funds is a logical reflection of gender hierarchies in the overall society. It is worth being optimistic. Altorki concludes in her research, on Saudi women with a note of optimism. She stresses the changes and improvements that have opened up more space for women in the public sphere (as cited in Afshar, 1993, p.13).

Looking at women's education in Saudi one should consider all sides of the issues. Studies have shown how women's education is taking another route. In his study (1975) entitled *Perception of Female Students from the Countries of the Arab Gulf*, Al Kotob interviewed 519 women students. He notes that 79 per cent of his respondents agreed strongly that women should have the same opportunities as men, 70 per cent insisted that Master's and Doctorate level degrees are suitable for women in the Gulf region, and 80 per cent indicated that university education should be co-educational. With regards to marriage, 94.8 per cent of the participants supported education prior to marriage. In relation to the subjects of study available to women, 94.2 per cent agreed that women should not be confined to certain subjects and should be able to study in any field. Sixty-six per cent of the participants believed that a husband's education should exceed that of his wife. However, research shows that economic problems may influence a social shift on issues around women's education. For example, many men consider a college or university graduate partner as a vital asset in a potential marriage, believing an educated woman can contribute to the income of the family (Abobaker as cited in Doumato, 2000). Ironically, a study by Abobaker on male university students conducted in 1980 showed that 70 per cent of men would not prefer to marry an educated college graduate, nor did they want their wives to participate in the house budget since they considered that a threat to their authority (Abobaker as cited in Doumato, 2000).

More recently, a question raised again and discussed in the Consultative Council concerning Saudi women's education was that if women stayed for too long in school (the average stay is 12 years before university) would they be considered undesirable for marriage? Would women with Master's and Doctoral level degrees have compromised their chances for marriage? Recent statistics released by the Saudi Ministry of Planning and Human Resources (2003) indicate that the number of single women is increasing dramatically. The primary reason being cited for this trend is the increase in women's education. The study also shows that the number of single women is climbing toward one third of the total number of women in the country. These unmarried women have passed what in Saudi Arabia is considered the marriageable age of 30 years. The projected numbers given for the end of 2002 was 1,813,000 women. This number was expected to increase to four million in five years unless the government supports plan to change the nation's view of educated women (Al Sari, 2003c).



Moreover, it is stunning how the issues of women's rights in Saudi Arabia have become a dominant subject in Western media. Why are Saudi women such a hot topic? Saudi women's education and issues guarantee the author a high publishing rate. In addition, many non-academic materials promote stereotypical images of Saudi women as exotic and erotic. These kinds of books and articles exacerbate the lives of Saudi women in their own country, especially in as much as they need the support of the international community in order to challenge the power of some conservative religious scholars and old 'sexist' traditions. Part of the media war used against Saudi Arabia does not care about women's rights as much as they care about political hegemony over the resources of the 'Third World' including Saudi oil. Be that as it may, an education system must carry out a mission to implement open-mindedness and understanding. This would allow students and the next generation to be strong in facing the challenge of Western hegemony. Western values might not be suitable for Saudi people, just as the views of conservative religious scholars and old traditions that favour men would not be suitable. There are conservative religious ideologies on both counts. On one side (in the Saudi view) are powerful conservative religious scholars, and on the other is the Bush ideology, "you're either with us or against us." Both are extreme and both are causing problems. The Saudi education system and curricula needs to implement different strategies for looking at the other people with whom we disagree. On a macro level, recent changes in the international arena have opened the door to changes that were not attainable in the recent past. Space is allowed in the Saudi press for honest reflection as never before. Saudi columnists are able to constructively criticise the system's performance in the health, education, and women's rights sectors. This is of itself a great relief for both men and women who have long felt deprived of freedom of speech. Both women and men are hopeful for signs of slow but steady change occurring in the country.

The future developmental plans must be able to tackle problems of increased economic demands, segregation of the sexes, limitations of women's jobs and the cultural and religious heritage (Huyette, 1985). If the country plans to survive this globalised era women's education in all fields should be a priority. Educated open-minded individual's' demands would bring changes and progress but to what extent? Is Saudi society ready for that change? Given the apparent variability in perspective of Educated open-minded individual's' who are seeking progress, and the attitudes of some conservative religious scholars and old traditions which resist any move forward it is difficult to predict. Until then women's issues will be at the centre of conflict between modernity and tradition.

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# Zimbabwe's public education system reforms: Successes and challenges

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*The purpose of this article is to discuss Zimbabwe's public education system. First, the article provides a brief look at pre-independence education in Zimbabwe. Second, it discusses some of the reforms that took place in the Zimbabwe education system following independence. Third, it looks at the current structure of Zimbabwe's education system and fourth it discusses some of the successes and challenges faced by the education system within the context of the prevailing social, political and economic environment.*

Zimbabwe, education reforms, education system, education policy, examination system

## INTRODUCTION

Soon after independence, most governments of developing countries reformed their educational systems to align them with new national goals. Zimbabwe is one such country that embarked on massive reforms of its education system in 1980.

Zimbabwe is a landlocked country in Southern Africa. It is a former British Colony formerly known as Rhodesia<sup>1</sup> that was annexed from the South African Company by the United Kingdom Government in 1923. A constitution that favoured the whites in power was formulated in 1961, and in 1965 the government unilaterally declared independence but the United Kingdom government did not recognise it because it wanted the Rhodesian government to give more rights to blacks. A guerrilla uprising and United Nations sanctions led to free elections and independence in 1980, leading to the election of the government of Robert Mugabe which has been in power until today.

## PRE-INDEPENDENCE EDUCATION

After the arrival of European settlers in 1890, missionaries found it easier to spread their influence among the indigenous people. Mission schools were the source of formal education for Africans, with the government providing education primarily to white children. The new exchange economy introduced by the settlers created increasing demand for education among Africans. As demand for more education among Africans was increasing, the colonial government stepped in to control the provision of education and ensure that missionaries would not 'overeducate' them (Nherera, 2000). The colonial administrators were critical of the type of education that the missionaries provided the Africans. They felt the Africans had to be given education which was practical in nature; that is, related to agriculture and industry to prepare them as labourers, but not to the extent where they could compete with Europeans (Atkinson, 1972; Dorsey, 1975). According to O'Callaghan and Austin (1977), Africans were to be given education but not equal to that given to whites. Industrial training in African schools was limited to elementary knowledge of agriculture, carpentry and building.

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<sup>1</sup> The country was known as Southern Rhodesia before it was just referred to as Rhodesia.

## REFORMS OF ZIMBABWE'S PUBLIC EDUCATION SYSTEM

According to Riddel (1998), there are many different ways that one could categorise the different 'themes' of educational reform that have been prominent in developing countries. These can be divided broadly into three groups: (1) planning and efficiency reforms; (2) quality reforms; and (3) curricular reforms. He also points that there are no clear boundaries among these broad groups. In this article, educational reforms in Zimbabwe are discussed within the context of the above categories where possible.

At independence in 1980, Zimbabwe inherited an education system that favoured mainly white<sup>2</sup> Zimbabwean students. Prior to 1980, very few black children had access to education. Those who had access to education found themselves in schools that were poorly funded, with very few educational resources and a separate curriculum from that offered in all-white schools. Education for black students was provided mainly by missionaries rather than by the government. Basically, two school systems existed prior to independence. The colonial government made education for white students compulsory and therefore offered universal education, spent as much as 20 times more per white student than the black student (Ministry of Education, Sport and Culture, 2001). The first major reform was the unification of the separate education systems to remove anomalies and inequalities. At independence, the Government adopted a socialist principle: 'Growth with equity' to redress the inequalities in access to education and other basic needs such as health services. The government's socialist principle was perceived through Karl Marx's concept of 'polytechnic education' whose main objective was to link mental and manual work and produce 'totally developed individuals' (Chung and Ngara, 1985, p.89). It had been observed that the inherited colonial education system placed undue emphasis and value on paid employment and white-collar jobs. It failed to instil good work habits and ethics and did not prepare school leavers for the world of work (Nherera, 2000).

Over the first decade of independence, the reforms in the education system focused on making them suitable for Zimbabwe in line with the principle of 'Education for all' adopted at independence. The government expanded the education system by building schools in marginalised areas and disadvantaged urban centres, accelerating the training of teachers, providing teaching and learning materials to schools. Increase in enrolments gave rise to the need for buildings. This was managed by introducing double shifts per day, but with two different sets of teachers, ensuring a more efficient use of existing classrooms without disturbing the existing teacher-pupil ratio. The need and supply of teachers was met by rapidly increasing the number of untrained teachers at primary level. Although this step provided a well-motivated teaching corps, it led to the supply of low-quality teachers and resultant poor quality of teaching. The supply of teachers was increased by introducing the Zimbabwe Integrated Teacher Education Course (ZINTEC), a low-cost teacher-training scheme, whereby, only two terms of the four-year course were spent in college and the remainder in teaching in schools.

The government involved local communities to help support schools through providing labour and other resources. The emphasis was not so much on quality and cost effectiveness of the education system, but on accessibility to education.

In 1988, the government formed a separate Ministry of Higher Education<sup>3</sup> to be responsible for tertiary education, which included teacher training colleges, universities and vocational colleges. More and more trained teachers were supplied into the education system and this helped reduce

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<sup>2</sup> Prior to Independence, White was used to include Asians, Europeans and Coloreds (people of mixed races).

<sup>3</sup> The Ministry of Higher Education is now known as the Ministry of Higher Education and Technology.

the proportion of untrained teachers. All the different government strategies helped boost the number of teachers from 18483 in 1979 to 60886 by end of the decade.

From 1990 to 2001 the reforms focused more on the relevance and quality of education and training through new approaches to content, technologies, teaching methodologies, skills provision and through decentralisation and devolution of technical and teachers colleges into degree awarding institutions. According to Riddel (1998)'s categorisation, this would fall under quality reform. The proportion of trained teachers increased dramatically during this period. In 1990, about 51.48 per cent of primary school teachers were trained and by 1997 the proportion of trained primary school teachers had jumped to 77.2 per cent. In secondary schools, only 48.1 per cent of the teachers were trained in 1990 and this number increased to 89 per cent by 1996. This period also witnessed the localisation of the country's testing programs. An Act of Parliament created the examination board, the Zimbabwe School Examination Council (ZIMSEC) to administer and manage all of the country's primary and secondary education examinations. Prior to the creation of this examination board, all the examinations were set and marked by the University of Cambridge Local Examinations Syndicate (UCLES) in the United Kingdom. Thus, the localisation of the examinations helped cut costs by eliminating the need for foreign currency. However, it created other challenges as discussed further in this article.

Education in Zimbabwe today aims at promoting national unity to contribute to national development particularly, economic development through the supply of trained and skilled teachers and staff. The aim is also to revive neglected languages and cultural values and to develop a distinctive way of life with mutual recognition and enrichment of the diverse cultures.

## **STRUCTURE OF ZIMBABWE'S EDUCATION SYSTEM**

### **Primary Education**

The education system consists of primary education, secondary education and tertiary education. The primary level is a seven-year cycle and the official entry age is six years. It runs from Grade 1 through Grade 7. Prior to Grade 1 children enrol in the early childhood education and care (preschool). Primary education is mainly free but parents pay levies in the form of building fund and sports fees. The curriculum is centrally planned by the *Ministry of Education, Sport and Culture's Curriculum Development Unit* (CDU). This unit designs syllabi and teaching materials. The subjects taught in primary schools are: Mathematics; English; Shona and Ndebele (Indigenous languages); and General Paper covering Social Studies, Environmental Science, and Religious Education (largely based on Christianity). The teacher student ratio is one to 30 or 40, though sometimes it can be higher than that. Most teachers in primary school hold a diploma in teaching. However, there are untrained teachers especially in remote parts of the country where trained teachers are unwilling serve.

At the end of Grade 7, students are tested in the four subjects. Since primary education is compulsory and is guided by the policy of unimpeded progress, performance on the Grade 7 examination does not necessarily affect the progression of the students to secondary education. However, some secondary schools are selective and they set selection criteria based on the Grade 7 examinations.

### **Secondary Education**

Secondary education starts in Form 1 (Grade 8) and parents have an option to send their children to a private boarding school (usually church-affiliated), a government boarding school or a day school. Parents pay fees for secondary education, and boarding schools are usually very expensive. Those who can afford it prefer to send their children to boarding schools because most

of them provide good quality education. The majority of students go to day secondary schools because they are the cheapest. However, the quality of education in most day schools is poor compared to boarding and private schools. Like primary education, the secondary curriculum is centrally designed by the CDU in the Ministry of Education, Sport and Culture.

### ***Ordinary Level (O-Level)***

Secondary education comprises a four-year O-Level cycle where the official entry age is 13 years, and a two-year Advanced Level (A-Level) cycle. The O-Level cycle covers a wide curriculum and different schools offer different subjects depending on the availability of resources. However, there are core subjects that students are required to take. These subjects are: Mathematics, English, Science, Shona or Ndebele, Geography, and History. Officially, a student should take a minimum of eight subjects in secondary education. At the end of the four-year cycle, students sit for the Zimbabwe General Certificate of Education Ordinary Level (ZGCE-O) examinations. A student should pass a minimum of five subjects, which include Mathematics, English and Science. After O-Level, a student may choose to proceed to A-Level or go to any of the following: teacher's training college, technical college, agricultural college, polytechnic, and nursing training college.

### ***Advanced Level (A-Level)***

Progressing to A-Level is based on the performance on the ZGCE-O examinations. Progression is on merit and schools set selection criteria. Only those students with good passes proceed to this level of education. At A-Level, students major in a minimum of three subjects. The choice of subjects is usually based on the students' long term career goals. The subjects one picks at A-Level will determine the degree program one will study at the university level. For example, a student who wishes to study Law may consider subjects like English, English Literature, and History while a student who wishes to study Engineering may consider subjects like Chemistry, Physics and Mathematics.

## **Tertiary Education**

Tertiary education in Zimbabwe covers all universities, technical colleges, polytechnic colleges, teacher's training colleges and other vocational skills training canterers. Tertiary education falls under The Ministry of Higher Education and Technology, and is not discussed in detail in this article.

## **Zimbabwe's Examination System**

The Zimbabwe Schools Examination Council (ZIMSEC) is responsible for all examinations in primary and secondary education, which are Grade 7 examination, Zimbabwe Junior Certificate of Education (ZJC), Zimbabwe General Certificate of Education Ordinary Level (ZGCE O-Level) and Zimbabwe General Certificate of Education Advanced Level (ZGCE A-Level) examinations. All the examinations except objective tests are marked by teachers who are trained as markers by ZIMSEC. To qualify to be trained as markers teachers should have at least a diploma in teaching, and some experience in the subject they intent to mark.

### ***Grade 7 Examination***

The Grade 7 examination takes place at the end of primary education. The average age of students taking this examination is 12.5 years. The age ranges from 12 to 15 years. Students are tested in four subjects: English, Mathematics, Shona or Ndebele, and General Paper. Students do not pay examination fees to write this examination. Candidates receive a separate result for each subject in the form of units on a nine-point grading scale from 1 to 9 with 1 being the highest possible grade



and 9 being the lowest. This means students with the best results will have four units (one point in each subject) and one with the worst results will have 36 units (nine points in each subject).

The main purpose of the Grade 7 examination is certification of the students' level of educational achievement. It is also used for the selection of students to secondary education especially by private and mission schools. Some top government schools where there is stiff competition to enter also set selection criteria based on the Grade 7 results. Many other schools, especially those in rural areas, have a 'mass admission' policy regardless of the students' results on the Grade 7 examination. This is because of the government policy of education for all, so that no student should be denied a place for whatever reason.

### ***ZGCE O-L Examination***

The next examination takes place at the end of Form four (Grade 11). Students pay examination fees to take this examination. This examination serves a number of purposes. First, it certifies students' level of educational achievement. Second, it used for selection to go to A-Level. Third, it is also used by employers for hiring purposes as well as for admission to other institutions of higher learning like teachers' and nurses' training colleges. A letter grading system is used as follows: A, B, C, D, E, F, and U; with A being the highest grade achieved and U (Unclassified) being the lowest. The grades are assigned for each subject, and C is the minimum acceptable passing grade. A student should get a minimum of 5 Cs including English to have successfully completed Ordinary level.

### ***ZGCE A-L Examination***

The final examination of the secondary school education system is the ZGCE A-L examination, taken at the end of Form 6 (Grade 13). Results for this examination are used for: (a) certification of student's level of educational achievement, (b) selection to the university and other institutions of higher learning, and (c) employment purposes. Grading of this examination is based on a seven-letter grading system as follows: A, B, C, D, E, F (fail), and O. The O indicates that the student produced work that is equivalent to O-Level standard.

## **SUCCESSSES OF ZIMBABWE'S EDUCATION REFORMS**

The government policies achieved successes in increasing enrolment, achieving racial as well as gender equity in education, increasing the supply of educated manpower, and improving the country's literacy rate<sup>4</sup>.

### **Access to Education**

The government made basic education accessible through policies of free education, compulsory education and upholding children's right to education. With a socialist philosophy, primary education was made free and this resulted in admission rates expanding dramatically (Ministry of Education, Sport and Culture, 2001). According to The Ministry of Education, Sport and Culture (2001), during the first decade of independence, the number of primary schools jumped from 2401 in 1979 to 4504 in 1989, an 87.6 per cent increase and primary school enrolment showed a 177.5 per cent increase from 819,586 to 2,274,178 during the same period. The number of secondary schools increased from 177 in 1979 to 1502 in 1989, a change of 748.6 per cent and secondary school enrolment increased from 66,215 to 695,882 a 950.9 per cent change. The government took steps, such as a rapid increase in public spending on education from 4.4 per cent of recurrent public expenditures in 1979-80 to 22.6 per cent by 1980 and introducing substantial community

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<sup>4</sup> Literacy rate is defined here as the proportion of those who are 15 years or older who can read and write.

financing. This allowed rapid primary sector expansion, for which government resources quickly became inadequate.

### **Gender Equity in Education**

In 1980, the proportion of female students in primary schools was 47.6 per cent compared to 52.4 per cent males. By 1999, the proportion of females had increased to 49.1 per cent and that of males had gone down to 50.9 per cent. This information shows that although equity has not been completely achieved, there were significant improvements during the first two decades of independence in making education accessible to female students. The general pattern is the same for secondary education as it is for primary education; that is, the proportion gap between male students and female students was narrowed during the first two decades. In 1980, about 43.3 per cent of students were females and 56.7 per cent were males in secondary education. In 1999, the proportion of females had increased to 46.9 per cent and that of males had gone down to 53.1 per cent.

### **Racial Equity in Education**

Prior to independence, schools in Zimbabwe were divided into two main categories, Group A schools and Group B schools. Group A schools were for white students and most of these schools were well equipped with state of the art teaching and learning facilities. Group B schools were for black students and most were poorly funded. The government disbanded this classification system in an effort to achieve racial equity in all schools. White and black students had the opportunity to enrol in the same schools and receive the same education regardless of race.

### **Educated Manpower**

The aggressive education policies by the government resulted in the country producing professionals to work in the private sector and government. The country also became a major source of educated manpower in Southern Africa and today Zimbabwe has thousands of teachers, engineers, doctors, nurses, and other professionals working in neighbouring countries and overseas. The sad part associated with this success story is that some poor economic policies by the government created a hostile environment resulting in 'brain drain' of the country's professionals, discussed further below.

### **Literacy Rate**

Although literacy rate is not a perfect measure of educational results, it helps especially in international comparisons of some achievements in different education systems. According to the United Nations Development Program (2003), the country achieved a male literacy rate of 94.2 per cent; a female literacy rate of 87.2 per cent and a total literacy rate of 90.7 per cent. Zimbabwe ranks first in male literacy rate, second in female literacy rate and first in total literacy rate among Southern African countries. This is important because literacy and educational access are important as a means of improving public awareness of environmental and health issues, and reducing family planning (International Labor Review, 1995).

## **CHALLENGES TO ZIMBABWE'S EDUCATION SYSTEM**

The policy formulation process of the first decade after Independence was hurried and highly centralised. The goals and targets were not put within a reasonable time frame. They were largely an act of faith as the strategies and targets were neither well defined nor focused. These goals were not tied to the availability of the requisite resources to achieve them. The provision of education was therefore regarded as a compensatory act for those who had been denied the

opportunity by successive regimes of the colonial era and as a payback to the people who had participated in the liberation struggle to bring about independence.

### **Impact of the Economic Structural Adjustment Program**

By the end of the 1980s, it became evident that the government's socialist ideology adopted in 1980 was no longer suitable to the changing world and was placing a heavy financial burden on the government. Also, the fall of communism in the late 1980s forced the government to move towards a more capitalist society. The government had to pursue new strategies to address the economic challenges facing the country. These strategies were prescribed by the International Monetary Fund (IMF) through the Economic Structural Adjustment Program (ESAP). This program was adopted by the government in 1990. It helped in the liberalisation of the economy with the consequence that many people lost their jobs as local industrial companies closed down because of high competition from outside. The introduction of this program required the government to cut expenditure in social services sectors including education. The government therefore had to make the most of meagre resources to meet the educational and training needs of a growing young population. The Zimbabwe Human Development Report (United Nations Development Program, 2003) notes that the country's economic performance went down since the introduction of ESAP in 1990. Poverty has become more acute and widespread, leading to many parents finding it difficult to afford school fees for their children.

The period 1990-96 witnessed the introduction of cost-recovery policies with regard to education and health. The government scrapped a lot of subsidies in some basic services and commodities. The cumulative effects of these measures on the well-being of ordinary families have been devastating particularly concerning education of children and care of the sick. To cushion the disadvantaged, the government introduced the Social Development Fund (SDF). This fund helps pay school fees and examination fees to orphaned children and those whose parents are physically disabled. It also helps those who are able but poor to afford paying for the education of their children. This fund is too small and in most cases, because of government bureaucracy, it takes a long time for the funds to be disbursed to schools. That means most schools continue to operate on limited budgets.

In 1991, faced with a different socio-economic climate from the one existing in 1980, the government amended the Education Act of 1987 (No.5/1987) to bring it in line with the new socio-economic environment caused by the introduction of ESAP. In particular, the 1991 Act (No.26/1991) introduced fees at the primary school level that had been tuition-free since independence, a reversal of the principle of free and compulsory primary education enacted into law by the 1987 Act. It is important to point out that even after this Act, rural primary education continued to be mainly free. Decentralisation helped reduce the central government's administrative and financial responsibility for the educational expansion. This, however, resulted in less financial support for those schools in poor rural areas, hence further widening the gap in quality education between the rich and the poor.

Although rural primary education generally remained free, parents continue to be responsible for levies to take care of buildings, school facilities and sports. These levies are beyond the reach of a majority of parents. A lot of workers got laid off as companies tried to remain viable under the deteriorating economic environment, inflation began to rise and teachers' income became eroded, schools got caught between reduced funding and increased costs of supplies. One headmaster of an urban primary school points out that at least half of the school's more than 1,000 pupils cannot afford fees, while a government directive says students must not be sent home for failing to pay fees.

The situation became worse by the drying up of donor support and the government was forced to further cut costs. All these resulted in (a) general shortage of books, science equipment and other essential learning facilities due to poor funding of schools, (b) poor students' performance due to lack of books and other teaching/learning resources, (c) low moral among teachers as a result of poor salaries and other working conditions, and (d) lack of attraction and retention of qualified teachers because of poor amenities in rural areas.

These problems facing the education system in Zimbabwe were echoed by the country's leading financial newspaper which noted:

The malady plaguing the local education system is fed by under-funding from the State budget; high inflation which topped 525.8 per cent continues to eat into grants provided by the State to schools. Low morale within the teaching profession has led to staff exodus from the teaching profession. (Financial Gazette, 2003)

Many teachers have left the teaching profession to escape the worsening economic situation. Most found employment in neighbouring countries and others have gone to Britain and the United States to continue with their education. This brain drain seems to be reversing the gains attained over the past two decades of providing trained teachers to the system.

### **Corruption in the Examination System**

One of the major changes that took place in the 1990s was the localisation of the country's testing program. This was done following the setting of the Zimbabwe Schools Examination Council. Although this was a cost-cutting measure, the system faced serious challenges. One of the problems has been the issue of the security of examinations. There have been several cases of examination leaks, with some scripts getting lost during transportation as there is reliance on public transportation to transport examination papers. Headmasters and teachers complain of the sloppy conduct of examinations, which sometimes result in a mix-up of results. Some headmasters gave examples of wrong examination scripts delivered to wrong candidates, candidates receiving results for subjects they did not sit for, and candidates failing to receive results for subjects they sat for. School officials pointed out that not only do the mix-ups of examinations betray the inefficiencies within the education system, but they erode the little confidence that the public still has in the system. Corrupt school officials unseal examination packages before the examination date and either sell the scripts to candidates or give them to relatives. There have been cases of examination papers sold on the black market before students sit for the examination, and teachers writing examinations for students as noted in the *Zimbabwe Independent*, a leading independent weekly newspaper:

In January the dubiety of Zimbabwe's examinations system was exposed at Mnene Primary School in Mberengwa. It was revealed that the school headmaster and three teachers wrote and filled in answer sheets for dozens of Grade 7 pupils. The then Education permanent secretary, Thompson Tsodzo declared that results of more than fifty pupils at the school would stand as genuine. (Zimbabwe Independent, 2004)

### **Relevance of the Curriculum**

The expansion of the education system during the 1980s led to many qualified graduates supplied onto the job market. Sadly, this increased supply of educated manpower has not been met by an equal or greater supply of jobs to absorb them. This has been worsened by the shrinking of the private sector as some companies closed down and others relocated to neighbouring countries to escape the poor economic situation. Unemployment quickly rose to unimaginable rate, about 70 per cent according to 2002 estimates. Some people in the country argue that the school curriculum should be revamped to align it with the needs of the country's industries. They complain that most

students who graduate lack the requisite skills for them to be employed. Thus, people argue that the system is failing to produce employable graduates. For example, the *Presidential Commission of Inquiry into Education and Training* which was headed by one of the country's leading educationists, Nziramasanga (1999), recommended that the curriculum be changed to focus on employment related skills and other essential skills. However, the government is not moving fast enough to implement some of the commission's recommendations, and as a result the irrelevance of the curriculum is an issue most people still blame for the rising unemployment.

### **Information Technology**

The promotion of technology in the school system is one area which has not been moving fast enough. In fact, this is a problem in most developing parts of the world not just Zimbabwe. The problem is that while most schools and other educational institutions in the industrialised countries have ready access to computers and the internet, the same cannot be said of developing countries. Moore (2000) notes that around 700000 in Africa (about 0.1 per cent of the population) use basic internet service such as email. The lack of financial resources and poor infrastructure are the main reason why it is difficult to introduce computer technology in most rural schools. Although computers have been part of the country's education curriculum for a long time, their use has been limited to a few well-funded private schools and boarding schools that have electricity. The majority of the schools do not have the basic facilities required for the use of computer technology.

### **CONCLUSIONS**

Lessons that can be derived from Zimbabwe's experiences are that quality educational reform in developing countries is difficult to achieve. The reforms that took place in Zimbabwe did not focus on outcomes assessment. Indicators of quality education like reading achievement, writing achievement, and test scores did not achieve sufficient attention during reforms. Much attention was paid towards the quantity of students enrolled and their progression through the system regardless of whether they can read and write or not. There were no standards set for students to meet at each level of their education. It can be argued that the colonial education system produced higher pass rates than the post-Independence education system. However, this argument should be made within the context that the colonial education system was highly selective and only a very small percentage of those attending primary school qualified for secondary school education. This means the standards and quality of a colonial educational system are inappropriate for a post-colonial system where the government believes in empowering people and serving the once disadvantaged group of people.

Lack of financial resources to adequately fund the educational system is the main challenge and will remain so for a long time to come. Zimbabwe, just like any other developing country relies on donor funding for some of its educational projects. According to the Ministry of Education, Sport and Culture (2001), about 94 per cent of the government's allocation to the education systems goes towards paying salaries. Only 4 per cent remains to fund development projects. These financial constraints result in the shortage of staff and training materials thus compromising the quality of education. With this poor funding, it is impossible to implement reforms that improve academic achievement, and proficiency and hence provide quality education.

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## Examining the purpose of technical education in Zimbabwe's high schools

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*At the secondary school level, technical education programs serve numerous purposes ranging from narrow skill training to enhancing general education. However, implementation strategies may make the intended purpose of the educational program unclear. This study examined the purpose of technical education in Zimbabwe's high schools, as outlined in the official curriculum documents and perceived by the program implementers. Data were collected in Zimbabwe from policy documents and program implementers (technical teachers, teacher educators, and program managers) using a questionnaire. Lack of clarity and differences between the purpose as viewed by implementers and that in official documents were found. The study recommends that the Ministry of Education: a) take a position on the desired purpose of the technical education program, b) check and institute appropriate measures to correct mixed messages in the policy documents regarding the purpose of technical education, and c) direct adequate resources toward the desired purpose.*

Technical education, Zimbabwe, high school, curriculum

### INTRODUCTION

Education, particularly vocational education (career and technical education), has been seen as a tool for servicing the developmental needs of society. Education philosophers, who believe this, according to Mandebvu (1989), feel that the social, political and economic world outside the school can be changed, if not completely, then partly, by introducing vocational education in the content of education. Many countries have introduced vocational education as part of the formal school system but the most debated issue, particularly at the secondary school level, has been the purpose of vocational education (Hawke, 2000; Strong, 1990).

Vocational and technical education programs at the secondary school level serve numerous purposes. The purposes range from narrow skill training aimed at providing individuals with occupational skills for employment in specific jobs or a cluster of jobs, to enhancing general education (Hawke, 2000; Little, 1992; Lynch, 2000). Traditionally, training received in high school vocational education programs provided the skills and competencies necessary for gainful employment upon completion of the program (Burnett, Harrison and Miller, 1984). Over the years, technology in industry has developed from the artisan-craftsman stage, from emphasis upon manual skills, to the factory system operated and controlled by man (Lynch, 2000; McClurkin, 1996). Employers now require vocational and technical graduates to have soft or non-technical skills (Alpern, 1997; Clagett, 1997). These skills include:

Knowing how to learn; competence in reading, writing, and computation; effective listening and oral communication skills; adaptability through creative thinking and problem solving; personal management with strong self-esteem and initiative; interpersonal skills; the ability to work in teams or groups; and leadership effectiveness. (McNabb 1997; Murnane and Levy, 1996; Oliver et al. 1997, as cited in Imel, 1999, p.1)

The demand for a workforce that is multi-skilled and capable of learning new skills more rapidly has changed the traditional purpose and implementation of vocational education (Brand, 1992). Strategies for implementing the shift in program focus are varied. Developed and developing countries such as Zimbabwe have responded to the trend in industry by shifting the focus of technical education programs from labor-specific craft programs to technical education programs of a general nature. However, from the implementation strategy, it is not clear whether the purpose of the program is prevocational or intensive skill training.

### **Overview of technical education in Zimbabwe**

Zimbabwe follows a 7-4-2-3 system of education, (7 years of primary, 4 years of secondary, 2 years of advanced high school, and 3 years of college or university). Technical education is available from the last two grades in primary school through university. In primary and secondary schools, the technical subjects on offer include: building studies, fashion and fabrics, food and nutrition, metalwork, technical graphics, and woodwork. Not all primary schools offer technical subjects and not all technical subjects are offered in the few primary schools that offer technical subjects.

Secondary education is subdivided into three 2-year phases: Zimbabwe Junior Certificate (ZJC), Zimbabwe General Certificate (O Level), and Zimbabwe Advanced Level Certificate (A Level). The first two levels of secondary education are commonly referred to as high school. Every high school is supposed to offer at least one technical subject and the schools decide the subject to offer. In addition to technical subjects, various technical and vocational education courses are offered through vocational skills centres, privately owned institutions, technical colleges, polytechnics, and universities. The Zimbabwe Ministry of Education, Sports and Culture is responsible for the primary and secondary levels of education while the Ministry of Higher Education and Technology oversees tertiary education, which includes universities, technical and polytechnic colleges, vocational skills training centres, and teacher training colleges.

### **STATEMENT OF THE PROBLEM**

In Zimbabwe, technical and vocational education was introduced before independence in former F2 (technical) secondary schools. These schools catered for 35 per cent of the 50 per cent black primary school leavers (Chinyamunzore, 1995) and were said to be for the less academically minded pupils who could not gain a place in a regular secondary school (Gumbo, 1986; Zvobgo, 1994). The technically-oriented schools gave pupils a sound background in carpentry, metalwork, building, needlework, cooking and agriculture to prepare them for employment as low skilled workers in industry (Mungazi, 1989; Nherera, 1999). The F2 secondary school curriculum, considered to discriminate against blacks from whites, became unpopular with the blacks and the schools were subsequently abolished (Mungazi, 1989).

Following the attainment of political independence in 1980, Zimbabwe's education system underwent many changes. Among these were the abolition of the two racially separated systems of education (Gumbo, 1986), and an emphasis on technical and vocational training (Chinyamunzore, 1995). The focus on technical and vocational training was aimed at reducing shortages of skilled workers, and was also viewed as a possible solution to the increasing youth unemployment



problem in the country (Nherera, 1999). Zimbabwe's education reforms from 1990 to 2001 were more qualitative in nature and focused on the relevance and quality of education and training through new approaches to content, technologies, and skill provision (Mumbengegwi, 2001). In the high schools, technical education programs shifted their focus from the labour-specific, skill-oriented technical programs to technical education of a general nature, with an emphasis on design and technology.

The staff to implement the new high school technical education program were the same professionals trained for the labour-specific, craft-based programs. New syllabuses were printed and in-service workshops held, but not all technical education professionals were retrained inline with the new focus. This implementation strategy raises questions on what exactly is being taught in the technical education curriculum. Besides, in the absence of set performance standards, the course objectives from which teachers derive the content for the various technical subjects are open to different interpretation, resulting in graduating students lacking uniform competencies. While the Ministry of Education and Higher Education (1996) acknowledges vocationalisation of the school curriculum and integration of vocational education into the general secondary school system, it considers these as challenges for the government.

The implementation strategy, to some extent, may have created confusion among educators who are uncertain of their roles (Strong, 1990), resulting in a program serving numerous purposes. Since program implementers greatly influence the curriculum offered or followed in the schools, having implementers who are unsure of their role is detrimental to the success and development of the educational program (Schumacher and Kahler, 1989). Therefore, if any growth of the program is to be expected, and if the new program is to be implemented effectively, it is important to establish whether Zimbabwe's technical education professionals understand the purpose of the technical education program they are implementing.

### **PURPOSE AND OBJECTIVES OF STUDY**

This study sought to examine the purpose of the high school technical education program in Zimbabwe, as perceived by three groups of program implementers: technical teachers, technical teacher educators, and program managers. Specifically, the study aimed to:

- 1) determine the official purpose of the technical education program as stated in the Ministry of Education, Sports and Culture curriculum documents;
- 2) determine the purpose of the technical education program as perceived by the program implementers;
- 3) compare the official purpose of the technical education program against the purpose as viewed by the program implementers; and
- 4) provide recommendations based on the findings.

### **METHOD**

The target population for this study was technical education professionals (technical subject teachers, technical teacher educators, and program managers [inspectors] for high school technical education program). Data for this study were collected in Zimbabwe from 452 technical education professionals: 397 high school technical subject teachers, 39 technical teacher educators, and 16 technical education program managers. The technical subject teachers were all from one district while the teacher educators were from three technical teacher colleges in Zimbabwe. The sub-population for program managers included all secondary school technical education program managers from all the nine educational regions in Zimbabwe.

The data were collected from policy documents and using a 20-item researcher-designed, closed-form questionnaire with a Likert-type scale. The 20 items (10 general education items and 10 craft-based education items) were statements on purposes of technical education derived from policy documents and literature review. Content validity for the instrument was established using a panel of experts. Respondents rated the extent to which they perceived each of the stated purposes of technical education to be currently emphasised in the high school technical education program, according to the following five point scale: 1 = Not emphasised; 2 = Slightly emphasised; 3 = Somewhat/moderately emphasised; 4 = Emphasised; and 5 = Strongly emphasised. The questionnaire was hand delivered to the technical teachers and teacher educators, and was mailed to the program managers.

## RESULTS AND ANALYSIS

### Official purpose of technical education in Zimbabwe

The Zimbabwe Education Act (1991) makes a commitment to move from quantitative expansion to quality and relevance in education through the vocationalisation of school curricula (Raftopoulos, 2003). However, other than statements of goals and objectives in technical subjects' syllabuses and circulars from the Education Officers (program managers) for technical subjects, there was no single document that spells out the official purpose of technical education in Zimbabwe's high schools. The Ministry of Education, Sports and Culture, and the Ministry of Higher Education and Technology (1998 cited in Raftopoulos, 2003, p.4) acknowledge:

The absence of a comprehensive policy document on education and training...has lead to periodical political announcements, policy circulars and Chief Education Officer Circulars that are at times conflicting the source of direction to the sector.

Furthermore, The Nziramasanga Commission of Inquiry into Education (1999) simply recommended the continued expansion of educational facilities and equal emphasis of practical and technical subjects with other academic subjects, in the last two years of secondary schooling. The reason was that "Zimbabwe was graduating far too many students whose exam results were not good enough for university entrance, but who had no practical skills and therefore could not find employment" (Barnes, 2003, p.4). While the recommendation points to provision of technical skills at the secondary school level, it is not clear whether the program is failing to produce the skilled graduates because of other reasons or whether the focus of the program is not skill-oriented.

The lack of clarity and confusion in program purpose can also be seen in the subject syllabuses, which are used by the teachers to interpret the goals of the program and derive content. The Ministry of Education and Culture (n.d.), Zimbabwe Junior Certificate Syllabuses for Building, Metalwork, Woodwork, and Technical Graphics, lists the objectives for Metalwork as to:

Develop skills in using tools and equipment safely; make simple articles that are useful in the home and community; analyze problems in situations in order to find suitable solutions; become aware of techniques and materials used in industry; develop self esteem and take pride in their work; and develop skills leading to self reliance. (Ministry of Education and Culture, n.d., p.13)

From these objectives, the students are expected to get exposure to the industries, gain basic skills and processes for a particular industry, and develop technical skills to a degree where they are self-sufficient. An awareness of the industry and acquisition of basic skills seem to be on extreme ends of the continuum with advanced skill proficiency. The dilemma for teachers becomes how much emphasis to put on basic skills without jeopardising the levels of technical proficiency to where the students are self-sufficient?

A similar situation appears in Building Studies and Woodwork. The objectives for Building Studies include:

Develop a variety of manual skills; become aware of trades and professions in the building industry; become aware of the construction technology available and appropriate to their environment; design simple buildings; and become self reliant and committed to community development. (Ministry of Education and Culture, n.d., p.3)

Among the objectives for Woodwork are to “promote the acquisition of knowledge and technical skills leading to self-reliance; and make simple wooden articles that are useful in the home and community” (Ministry of Education and Culture, n.d., p.22).

### **Purpose of technical education as perceived by program implementers**

Table 1 presents the mean responses and ranking (in parentheses) for each item regarding the current purposes of technical education in Zimbabwe’s high schools, as perceived by the three groups of technical educators. In terms of the highest rated items, the technical teachers rated the following: “Develop in students an interest towards trade or craft oriented work” (mean = 4.47); and “Develop a high degree of skill in the use of basic tools for your trade (mean = 4.45). One of these was a general (prevocational) education item and one was a technical education item. The teacher educators also rated the same item as their highest. The program managers rated the same top three items as the technical teachers.

In terms of least emphasised purposes, the technical teachers perceived the following three items: “Provide exploratory experiences related to current practices in a specific business or industry” (mean = 3.42); and “Develop technical expertise in the operation of power driven machines used in related industries” (mean = 3.36). The teacher educators also perceived “Provide consumer knowledge that enables students to be wise consumers of industrial products” (mean = 2.82), and “Develop highly specialised technical skills necessary for the production of precise finished products” (mean = 2.87) to be least emphasised. The program managers rated least the same item as the technical teachers, and “Provide opportunities for the application of science and mathematics concepts in the technical fields” (mean = 2.48). While the ranking of the items (in parentheses) may vary slightly from one group to another, the 10 highest and 10 least rated current program purpose items were almost the same for each group.

### **Official purpose versus the perceived purpose**

The official objectives of the technical education program in Zimbabwe’s high schools focus on enhancing general education (awareness of trades, professions, and materials in the respective trade areas) as well as on development of technical skills to a level where students are self-reliant. This was also evident from the ranking high of general education and skill-oriented vocational education items by the program implementers, implying that the program has not changed its focus in the eyes of other program implementers. On the other hand, perceptions of members of the public and academics on the purpose of the technical education program confirm the confusion, lack of clarity of purpose, and need for craft-based program. For instance, a Zimbabwe Congress of Trade Unions, Chief Economist felt:

The school-leavers have no experience, no adequate practical skills. What they have is academic education, which has imbued them with high aspirations for white-collar jobs. What they need to improve their chances of (self) employment are opportunities for work experience on the labor market. (Kanyenze, 1997, p.14, as cited in Raftopoulos, 2003, p.7; see also Munowenyu, 1999)

While this observation favours skill-oriented technical education, the attack is not on the current purpose of the technical education program, because the technical education program may not be failing in its purpose, after all.

**Table 1. Mean Responses, Ranks and Degrees of Differences on Current Purposes**

Item <sup>a</sup>	Purpose of Technical Education	Mean Response <sup>b</sup> and Rank for Each Item		
		Teach <sup>c</sup>	Educ <sup>d</sup>	Mgr <sup>e</sup>
5(G)	Develop in students an interest towards trade or craft oriented work	4.47 (1)	3.82 (1)	4.31 (2)
13(T)	Develop a high degree of skill in the use of basic tools for your trade	4.45 (2)	3.69 (4)	4.00 (3)
4(G)	Develop technical skills of a general nature such as measuring, planning, drawing etc.	4.36 (3)	3.72 (2)	4.56 (1)
18(T)	Develop technical skills to a degree where the students are self-reliant	4.28 (4)	2.97(17)	3.31(12)
1(G)	Provide career education to assist students in making informed and meaningful occupational choices	4.25 (5)	3.13(10)	3.50(19)
20(T)	Prepare students for enrolment in highly skilled post secondary school technical education programs	4.15 (6)	3.56 (5)	3.69 (7)
15(T)	Develop safety skills related to a specific occupation	4.09 (7)	3.72 (3)	3.50 (8)
3(G)	Develop human relation skills that will enable students to work cooperatively with others in various fields	4.08 (8)	3.23 (7)	3.44(10)
6(G)	Develop general problem solving skills related to job situations	4.05 (9)	3.18 (9)	3.13(14)
12(T)	Develop in students basic home skills useful in the home or for leisure use	3.94(10)	3.03(13)	3.75 (4)
19(T)	Develop highly specialised technical skills necessary for the production of precise finished products	3.91(11)	2.87(19)	3.13(15)
2(G)	Provide opportunities for the application of science and mathematics concepts in the technical fields	3.79(12)	3.10(11)	2.44(19)
11(T)	Develop manipulative skills for the purpose of fitting persons in specific industries	3.77(13)	3.00(15)	3.69 (6)
10(G)	Provide basic theoretical knowledge on key materials commonly used in Zimbabwean industries	3.76(14)	3.05(12)	3.78(11)
16(T)	Develop specific employment skills needed to enter a particular occupational field	3.74(15)	3.23(8)	3.75 (5)
9(G)	Provide consumer knowledge that enables students to be wise consumers of industrial products	3.70(16)	2.82(20)	3.19(13)
8(G)	Develop general technical skills applicable to various occupational clusters	3.54(17)	3.00(14)	2.88(16)
7(G)	Provide occupational information pertaining to a broad range of occupations	3.52(18)	3.31 (6)	2.81(17)
17(T)	Provide exploratory experiences related to current practices in a specific business or industry	3.42(19)	2.95(18)	2.56(18)
14(T)	Develop technical expertise in the operation of power driven machines used in related industries	3.36(20)	3.00(16)	2.13(20)

<sup>a</sup> (G) = General education item, (T) = Technical education item; <sup>b</sup> Mean response on a 1 to 5 scale: 5 =Strongly emphasized; 4 = Emphasized; 3 = Somewhat/moderately emphasized; 2 = Slightly emphasized; 1 = Not emphasized; <sup>c</sup> Technical Teachers; <sup>d</sup> Teacher Educators; <sup>e</sup> Program Managers

## DISCUSSION

With mixed messages from statements of objectives in the syllabuses, and the emphasis of both the general education and skill-oriented technical education items, the official purpose of technical education in Zimbabwe's high schools is unclear. The lack of program focus and confusion of purpose is aptly put by a discussant to Nherera's presentation (1999) who questions:

What exactly is currently being taught in the technical education curriculum? Are the graduates of the program able to go out and create their own employment or do they learn so that they can only go out to look for employment in someone else's firm? These are the questions that the purpose of the technical education program should address.

Commenting on Zimbabwe's technical education curriculum, Munowenyu (1999, p.53) noted, "The present curriculum in Zimbabwe is failing...to help make school-leavers become better skilled, educated and confident problem-solvers. The solution is to introduce meaningful basic vocational education in schools." This observation and recommendation implies that the current program is not providing adequate technical skills, if that is what is intended, and is focusing on pre-vocational education. It is therefore, not surprising that the World Bank Group (1997) recommended overhauling curriculum toward vocational needs to allow specialisation of skills by revisiting academic (F1) and technical (F2) secondary school systems. The way forward will depend, among other things, on the available financial and material resources, the education system, and the country's social and economic environment (Gumbo, 1986).

Given the increasing unemployment situation (now at 65%) and the worst economic hardship the country is experiencing, the question to ask at this point is whether Zimbabwe needs to revert to the F2 type of vocational training as a strategy for unemployment (Nherera, 1999) or continue to focus on pre-vocational technical education to enhance general education? This issue needs to be debated by all concerned parties (for example, educators, industrialists, economists, funding agencies, and politicians) before a recommendation can be made. Implementing a craft-based technical education program in all secondary schools will be costly and is not possible under the present economic conditions. It is likely to put a bigger dent on the insufficient available resources. On the other hand, opting for the craft-based program in selected high schools will need to be examined in the context of the unpopular F2 secondary schools. This will ensure the program does not dampen the motivation of the program implementers who for a long time, have suffered from the negative stigma attached to craft-based technical subjects. At the same time, maintaining the status quo is not a solution, as uncertainty of roles among program implementers will breed frustrations; and produce students that lack required competencies – a situation that has serious implications on their employability.

### **CONCLUSION AND RECOMMENDATIONS**

There was no single document that spelt out the official purpose of the technical education program in Zimbabwe's high schools. In addition, the statements of objectives in the technical subjects' syllabuses were unclear, provided mixed messages, and were confusing on the exact purpose of the program. At the moment, the exact purpose of the technical education program in Zimbabwe's high schools is not well defined. Therefore, the Ministry of Education Sports and Culture in Zimbabwe needs to spell out the desired purpose of the program, check and correct the mixed messages, as well as provide policy documents that clearly spell out the purpose of the technical education program in high schools. In addition, once the desired purpose has been spelt out, there is need to direct adequate resources toward the desired purpose.

The results from this study are important for the organisation and smooth operation of the technical education program in Zimbabwe. In particular, the following lessons can be learnt:

- 1) by comparing the program purpose as outlined in the policy documents with the interpretation of the program implementers, can help adjust the direction of the program;
- 2) by measuring differences in interpretation of policy documents, may reveal mixed messages or lack of clarity in the official documents; and
- 3) by measuring the perceptions of the different program implementers, can help identify what group of technical education professionals is out of line and needs in-service training.

The research methodology used and results obtained can be of use to other technical education systems in developing countries that are facing issues of program purpose.

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## Co-national support, cultural therapy, and the adjustment of Asian students to an English-speaking university culture

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*This article discusses the adjustment of ten Asian-born university students to the academic culture of an English-speaking university in the United States. Findings from a case study reveal an instrumental role played by compatriot networks in the students' adjustment process. Spindler's cultural therapy model provides the lens for an anthropological understanding of the role of the co-national networks in the participants' adjustment to the new school culture. Implications of this study are two-fold: they indicate the need for universities to revise their orientation programs for international students, especially Asian students, whose home country school practices differ from the English-speaking school cultures. It is also suggested that cultural mediation upon arrival is a more viable alternative than institutional remediation of academic difficulties experienced by Asian students that come from cross-cultural maladjustment.*

Cultural adjustment, Asian students, co-national support, student orientation, international students, enduring self, situated self, endangered self

Despite the fact that English is the lingua franca of the world, it cannot be assumed that non-native English speakers who learn English in their home countries are fully prepared to undertake academic studies in an English-speaking country. The difficulty stems from the fact that using a second language in a school setting also involves socioculturally constructed norms. Besides linguistic proficiency in English, non-English speaking Asian students entering a university in English-speaking countries need to be prepared socioculturally and emotionally to deal with a multitude of non-linguistic factors in order to succeed academically in an unfamiliar educational environment. This article describes a case study involving ten Asian-born university students at a university in the United States.

### **BACKGROUND**

The cross-cultural, linguistic, and academic adjustment of international students pursuing degrees in English-speaking countries has been investigated by linguists, second language educators, psychologists, anthropologists, and sociologists. Studies of second language acquisition have addressed cognition, motivation, attitude, learner strategies, and stages of culture and language shock. The studies postulate that adjusting to a new environment through the use of a second language involves challenges to self-concept, worldviews, values, and attitudes (Ellis, 1995; Gardner, 1985; O'Malley and Chamot, 1990; Schumann, 1978).

Scholars across various disciplines have debated over the significance of cultural differences between the school cultures and practices in Western countries and those in Asian nations, in an effort to explain why cultural difference makes it more difficult for Asian students to adjust to academic life in Western universities than for international students from other Western nations,



regardless of their native language (Littlewood, 2000; Marsella, DeVos, and Hsu, 1985; Ward and Kennedy, 1993). In question are the teaching practices, concepts of academic success, and expected behaviours and interactions among students and between students and teachers in the classroom. Some scholars have indicated that the educational experience of Asian students in their home countries is usually characterised as teacher-dependent, passive, receptive, unquestioning, and based on rote learning (Atkinson and Ramanathan, 1995; Ferris and Tagg, 1996; Johnson, 1988; Saville-Troike, 1984). The Asian students may have difficulty adjusting to Western dialogical practices in class such as questioning, criticising, refuting, arguing, debating, and persuading. These are sociolinguistic characteristics of the standard English academic discourse that are key factors for academic achievement in English-speaking Western countries (Adamson, 1993; Gee, 1990). Other researchers have presented evidence that university students from Asian backgrounds consistently succeed in higher education (Biggs, 1999) despite the stereotypes of their learning styles. More recently, Hellstén and Prescott (2004) and Reid (2002) have claimed that international students, including Asians, actually value interactive teaching and learning. In any case, the adjustment of Asian students has been of some concern to researchers, university administrators, faculty, counsellors, and advisors in English-speaking countries.

## **THE STUDY**

### **Research design**

Designed as a case study (Merriam, 1988; Yin, 1994), the data collected consisted of a series of audio-taped individual interviews with ten Asian students enrolled at a university in the West of the United States. Other sources of data were the students' reflective journals, interviews with their instructors and advisers, observations of classrooms and special events, the researcher's field notes and research journal, and relevant student orientation and advising documentation. Data collected through visits, observations, and interviews with key informants (such as faculty and staff in appropriate departments and service units) provided a profile of the university culture and the context of the students' experiences during the study.

### **The setting**

Western State University (a pseudonym) is located in an agricultural area of the north-western United States. In a student population of 17,500, around 1,300 students have been identified as internationals on student visas; and approximately 73 per cent of those students have come from Asian countries. The majority of the undergraduates are state residents of European-American descent. Domestic ethnic minorities (African-American, Native-American, Hispanic-American, Asian-American, and Asian-Pacific Islanders) and most of the international students are highly visible because of their small numbers and physical appearance against a backdrop of a significant European American, white majority. International students on student visas must achieve 500 and above on the TOEFL test to be admitted to the university.

Academic departments and service units included in this study were: the International Student Office, the English Department and its ESL program, the Writing Centre, the Intensive English Program, the Advising Centre, the Counselling Centre, and various campus-based international student associations. Services for international students are departmentalised; that is, there is no central coordination of support or academic services. A Multicultural Student Centre serves primarily domestic (American-born) minorities. Within the selected departments, key informants (professors, staff, or advisors) were interviewed privately and observed during special events. Foreign student orientation, peer tutor training workshops, extended freshman seminar sessions, writing tutorial sessions, counselling workshops and study skills sessions were observed and a large amount of documentation, such as program brochures, training manuals, orientation packets,

course syllabi, handouts and tests, counselling information, and other relevant data were collected and analysed.

Under the university's student governing body, several special interest and ethnic associations represent their respective student constituencies. These organisations sponsor or participate in cultural, social, and informational campus events. For the Asian students in this study, the co-national student organisations were the linchpin of an informal network of compatriots who assisted them with academic advice, sociocultural mentoring, interpersonal support, and ethnic identity validation.

## Participants

Two types of undergraduate Asian students were interviewed: newly-arrived students and continuing students. The first group provided insight into the dynamics of their adjustment as it unfolded. Continuing students with more than two years of residence at the university added a retrospective point of view on the adjustment process. Participants were recruited through announcements made to the international student population, in ESL classes, and through direct mailings to the Asian student associations on campus. The ethnic and linguistic backgrounds of the ten volunteers who chose to participate closely mirrored the national origins of the four largest groups of Asian students at this university at the time of the study (Japanese, Chinese, Taiwanese, and Thai). The study focused on undergraduates only because their classes were usually larger, their courses were more standardised, and advising was more perfunctory. Too many variables in the adjustment process of postgraduate students such as age, family status, length of stay, and departmental support, would have detracted from the focus on the sociocultural context of adjusting to the academic culture. Table 1 identifies each participant's pseudonym, age, gender, country of origin, major, educational status, and length of stay in the United States or in another English-speaking country at the time this study began.

**Table 1. Profiles of ten Asian undergraduate students ranked by length of stay since arrival**

Name	Gender	Age	Country of origin	Major	Status	Length of stay at onset of study
Yuko	F	23	Japan	Elementary Education	Unclassified	1 month
Emiko	F	21	Japan	English Education	Unclassified	1 month
Masumi	F	20	Japan	International Relations	Unclassified	1 month
Yuan	F	26	Taiwan	Finance	Third year, transfer	1 month
Terawat	M	25	Thailand	Food Engineering	Fourth year, transfer	2 years
Jay	M	24	Taiwan	Business Management	Third year	2.5 years
Su-ling	F	23	Taiwan	Fine Arts	First year	3 years
Naraporn	F	23	Thailand	Communications	Fourth year	3.5 years
Xiao-su	F	22	Taiwan	Hotel Restaurant Management	Second year	3.5 years
Somsri	F	22	Thailand	Business Management	Third year	5 years

## FINDINGS

Through data analysis, the adjustment of the Asian students to academic life was categorised in dimensions and stages. The stages were consonant with the stages of culture shock and adjustment that commonly characterise the process of adjustment to a new and unfamiliar culture (Oberg, 1972; Schumann, 1978). The participants in this study described three stages in the adjustment process: (a) a short period of expectations and elation just prior to and immediately subsequent to arrival; (b) a second period of variable length characterised by intense emotional and interpersonal turmoil; and (c) a third stage where comfortable adjustment and achievement of personal and academic goals were achieved. For the purposes of data analysis, the stages were defined as entry, dissonance, and adjustment. In addition, the findings indicated that the students experienced interpersonal and sociocultural challenges, which could not be attributed solely to linguistic problems; that is, in their own views, it was not just a matter of limited English proficiency.

Categories that emerged from data coding suggested three dimensions of adjustment throughout each of the three stages: (A) intrapersonal, (B) sociocultural, and (C) academic. An analytical matrix that depicted the intersection of the three dimensions and the three stages of adjustment is seen in Table 2.

**Table 2. Analytical matrix depicting stages and dimensions of adjustment**

Stages and Dimensions	STAGE 1 ENTRY	STAGE 2 DISSONANCE	STAGE 3 ADJUSTMENT
A INTRA- PERSONAL	1A Expectations: being outside observer and doing intellectual tourism	2A Culture shock Psychological turmoil Sense of incompetence	3A Cultural therapy and self-efficacy Personal adjustment
B SOCIO- CULTURAL	1B Introduction to co-national network	2B Interpersonal and sociocultural divergence	3B Cultural therapy and sociocultural adjustment
C ACADEMIC	1C Co-national coaching and mentoring	2C Divergence of academic practices	3C Cultural therapy and academic adjustment

Two intersecting analytical models were applied to data analysis: Bandura's concept of self-efficacy and instrumental competence, and Spindler's concept of repairing a perceived lack of instrumental competence through cultural therapy or intervention. The concept of self-efficacy was defined by Bandura (1982, 1995) as an expectation to succeed in specific social contexts. Bandura postulated that self-determined perceptions of being able to do the right things in a school setting could be expressed as instrumental competence. The notions of self-efficacy and instrumental competence emphasised the situational nature of the relationship between self and self-esteem to schooling.

Spindler's anthropological model stresses the culturally-situated performance of students from culturally-dissonant backgrounds (Spindler, 1987, 2000). From this perspective, the students acquire deficits in self-concept when they fail to adjust to the school culture; they may be perceived negatively by teachers and majority students, or perceive themselves as incompetent or deficient. Since school performance and self-concept are interrelated, this means that plunged into an unfamiliar sociocultural school context, students develop a sense of personal incompetence in the absence of an effective cultural frame of reference. In addition, Spindler and Spindler's (1992, 1993) definition of a multi-faceted self (the **enduring self**, the **situated self**, and the **endangered self**) facilitates our understanding of how individuals can overcome cultural divergence by separating the permanent sense of self and ethnic identity from a locally situated self for adjustment purposes. The enduring self is the lifelong concept of self deeply rooted in home country heritage, educational experiences, and sociocultural practices, which all individuals possess. The situated self develops during a process of adjustment to a new environment without harming the enduring self. If, however, the person is constantly threatened by unfamiliar demands placed on the situated self for a prolonged period of time, the latter may be unable to cope or adjust, thus endangering the enduring self. The endangered self may resort to resistance, hostility, or simply shuts itself down, unable to adjust. The student with an endangered self attempting to adjust to a new school culture then either fails to succeed or becomes permanently marginalised. Nevertheless, the endangered self can be repaired by cultural intervention and role modification in a process that Spindler (1992, 1993, 1994) defines as cultural therapy. This process involves conscious learning of ways to make situational adaptations, to verbalise the dual nature of the self in cross-cultural situations, and make efforts to engage the situated self to act in culturally appropriate ways. This consciousness raising process results in instrumental competence and self-efficacy, which, in turn, facilitate academic adjustment. While these two analytical frameworks have been applied to studies of domestic linguistic minorities around the world (Bandura, 1995;

Spindler, 2000), they provide a new approach to understanding and interpreting the adjustment of Asian students to the university culture in another country.

Whether applied explicitly and directly by knowledgeable teachers or counsellors, or implicitly by cross-cultural mediators, cultural therapy, according to Spindler, is the “process of bringing one’s own culture... to a level of awareness that permits one to perceive it as a potential bias in social interaction and in the acquisition of skills and knowledge...[that] we call...instrumental competencies.” (1993, p. 28). According to Spindler and Spindler (1993), this empowerment process can be utilised by students as a form of consciousness-raising that allows them to identify the “steps necessary to obtain the instrumental competencies they need” (1993, p.29) in order to succeed academically. The intervention of co-national networks in the adjustment of the Asian students in the study reported herein is explained through this concept of cultural intervention or therapy. The students’ perspectives on their own adjustment, which they have shared through interviews and personal journals, are discussed in the following section. They are based on the dual analytical framework and the analytical matrix of stages and dimensions.,.

## **DISCUSSION**

### **Stage 1: Expectations**

The ten Asian students in this study arrived in the United States as adults with established ethnic identities and culturally defined self-concepts developed in their home countries. Cells 1A., 1B, and 1C in Table 2 depicted the initial experiences of the participants on arrival in the United States in terms of intrapersonal experience, sociolinguistic limitations, and initial tasks dealing with the structure of the academic program at the university. At the time of arrival (entry) the students expected to remain outside observers during their sojourn, attending classes, getting an education, and learning about American culture without really getting personally involved. As outsiders looking in, the Asian students anticipated an experience akin to cultural and educational tourism. Their initial motivation to study in the United States and their expectations upon arrival did not prepare them for what they encountered: they were expected to respond to new situations in an English-speaking university as socioculturally competent students able to participate effectively in the academic classroom discourse. Upon arrival, the institutional orientation to academic and campus life was overwhelming. Even to an observer familiar with the setting, the amount and breadth of information, catalogues, regulations, and guidelines to be pored over quickly in one or two days prior to registration was impressive. In a matter of days, international students were expected to negotiate the demands of attending all-day academic orientation sessions, take placement tests, select courses, see advisers, secure housing, and attend to financial transactions in an unfamiliar sociolinguistic and cultural context. Fortunately, the initial culture and education shock was cushioned by the safety net of the compatriot support system (cell 1B). Co-national coaching and mentoring helped them sort out the priorities of what needed to be accomplished in order to begin academic studies and adjust to university life (cell 1C).

### **Stage 2: Dissonance**

To the Asian students in this study, the anticipated onset of culture shock corresponded to varying levels of emotional turmoil (cell 2A) that came mostly from cultural dissonance between their earlier schooling experiences in their home countries and the new school culture. This dissonance was manifested in all facets of daily life: sociocultural divergence (cell 2B), cognitive divergence (cells 2B and 2C), academic discourse divergence (cell 2C), with serious repercussions to the students’ self-concept, self-efficacy, and interpersonal interactions (cell 2A).

From a psychological perspective, feelings of estrangement and inadequacy, although predictable, resulted in dysfunction and alienation (cell 2A) To varying degrees, every one of the students

experienced culture shock, mental fatigue, loss of self-confidence, and academic deficiency. The students expressed their pain and self-awareness in the following ways:

*Now, I am not so glad I came. I cry all the time, I'm homesick, I feel lonely... I can't sleep, headaches. Big problem is myself... I think I can do better... Here I don't have chances to express myself... In Taiwan I communicated very well in my job. I lost confidence... here I'm scared and afraid.* (Yuan, Interview 2)

*... When I want to say something to the teacher, the body language says "What you say is not important" or "Asian people act very stupid," then I don't talk anymore.* (Naraporn, Interview 2)

The feelings described by the participants revealed emotional turmoil during stage 2. At this point, their enduring selves became endangered because the situated self was not well equipped to facilitate the adjustment without harming the enduring self (Spindler, 1987, 2000). In Yuko's words,

*... All the time I can't say anything my opinion...so I get so nervous...The problem is I cannot speak well, they cannot understand me... I know everything is not English... I feel a little discrimination, I feel out of place with strict attitude of some classmates. Also behaviour of students... attitude against teacher is very different...This would never happen in Japan, because we have other custom, we have to respect teacher and we can't complain... I worry, feeling helpless and tormented by the change in personality because of the difficulty expressing in different language.* (Interview 2)

### Stage 3: Adjustment

Some of the participants in the study had been put on academic probation because failing grades at some point of their studies (Xiao-su and Somsri). Although some of the students considered leaving the school (and the country) early in their studies as stated in their journals and interviews, none of them dropped out. It may be argued that self-motivation and cultural therapy were factors that enabled the participants to move into the comfort zone (cells 3A and 3B). Motivation and goal-setting had brought some of them overseas in the first place. During the second semester of the school year, (during Interview 3, students shared their thoughts. To Emiko, an aspiring elementary school teacher, it was professional motivation: *"In Japan, elementary school teachers will have to teach English to elementary school children, so I came to improve my English."* To Naraporn, certain personal characteristics were essential: *"I think people who are insecure, troubled, shy, will have more trouble. I am not afraid to ask questions...I learn watching other people too."* Su-Ling believed goal-setting and self-motivation were keys to success: *"...I think most students don't want to drink beer, just study hard, keep going. The degree is their goal, they spend four or five years, get a degree and go back..."*

An informal network of compatriots was repeatedly mentioned as the main source of mentoring and cross-cultural reference.

*Last semester I couldn't understand the professor. I stopped going to classes. My GPA was 1.01... I was on probation... So my [Taiwanese] friends help me choose. I chose some easy and some hard classes. I worked very hard the second semester. My GPA is 3.09 this semester.* (Xiao-Su, Interview 3)

By providing reassurance that the individual was not incompetent but was facing a different educational system with different expectations of university students, the co-national mentoring network was instrumental in aiding the transition from cultural divergence (Stage 2) to the adjustment stage (Stage 3). *"... The librarians very helpful but they didn't explain. When I ask they cannot explain what I needed. My [Thai] girlfriend knew how to show me slowly step by step"*

(Terawat). This also validated ethnic identity and the need to succeed for the sake of their families. A key informant, the department advisor in the school of business, gave credit to the role of compatriot assistance:

*The Malaysian students come into my office in groups. The mentor shepherds them around campus in groups even for advising.... The Chinese students have a grapevine system to relay information ... sometimes erroneously, I might add... But they do well within the system, so I guess it works for them.*

## Discussion

Regarding the adjustment of students to situations of cultural discontinuity, Spindler's (1987, 2000) notion of multiple selves (the enduring self, the situated self, and the endangered self) makes sense. These views of self are reflected in the testimonies of the participants. Becoming adjusted, reaching a comfort zone, meant to Naraporn, Yuko, Terawat, and Su-Ling a reaffirmation of their enduring self, the ethnic identity proudly maintained, while the situated self was stabilised after the endangered self negotiated communicative and academic inefficacy. The situated self was able to reach academic and sociocultural competence at a comfortable level of self-confidence, sociocultural adjustment, and academic competence.

The concepts of 'adjusted accommodation' and 'learning to play by the rules' are processes described by anthropologists. Gibson (1987) studied language minorities in various countries who succeeded in their educational objectives despite home and school divergence, personal adversities, and sociocultural obstacles in mainstream schools. The instrumental value of an education in an English-speaking country, ethnic pride, the need to save face, the modelling by co-national mentors, and a gained awareness of sociolinguistic differences provided the tools for the students in this study to make the adjustment possible within each of the three dimensions.

To some of the participants in the study, the adjustment process meant adapting their study skills. Xiao-Su stated that she decided to "*crack down, not skip classes, and study ahead.*" Somsri relied on her college-graduate American host mother for advice. She reported that her

*host mom always went to the professor.... she told me to try because it makes a big difference, the teacher gets to know you... so if I'm not finished by the due date I go to the professor and he say, OK, no problem.*

Yuko took to heart her teacher's suggestion to consult after class: "*I see the teacher after class to make sure I understand the assignment.*" Su-Ling also reported she asked the teacher when she had problems with the class. Yuan had mixed feelings about talking to her professors. Even though she had been advised by her biology professor to "*talk to the Teaching Assistant to help with the vocabulary and use your dictionary during the exams,*" she acknowledged that she seldom talked to her teachers, preferring instead to "*talk to my [Taiwanese] friends about my classes.*" Jay concurred. "*I get help from my Taiwanese friend who took this class before,*" he said.

For some students, the adjustments had profound effects on them. To Naraporn, it meant regaining national pride:

*...Coming here made me more aware of being Thai... I found out that sometimes when we try to improve our pronunciation, the other [Thai] students will say, "You are trying to become American." It doesn't look good. So I decided to keep my heavy [Thai] accent... You have to tell yourself that you can do it like American students. You have to respect yourself. American students are not always better...*

Somsri had to deal with reverse adjustment to her own culture after five years of residence in Canada and the United States. She disclosed:

*... I changed a lot since I came. I used to be scared of everything, helpless... Now I can handle my life... I am still shy and quiet... When I hang out with Thai people, I don't get the joke. They are not funny anymore. It is more difficult to relate to them. I don't enjoy their topics. I see things differently.... I also argue with my parents a lot. I even said to my mom when she was here visiting 'back off, leave me alone'. My father was mad, but my mom said, let her go. She understands...*

Emiko attributed some of the difficulties in communicating to lack of interest of the native-born Americans in international students. She said:

*... I used to think that American students were cold, unfriendly. But now I think they just are not interested in other cultures and other people. When I go back to Japan I will remember, it's not enough to be kind to international students. I will have genuine interest and sharing.*

Yuko also realised some of the difficulties she had experienced were not her fault.

*The people's behaviour was hard. I thought it was prejudice. Why did I feel like that? I couldn't communicate.... Now I can communicate. The differences don't bother me. I have been Japanese for 23 years. Now I never think of becoming an American. I think the problem to communicate was the Americans. I have friends from Mexico and it's nice. The other day I was talking in English with a Korean friend, well I don't speak Korean and she doesn't speak Japanese, and we heard some people near us talking about why we were trying to speak to each other in English if our English was so bad, they thought we were from the same country.*

In the case of the Asian students in this study, self-reflectivity mediated by co-national support, provided the medium for the situated self to adjust. Through cultural intervention, or as Spindler (1987, 2000) called it, cultural therapy, the students were able to adjust to the new sociocultural context of the university by redefining their dual selves – the enduring and the situated self. In this way, they found a more favourable view of the self, maintained the enduring self-intact, adjusted to the new university culture, and succeeded academically. The catalyst in the adjustment process was the cultural therapy provided by the compatriot network that prevented the endangered self from damaging the enduring self permanently. Once the perceived interpersonal and academic inefficacies were defined as cultural discontinuity, the Asian students in this study were able to continue working towards their goal: to earn an academic degree from an American university.

## CONCLUSIONS AND IMPLICATIONS

Findings from this study add to the body of evidence, which indicates the need for culturally-specific support for non-native English speaking students and Asian students, in particular, attending higher education institutions in English-speaking countries. While linguistic preparation for academic studies in a second language is undeniably essential, adjusting to the university culture is far more demanding than just displaying linguistic proficiency. This understanding is essential for university administrators, admissions officers, international recruiters, advisers, and university staff and faculty in English-speaking countries. It is also of concern to English teachers and school administrators in Asia working with Asian students who plan to pursue academic degrees in English-speaking countries. The findings from this study are grouped into two categories: (a) student perspectives on their adjustment; and (b) suggestions for institutional intervention and support.

### **Student perspectives**

The Asian-born university students in this study did not seek help from any of the institutional support services for various reasons. Some of the participants were not aware of the existence of support services, or dismissed them as not as helpful as the co-national mentors. According to the ESL instructor interviewed, international students perceived themselves as visitors, “*not consumers of higher education as an export commodity who are entitled to appropriate support services. After all, they pay tuition and contribute to the local economy.*” By choice or by circumstance, the students who participated in this study remained segregated from the mainstream campus culture. Their quiet demeanour and smiles of embarrassment were often misunderstood in and out of the classroom. Their silent yet intense suffering remained unknown to, or ignored by, their advisors, professors, and classmates. To quote another institutional informant (departmental advisor) who reflected on the choice of support, “*Perhaps Asian emphasis on a sense of accomplishment and self-respect prevents them from seeking help from the university community.*”

#### ***Self-reliance as a cultural construct***

Upon arrival, understanding the university registration procedures for selecting, adding or dropping courses, and understanding the role of advisers, was challenging. The students needed individual support to meet these challenges. As mentioned above, the newcomer orientation sessions were crammed with verbal, visual, and printed information for immediate and future reference. This practice was a manifestation of the American self-help and self-reliance lifestyle, which has permeated the academic culture as well. In addition to cultural expectations of self-reliance, the overwhelming amount of information presented during foreign student orientation was bewildering to the students, despite the good intentions of the presenters and advisers. Assistance and guidance in navigating the institutional requirements during the first semester and thereafter came from the informal network of compatriots.

#### ***Co-national support and cultural therapy***

Compatriot support was the key element in the adjustment of each of the ten participants. Co-national mentoring did not label the student as linguistically or academically deficient; it focused instead on differences between the educational systems of two countries. Through individual mentoring and academic coaching, the co-national network was not repairing or remediating an incompetent person but providing cross-cultural therapy. Assuming that the Asian students had a choice between institutional support (advising, tutorials, counselling, remedial courses) and sociocultural mentoring through the co-national support, it was easy to see how the focus on cultural divergence rather than academic remediation would favour the compatriot network.

### **Suggestions for institutional intervention and support**

#### ***Remediation or sociocultural adjustment?***

At many institutions of higher education in the United States, remedial courses and tutorials are offered (or required) for students on academic probation due to low grades. This practice places the burden of remediation of academic deficiency on the students. In the case of Asian students in this study, if they had been provided adequate sociolinguistic orientation to the university culture before or soon after their arrival in more effective ways, they might not have reached the point of being placed on academic probation or forced to enrol in remedial courses when their grades dropped dramatically. By stressing cultural mediation as a characteristic of support services specifically designed to facilitate the academic and sociocultural adjustment of Asian students to a



new educational environment, a pro-active cross-cultural approach to student orientation would more closely resemble the cultural mediation provided by the compatriots in this study.

### ***Extended orientation to the academic culture***

One type of academic support which can be provided to international students is an extended orientation program. Offered at many universities in the United States for English-speaking first year students, the extended orientation program, sometimes called the First Year Experience, or Freshman Seminar, aims explicitly at improving critical thinking skills and academic reading and writing, targeting particularly first generation college students from Non-English-speaking backgrounds (NESB). More importantly, some of these programs also provide interpersonal support and academic modelling by peer facilitators, who lead small group discussions tailored to the students' academic adjustment needs and concerns. Promoted as a bridge between high school and higher education, First Year Experience programs have become quite common at universities in the United States. At the site of this study, an elective seminar is linked to one of the required freshman courses. It provides a supportive environment for academic acculturation of first year students facing an unfamiliar discourse and culture. Peer tutors lead small groups of five to ten students in weekly face-to-face and web-based seminars. This approach to student support linking lower division courses with peer-facilitated seminars has been implemented at Western State as a means to eliminate and prevent the need for subsequent remedial services for students who fail in their first year (From an interview with the director of the Freshman Seminar Program).

A program similar to the extended freshman orientation seminar could be developed for newly arrived international students. A semester-long orientation to the academic culture incorporating the three dimensions of adjustment discussed in this study is recommended. By inviting co-national mentors to participate as peer advisers, such an orientation program has the potential to diminish the risk of academic failure during the sociocultural and academic adjustment process.

### ***Cross-cultural awareness among faculty***

The globalisation of higher education is a reality in many countries. To many universities, the presence of international students brings financial and cultural advantages. This can be viewed as an opportunity for the university faculty to understand better cross-cultural differences. In-house professional development workshops on the topic, integration of instructional technology into course designs, and diversification of teaching strategies are some ways to assist university faculty in integrating cross-cultural diversity into classroom practices. This idea is gaining popularity in many universities in the United States, where centres for excellence in teaching exist to assist faculty to improve teaching and learning. Promoting cross-cultural and mutual adjustment between faculty and international students would foster inclusiveness and improve interactions between native and non-native English-speaking students in the university classroom.

Furthermore, when the stigma of remediation of academic deficiency is removed from support services available to international students, self-perceptions of maladjustment, inefficacy, and academic deficiency can be transformed into a journey towards personal growth and the acquisition of additional ways of reasoning, communicating, and interacting without loss of ethnic identity or the sense of self-efficacy. Cultural therapy would greatly facilitate the achievement of educational goals of international, particularly Asian students, in English-speaking universities. This pedagogical approach would also benefit the worldview of the native-born college students, if a true internationalisation program of reciprocal sociocultural and academic exchange were implemented in institutions of higher education in English speaking countries.

It would be naive to expect institutional changes to occur simply because there is a need for change. That is not to say nothing can be accomplished. Educators, student leaders, and recruiters

of international students in English-speaking countries can be effective advocates for the implementation of effective sociocultural orientation to the university culture for Asian students seeking university degrees in those countries.

### EXPANDING THE INQUIRY

More interdisciplinary studies of sojourner adjustment to school contexts are suggested. Ethnographic cross-cultural studies of the adjustment of students from different sociolinguistic backgrounds pursuing academic studies in English-speaking institutions would expand the understanding of the role sociocultural differences play in the development of instrumental competence and academic achievement of international students studying abroad. Studies of the tenuous nature of self-concept and self-efficacy of international students in unfamiliar settings, as proposed by Spindler's (1987, 2000) concept of cultural therapy (or mediation) have a place in international education research. Through qualitative studies of the First Year Experience or Freshman Seminars and other extended orientation programs specifically designed for international students, insight may be gained into institutional practices that promote academic adjustment and achievement for all students. Comparative studies of co-national support networks might reveal other aspects of adjustment to academia. Finally, educators and administrators in Asian countries, particularly English as a foreign language (EFL) instructors, involved in the education of Asian students bound for college overseas, should be encouraged to expand their practices in order to prepare students for the multiple dimensions of the university culture Asian students are likely to encounter abroad.

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# Parents' and teachers' perception of selection as a factor of quality in the curriculum process in Nigeria

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*This study was motivated by the need to redress the problem of decline in the quality of education in Nigerian schools. Although there are several factors that influence success in the learning situation, it is contended in this paper that the provision of the other conditions of learning may not have marked impact on successful learning if the learner is not intellectually prepared and fit for studies at that particular level. Selection is required in order to identify suitably qualified candidates for admission or promotion. In Nigeria, everybody wants to go to the university and earn a degree, including those who do not have the capacity to do so. The issue of selection therefore, seems to be controversial. This study sought to find out the perception of Nigerian parents and teachers of selection as a factor of quality in the curriculum process. A 13-item four-point scale questionnaire was administered to a sample of 2000 parents and 1000 teachers on this subject. While parents and teachers were to a large extent in agreement on the importance of quality education in any society as a guarantee for the effectiveness of that education, they disagreed on selection as a means to it. The teachers were better disposed to the practice of selection in the curriculum process than the parents. The paper recommends the need for the government to insist on standards in the admission and promotion processes in the schools.*

Selection, curriculum quality, Nigeria, promotion processes, quality in education

## INTRODUCTION

Decline in the quality of education in Nigeria has become too glaring and alarming in the past 20 years to the extent that the issue can no longer be glossed over by anybody who is aware of the key role of education as an instrument of social transformation and development in any society. A reference to specific indices according to Disu (1996) and Malik (1997) provides a convincing picture of the extent of decay and decline in the quality of education in Nigeria. Urevbu (1997) identifies the poor performances of students in the senior school certificate examination as an indicator of the falling standards in the nation's education. In addition, the inability of most school leavers to communicate effectively in written and spoken English Language is an obvious sign of decline in the quality of education. Foster (1999) shares the view that Nigerian schools have continuously failed to prepare the youth for effective and productive living and contribution to the society. In a study of the quality of Nigerian secondary school leavers, Foster (1999) found that the youths fell below the acceptable level in measures of creativity and problem-solving abilities. Accordingly, it was concluded that to a large extent there are indications that the quality of secondary education received by these youth was questionable. It suffices to say that these findings are still being corroborated by public commentaries on the declining quality of education in the country. For instance, the Nigerian Educational Research and Development Council (NERDC) carried out a nation-wide assessment survey on the effectiveness of secondary schools in the country. It found out, among other things, that subjects performed reasonably well in tasks

that required narration and very poorly when confronted with tasks requiring interpretation, inference, explanation, argumentation, and problem solving. It concluded that the potency of the education or preparing the youth for productive living was in doubt. Investigations have also shown that employers' rating of the creative abilities of school leavers and graduates is rather low. Today, a number of employers in the private sector give preference to applicants holding a Second Class Honors (Upper Division) Degree as a minimum qualification for employment. However, even these graduates have had to be given additional orientation and on-the-job training to help them to develop the appropriate skills and competencies related to the job. It is assumed that the schools no longer equip them adequately enough to fit into employment. However, it needs to be clearly stated that, the issue of decline in the quality of education does not necessarily mean that the content of education has been watered down. The point is that the quality of instruction has been generally low due to inadequacies and irregularities in the school system. According to Urevbu (1997), the Nigerian school system in the last 20 years has been overtaken by monumental crises. These include the endless closure of schools due to workers going on strike and students' restiveness; poorly trained, poorly paid and poorly motivated teachers; inadequate instructional materials and facilities; lack of basic infrastructure support; examination malpractice; and under funding of education by the government.

Admittedly, there has been eagerness on the part of the public and the government to provide education for the citizens. Politicians alike have always echoed the need for high quality education in the country. Unfortunately, this has remained rhetoric as no dynamic efforts have been made toward its realisation. Nevertheless, it would appear that the government seems to have a very vague and hazy notion about the curriculum process as well as how schools are created, organised and made to function (Apple, 1990, 1992; Urevbu, 1997). It is therefore high time to recognise the fact that schools do not function automatically, but have to be made to function. A lot is yet to be done beyond mere policy statements on high quality education in Nigeria as the expected quality does not evolve naturally from such statements of intention. Could it be that the government does not know what to do? Or could it be that it does not have the political will to bring about some dynamic and radical approaches to enhance quality in the school system?

Of course, not only do opinions differ on the concept and measures of quality in education, the political dimensions and implications of the means to it, make the subject more controversial and scaring. Akindele (1999, p.62) stated that:

if we are thinking of how to make our educational system to be qualitative, let us first, find out or think of what has made the system to lose the quality it once had and turn the table around by re-introducing and re-emphasising those missing variables for the needed results.

To this end, many observers and critics have attributed the decline in the quality of education in the nation's schools to poorly trained and poorly paid teachers, inadequate infrastructure, and outright neglect of schools by government due to their vague notion about the schooling process. Other contributory factors include dwindling economy, shortage of specialist teachers in most of the schools, shortage of basic instructional materials, evolving negative societal values and youth's lack of interest in schooling in preference for the pursuance of money-yielding ventures, as sources of decline in the quality of education in Nigeria (Azu, 1999; Enole, 2001).

Acknowledging the above factors as the critical sources of the decline in the quality of education in Nigeria, Iyamu (1998) argued that education involves the input-output equation. The quality of educational output such as equipping school leavers with the necessary knowledge, skills, values and attitudes needed for effective and productive living as individuals and members of the society is largely dependent on the quality of the educational input. Such inputs include the number and quality of teachers, the teachers' motivation in terms of a meaningful living wage and sense of

professionalism, relevant teaching and learning materials, instructional leadership and more importantly the quality of learners at the different levels of education. In the bid to make education available to as many citizens as possible in realisation of the unparalleled role of education as a tool for national development, Nigeria seems to have lost sight of quality education and the variables leading to it. Again, this is as a result of the notion the government has concerning the schooling process. There is the misconception that once school blocks are built and a few teachers made available, children can be pushed through the system and come out educated without providing several other conditions for effective teaching and learning. At the end of the day, the children leave school certificated but not educated. Today, it is common to find a good number of graduates of Nigerian universities who can neither express themselves well in the English language, nor demonstrate reasonable mastery of their subjects. The issue here has to do with the quality of the learners as a critical factor in the educational production function. Though the school is expected to help in moulding character and develop in the learners, relevant knowledge and skills, the extent to which this can be achieved is perhaps subject to the entry behaviour of such learners. Learners with a reasonable levels of maturity and readiness are likely to benefit more from a given school program. The questions here are: What is the quality of learners admitted to the different levels of education in Nigeria? What is the quality of students who are promoted from one class to the other in Nigerian secondary schools?

As part of the problem in Nigerian society and its education system, there is an apparent loss of value for excellence and merit. Student admissions to university generally, and to more highly esteemed courses (university programs) are not entirely based on merit. Class influence and economic power are critical conditions rather than merit. Though the Joint Admissions and Matriculation Board (JAMB) is expected to moderate and ensure compliance to admission regulations, it is distressing to note that a very insignificant proportion of students admitted each year is based purely on merit. This results in the preponderance of students who are neither mature nor ready for university education. It follows therefore that such students find it difficult to cope with their studies. They are also not likely to benefit maximally from the learning opportunities provided. The above phenomena prevail in the university system today because the authorities have negated the selection culture that ensured high quality in the past (Malik, 1997).

However, this author acknowledges the fact that selection is not the only variable that influences successful learning. Studies including those of Imogie (1990) and Iyamu and Aduwa (2004) have shown how the various components of the learning system interact to facilitate learning. These include personnel, facilities, materials, equipment and the learners. Besides, researchers have also recognised the impact of the home environment, the learners' cognitive abilities, their self-esteem, self-concept, and motivation as important determinants of success in the learning situation. It is the belief of this author that the adequacy of the learning environment may not contribute much to successful learning if the learner is not intellectually prepared and fit for learning at that particular level. This is where the relevance of selection comes in.

The negation of selection in the nation's primary and secondary schools is manifested in obvious learning ineffectiveness and difficulties. According to Blumende (2001), secondary education in Nigeria has become a routine to the extent that people are more interested in attendance than learning outcomes. In the past, entrants into primary and secondary schools were expected to meet certain qualification requirements. Similarly, pupils were promoted to the next higher classes if they were found qualified. The weak ones were asked to repeat their classes. Today, there are no strict conditions that guide admission and promotion. A pupil is admitted or promoted if the parents have the money to pay. The proliferation of uncoordinated and unregulated private primary and secondary schools and corruption among school heads have compounded this problem. It is easy to find pupils transferring from Class 2 in School A to Class 4 in School B provided they can pay the fees. This has resulted in lack of quality control at the formative stage.

On the implications of this phenomenon, Blumende (2001) holds the view that schools face the serious task of teaching children who do not have the needed capacity to learn at that level. No matter the zeal and commitment of the schools, their ability to make the best out of the so-called 'unselected students' is grossly limited.

The negation of selection in the nation's schools seems to have the tacit support of the governments that have continued to politicise education through its policy of a quota system that is meant to equalise educational opportunities for the citizens. The problem here is the confusion between equality and equalisation of educational opportunities. Over the years, governments have been caught between mass and populist education and qualitative schooling.

### **THE PROBLEM**

The central role of education as an instrument for social transformation and national development is globally acknowledged. That education will perform this role more effectively if it is of high quality is indisputable. That the quality of education output is a function of its input is also not disputable. There is also no dispute over the fact that selection is needed to have high quality input of learners to produce high quality output. In the views of Imogie (1990), however, emphasis should not be on educational input as an end in itself but as a means to an end. Such input becomes meaningless unless the input is well organised and utilised to achieve the desired educational goals. As part of educational input, selecting the suitably qualified candidates for admission or promotion has to be complemented with other important educational variables for effective results.

Though selection plays a critical role in ensuring students' successful learning, there appears to be no agreement on the issue of selection as a factor of quality in education in Nigeria. Neither are Nigerians in support of strict selection in the curriculum process as a result of political, social and ideological considerations. Against this background, is it not necessary to find out the perception of parents and teachers on the issue of selection as a factor of quality in the curriculum process?

### **Research Questions**

The following questions were asked to direct the investigation.

1. Do Nigerian teachers perceive selection as a factor of quality in education?
2. Do Nigerian parents perceive selection as a factor of quality in education?
3. Do Nigerian parents and teachers differ significantly in their perception of selection as a factor of quality in education?

### **PURPOSE AND SIGNIFICANCE OF STUDY**

The main purpose of this investigation was to find out the perceptions of Nigerian parents and teachers of selection as a factor of quality in education. A study of this nature is needed as a basis for re-orientating the thinking of the government and public on the need to emphasise quality in the selection of candidates for admissions to the various levels of education according to their abilities and not necessarily their aspirations. Parents would need to know that it is better for their children to be educated instead of just being certificated. The government needs to know that unless quality inputs (including selection of qualified students) are fed into the educational process, the society will continue to lack quality products of schools and the capacity to use education as a radical instrument of change. The findings of this study will help to promote this awareness.

### **Definition of Terms**

Selection is used in this context to mean the consistent tradition and process of setting minimum standards in terms of intellectual ability, aptitude, interest and disposition for the admission of candidates to the various levels of education or promoting students from one class to a higher one.

### **PROCEDURES**

This study employed a survey method. It used a random sample of 1000 secondary school teachers and 2000 parents drawn proportionately from the north, south, east and western parts of Nigeria.

The instrument used for the collection of data was a 13-item structured questionnaire designed to seek the opinions of Nigerian parents and teachers on the issue of selection of students for admission and promotion as a major means of ensuring high educational standards in Nigerian schools. The questionnaire was based on four-point scale of Strongly Agree (SA) Agree (A) Disagree (D) and Strongly Disagree (SA).

The four-point scaled questionnaire was weighted 4, 3, 2 and 1 respectively. Accordingly, the mean and standard deviation scores of the weighted responses were calculated. For the purpose of decision making, the mid value of the scale (2.5) was taken as the cut-off point, obtained by adding the exact upper limit (4.5) to the exact lower limit (0.5) of the scale and dividing by two. Thus, any mean score of 2.5 and above was considered significant with respect to Research Questions 1 and 2. For the third research question, the significant difference between the overall mean scores of parents and teachers was determined by using the Z-test statistics. This was carried out at 0.05 Alpha levels. The instrument had a reliability coefficient of 0.68 calculated through the split-half method. Largely the author's postgraduate students who came from these parts of the country carried out the administration of the instrument.

### **RESULTS**

The results of this investigation, the parents' and teachers' perception on selection as a factor of quality in education, are compared in Table 1.

From the analysis of the data in Table 1, 11 out of the 13 items were significant for teachers. The teachers were of the view that Nigerian schools needed quality students to produce quality graduates. They were also of the strong view that Nigerian schools should emphasise selection if they sought to produce the quality of graduates capable of making meaningful contributions to national development.

While they considered selection as a factor of quality in education, they recognised the complementary role of other variables in the educational process, and hence were of the view that entry qualities and qualifications of students did not necessarily predict their quality at graduation. Also, they did not see selection as a way of preventing the less qualified from attending school as they could be pushed into areas for which their abilities fitted them.

On the other hand, only four out of the 13 items were found to be significant for parents. It is only with regard to these four items that parents perceived selection as a factor of quality in education. Accordingly, while they felt that schools needed high quality entrants to produce high quality graduates and that the quality of school was high in the past due to the high quality of entrants, they did not subscribe to the need for schools to emphasise selection. They believed that no matter the weakness of students, the school could still enhance their quality. There is therefore a contradiction among the parents on this subject. This may have been so because of the eagerness of parents to send their children to school without hindrance.



**Table 1. Comparison of parents' and teachers' perception on selection**

S/N	Item	Subjects	Responses	
			Mean (X)	Std Dev (SD)
1.	Entry qualities are predictive of quality at graduation	Parent	1.96	1.39
		Teacher	2.42	1.55
2.	Schools need high quality entrants to produce high quality graduates	Parent	3.1*	1.77
		Teacher	3.36*	1.83
3.	The quality of school entrants in Nigeria today is generally low	Parent	2.23	1.74
		Teacher	3.4*	1.84
4.	Low quality education in Nigeria today is largely traceable to low quality school entrants	Parent	2.27	1.5
		Teacher	3.35*	1.82
5.	Nigerian schools should emphasise selection in the admission process	Parent	1.56	1.39
		Teacher	2.78*	1.66
6.	Quality of school learning was higher in Nigeria in the past due to effective selection of students	Parent	2.65*	1.78
		Teacher	2.87*	1.83
7.	Students should be selected into school programs according to their ability regardless of their ambitions or aspirations	Parent	2.18	1.47
		Teacher	3.17*	1.76
8.	Unless Nigerian schools admit quality students, the quality of school learning will continue to be low	Parent	2.5*	1.58
		Teacher	3.06*	1.74
9.	Education cannot make meaningful contribution to national development unless its products are of high quality	Parent	2.42	1.56
		Teacher	2.92*	1.7
10.	Teaching and learning are more effective when students are well selected	Parent	2.4	1.56
		Teacher	3.52*	1.87
11.	There is nothing schools can do to academically weak students to transform them into high quality graduates	Parent	2.03	1.12
		Teacher	2.63*	1.62
12.	High quality educated few is more meaningful to national development than low quality educated masses	Parent	2.15	1.45
		Teacher	2.14	1.46
13.	Selection limits educational opportunities in the society and should not be emphasised	Parent	3.01*	1.73
		Teacher	2.15	1.46

\* = Significant

Following Z-test analysis, there is also disagreement between parents and teachers on the subject of selection as a factor of quality in education, as shown in Table 2.

**Table 2. Z-test Analysis of overall perception of selection as a factor of quality in education**

Category	N	X	SD	Cal. Z	Crit. Z	Decision
Parents	2000	2.38	1.54	12.6	1.96	Significant at the 0.05 level
Teachers	1000	3.01	1.7			

The analysis of data in Table 2 shows that there is significant difference between the parents' and teachers' overall perception of selection as a factor of quality in education. With a mean score of 2.38 for parents and 3.01 for teachers, it shows that the teachers were more supportive of the need for selection as a factor of quality in education. The difference between these means is found to be statistically significant with a calculated Z of 12.6 and a critical value of 1.96.

The foregoing result reveals that there are differences in the values and views of Nigerian parents and teachers. While both of them may be the same in their need for high quality education of the students, they seem to differ with regard to the means to this end. The teachers seem to be concerned with having good quality students to teach in order to produce good results. They do not want to be accused of inability to produce quality graduates, a condemnation which they have faced over the years. For instance, Temi and Theo (1999) attributed the falling standards in education in Nigeria to the gradual decline in the commitment and dedication of teachers. According to them, the quality of school instruction has dropped significantly. On the other hand, the then President of the Nigerian Union of Teachers countered this view by saying that teachers were the least to be blamed for the decline in the quality of education in the country. The view of Imogie (1990) that teachers as facilitators of learning are primarily responsible for organising and manipulating the available educational variables and the environment to make learning possible.

Thus, the result of their activities depends largely on the quality of such variables and environment.

On the other hand, parents seem to be ideologically disposed in their perception of selection in the educational process. They are of the view that it limits educational opportunities. Yet, they believe that the school system needs quality entrants to produce quality graduates. Their contradictory position on this issue is understandable. Every typical Nigerian parent would want his or her children to go to school and graduate with a certificate as a mark for employment and social status. They are not so concerned about the actual learning that takes place in the school. This probably explains why most of these parents indulge in aiding and financing examination malpractices to help their children pass examinations.

In addition, parents are of the view that teachers, in their professional training, have the potency and capability to help children learn, despite their weak entry behaviour. This also explains why most Nigerian parents insist on the admission of their under-age and unqualified children into school. They also offer bribes to school authorities to admit their children who fail to attain the cut-off mark for admission. Their belief is that when the children get to school they soon overcome their deficiencies.

### **CONCLUSION AND RECOMMENDATIONS**

The results of this study can be summarised in the following statements.

1. Nigerian parents and teachers are of the view that quality education is necessary and that selection is necessary in the educational process as a factor of quality.
2. Although Nigerian parents recognise selection as a factor of quality in education, they do not favour the practice. On the other hand, the teachers would like Nigerian schools to emphasise selection in the process of admission and promotion of students.

Based on the research conducted and that data analysed in this study, the following conclusions can be reached:

1. Since parents and teachers do not agree on the practice of selection in Nigerian schools, the schools are most likely to continue to admit unqualified entrants.
2. Since Nigerian schools are constrained and handicapped in selecting entrants, the quality of school learning is likely to continue to be low.
3. Consequently, the prevailing decline in the quality of education in the nation's schools is likely to continue.

In order to get out of this quandary, the following recommendations are put forward.

1. The government should put in place appropriate policies that stipulate minimum standards for the nation's schools in terms of conditions and guidelines for admitting and promoting students. These are not effective at present, especially among private school proprietors.
2. The government and schools should actively inform parents that selection does not necessarily limit educational opportunities. Rather, it places a child where the child is most qualified to learn.
3. Issues related to selection as a factor of quality in education should frequently dominate the agenda of Parents' and Teachers' Association meetings.

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# Family background, adolescents' educational aspirations, and Australian young adults' educational attainment

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*In this longitudinal study, relationships were examined between educational aspirations and educational attainment for Australian young adults from different ethnic and social status backgrounds. Participants included 6, 811 (3, 547 women and 3, 264 men) young adults (mean age = 20.3 years) who were in Year 9 when the study began. In the analysis, the AM Statistical Software was used to take into account the design features of the sample. The results indicated (a) that family background and adolescents' aspirations combined to have large associations with young adults' educational attainment, (b) there were gender differences in the linear and curvilinear nature of relationships among family background, adolescents' aspirations, and young adults' attainment, and (c) for young adults from lower social status families there were ethnic group differences in attainment at all aspiration levels, whereas for young adults from higher social status families, ethnic group differences in attainment were minimised at high aspiration levels.*

Family background, educational attainment, educational aspirations,  
ethnic group differences, gender differences

## INTRODUCTION

Kao and Thompson (2003) observed that although educational aspirations are an important predictor of eventual educational attainment "their position in recent social science literature is more problematic" (p.422). They indicated that the nature of the associations between aspirations and attainment for young adults from different family backgrounds continues to be unclear (also see Saha, 1997). The purpose of this study was to try and clarify the nature of the relationships between educational aspirations and educational attainment for young adults from different ethnic and social status backgrounds.

The investigation was guided by theoretical orientations, which suggest that family contexts may be defined as opportunity structures. Bankston (2004) suggested that family "theories need to probe how culture, social structures, and socioeconomic positions combine in complex ways to provide outcomes that are often unexpected and even paradoxical" (p.178). Blau (1990) proposed that family background structures, such as social status and ethnicity, constrain many individuals from realising their educational and occupational choices, while they expand such opportunities for others. In an extension of Blau's general proposition, Furlong, Biggart and Cartmel (1996) claimed that "while an individual's location within the class structure, as well as gender or racial inequalities, affect the life chances of all young people, irrespective of their social location, it can be argued that contexts potentially magnify or dilute the effects of individual attributes" (p.552).

Blau's perspective has been developed further in Bourdieu's field theory of the social trajectory of individuals. Bourdieu (1984, 1998) proposed that young adults' educational outcomes are

associated with effects that may either reinforce or offset each other. First, there is a general effect exerted directly by young adults' family social and cultural backgrounds. It is claimed that the relationships between other predictors and outcomes are moderated by individuals' family backgrounds. Second, there is a specific effect related to individual characteristics such as aspirations, and such characteristics act as mediators between family background and young adults' educational outcomes. Bourdieu (1984) claimed "all positions of arrival are not equally probable from all starting points" (p.110). While individuals are subject to the forces that structure their social space, they may resist "the forces of the field with their specific inertia, that is, their properties, which may exist in embodied form, as dispositions [aspirations], or in objectified form, in goods, qualifications, etc." (p.110).

On the basis of these general theoretical orientations, the following hypotheses were examined:

- Hypothesis 1: Family social status, ethnic background, and adolescents' educational aspirations combine to have large associations with young adults' educational attainment.
- Hypothesis 2: Relationships between adolescents' educational aspirations and young adults' educational attainment are moderated by young adults' family social status and ethnic background.
- Hypothesis 3: Relationships between family background and young adults' educational attainment are mediated by adolescents' educational aspirations.

## METHOD

### Sample

The data for the analyses were from the Longitudinal Survey of Australian Youth (LSAY), which provided national information on students who were in Year 9 of school in 1995 and who were contacted each year until 2000 (Ainley, Marks and Lamb, 2000; Marjoribanks, 2002a).<sup>1</sup> Students were selected using a two-stage probability sample framework. First, a random sample was taken of 301 schools from across Australia, and then classes within those schools were randomly selected. In this study, the sample included 6,811 young adults (3,547 women and 3,264 men), who in 2000 had an average age of 20.3 years (SD = 0.45 years).

### Measures

**Family background: Social status.** In the first survey, the Year 9 students responded to questions about their family background. From principal components analysis of the responses, family social status was constructed from an equally weighted composite of fathers' and mothers' educational and occupational attainments. Educational attainment was assessed on a 5-point scale (1 = no secondary schooling, 5 = university education). Parents' occupational attainments were coded according to the Australian National University 4 Index, which ranks occupations in the Australian context (Jones and McMillan, 2001).

**Family background: Ethnicity.** Family ethnicity was defined in categories that were labelled as Anglo Australian, (5,409 families), Asian (422), English (269), Middle Eastern (149), New Zealand (81), Other European (125), and Southern European (283). Families that could not be classified into these categories were labelled as Other (73 families). Families were defined as

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<sup>1</sup> Support for the longitudinal study was provided by the Australian government and the Australian Council for Educational Research, and the data for the study were supplied by the Social Science Data Archives of the Australian National University. Those who carried out the original investigation and collection of the data bear no responsibility for the further analysis and interpretation of the data that appear in this article.

Anglo Australian if both parents were born in Australia and English was the language spoken in the home. English and New Zealand families were defined by both parents being born in England or New Zealand, respectively, with English being the language spoken in the home. The remainder of the families were classified as belonging to a broad ethnic category if both parents were born in a country from a particular geographic region. It is realised that the general ethnic categories are a potential limitation of the study as they may conceal differences that could be revealed with the use of more refined group definitions. The small sample size in some of the immigrant groups, however, would have restricted the use of multivariate statistics. In addition, when immigrant group differences within the broad categories were examined, few significant variations were found in the mean scores of the variables under investigation, whereas there were many between-category differences. Therefore, these broad categories were adopted as an acceptable, if not ideal, categorisation of adolescents' family ethnic background.

**Adolescents' educational aspirations.** In the first three surveys, educational aspirations were measured with the adolescents indicating when they planned to leave school and how much education they hoped to attain afterward. The successive responses were rated on a 5-point scale (1 = leave school as soon as possible, or I have left school; 5 = attend university).

**Young adults' educational attainment.** In the sixth survey, in 2000, the young adults indicated their level of educational attainment. Responses were rated on a 10-point scale (1 = did not complete Year 10, 10 = studying for a university degree).

**Gender.** In addition, gender was included as a predictor, as investigations have demonstrated gender-related differences among family background, individual characteristics, and educational outcomes (Marjoribanks, 2002a, 2002b; Keeves and Slade, 2003).

The measures used in the longitudinal investigation were designed by the Australian Council for Educational Research, which has a long tradition of developing scales to be used in the Australian educational context.

## RESULTS

### Multistage Regression Analysis

In the initial analysis, multistage regression was used to examine (a) whether family background moderated relationships between adolescents' aspirations and young adults' attainment, and (b) to what extent adolescents' aspirations mediated relationships between family background and young adults' educational attainment.

For the analysis, variables were added successively to the regression equations. In Model 1, family social status, ethnicity, and gender were included. Then in successive models, the educational aspiration scores from three surveys were added. In addition, interactions between the predictors were included to test for possible moderation effects. In the regression equations, weighted effects coding was used to represent family ethnic background, with the base group including those families designated as Other. Such coding allows the different sample sizes of ethnic groups to be taken into account. The unstandardised regression coefficients represent the differences between the ethnic group mean scores with the weighted educational attainment mean for the total sample (Cohen et al., 2003).

For the analysis, the continuous predictors were centred on their means, which helps to reduce nonessential multicollinearity between first-order predictors and predictors that carry their interaction with other predictors. Further, missing data in the predictor variables were coded with a constant and dummy variables were formed that identified cases with missing data. The

inclusion of such variables allows the potential effects of missing data to be partialled from the regression relationships (Graham and Hofer, 2000).

In the analysis, the AM Statistical Software, designed by The American Institutes for Research, was used to take into account the design features of the clustered sample<sup>2</sup>. AM provides appropriate robust Taylor series standard errors, further adjusted, in this study, for clustering within schools. In addition, the models were weighted by the LSAY 2000 panel weights.

The findings in Model 1 of Table 1 indicated that after taking into account family social status and gender differences, Asian, Middle Eastern, and Southern European young adults had above average attainment. In contrast, the attainment of Anglo Australian, English, and New Zealand young adults was below the mean of the total sample. After taking into account the other predictors, young adults from middle social status families had higher attainment scores than did those from lower social status families, and women had higher attainment scores than did men. The significant interaction term showed that in Asian families, family social status had a smaller impact on attainment than it did for other young adults. Ethnicity, family social status, and gender combined to have a medium association with differences in young adults' educational attainment ( $R^2 = 15.21\%$ ,  $ES = 0.18$ ).

**Table 1. Multiple regression for relationships between family background, adolescents' educational aspirations, and young adults' educational attainment**

Predictor variable	Unstandardised regression coefficients			
	Model 1	Model 2	Model 3	Model 4
<b>Family background</b>				
<b>Ethnicity</b>				
Anglo Australian	-0.15***	-0.11***	-0.11***	-0.07***
Asian	1.67***	1.32***	1.24***	0.79***
English	-0.35*	-0.33*	-0.27*	-0.10
Middle Eastern	0.78***	0.71***	0.58***	0.37**
New Zealand	-0.86***	-0.80***	-0.66***	-0.66***
Other European	0.36	0.34	0.31	0.20
Southern European	0.53***	0.45***	0.44**	0.25
<b>Family social status</b>				
Gender (men = 1)	0.21***	0.15***	0.11***	0.07***
Anglo Australian x status	-0.56***	-0.39***	-0.29***	-0.18***
Asian x status	0.01***	0.01***	0.01***	0.006**
Asian x status	-0.14***	-0.16***	-0.13***	-0.08***
<b>Educational aspirations, 95</b>				
Status x aspirations, 95		0.41***	0.25***	0.14***
<b>Educational aspirations, 96</b>				
Australian x aspirations, 96			0.03***	0.02***
Asian x aspirations, 96			0.33***	0.18***
Gender x aspirations, 96			0.008***	0.003
Gender x aspirations, 96			-0.07**	-0.02
Gender x aspirations, 96			0.03*	0.01
<b>Educational aspirations, 97</b>				
Multiple R	0.39***	0.48***	0.58***	0.67***
$R^2$ (%)	15.21	23.04	33.40	44.89
Effect size	0.18 <sup>a</sup>	0.30 <sup>b</sup>	0.50 <sup>b</sup>	0.81 <sup>b</sup>
$R^2$ % change		7.83	10.36	11.49
Effect size, $R^2$ % change		0.10 <sup>a</sup>	0.16 <sup>a</sup>	0.21 <sup>b</sup>

Note. In the regression equations, Other is the omitted category. Only significant interactions have been presented. Effect size: <sup>a</sup>medium, <sup>b</sup>large. Significance levels: \* $p < 0.05$  \*\* $p < 0.01$  \*\*\* $p < 0.001$

In Model 2, the results showed that the new variables made an independent contribution to explaining differences in attainment scores (extra  $R^2 = 7.83\%$ ,  $ES = 0.10$ ). The interaction term suggested that increases in aspirations were more strongly related to changes in young adults' attainment in middle, rather than in lower, social status families. Aspirations from the first survey

<sup>2</sup> The AM Statistical Software is available at <http://am.air.org>

mediated only modestly relationships between family background, gender, and attainment. Social status differences in attainment, for example, were reduced by about 29 per cent ( $b$  in Model 1 = 0.21,  $b$  in Model 2 = 0.15), while gender differences were reduced by about 30 per cent ( $b_1 = -0.56$ ,  $b_2 = -0.39$ ).

In Model 3, the findings showed that the additional variables, involving aspirations from the second survey, were related to an extra 10.36 per cent ( $ES = 0.16$ ) of the variance in attainment scores. The interaction terms indicated that increases in aspirations were more strongly associated with increments in the attainment of Anglo Australians, than they were for Asian young adults.

Educational aspirations, in Model 4, accounted for an extra 11.49 per cent ( $ES = 0.21$ ) of the differences in attainment scores. The final regression coefficients showed that the cumulative impact of aspirations mediated substantially many of the relationships between the background measures and young adults' educational attainment. Differences for English and Southern European young adults, for example, became nonsignificant, while gender and social status differences were reduced by about two thirds. In addition, attainment differences for Anglo Australian, Asian, and Middle Eastern young adults were reduced by about 50 per cent.

Overall, the final regression equation showed that the background and aspiration variables combined to be associated with a large amount of variance in young adults' educational attainment, which provided support for the first hypothesis. Also, the multistage regression analysis provided initial support for the other hypotheses of the study. A number of relationships between educational aspirations and educational attainment were moderated by the young adults' family social status and ethnicity. In addition, the intervening educational aspiration measures mediated, or partially mediated, relationships between family background and young adults' educational attainment.

### **Regression Surface Analysis**

Eckenrode et al. (1995) observed that when there is evidence of moderation or mediation among a set of relationships, the nature of the associations among predictors and outcomes should be explored further. They indicated the need to examine possible curvilinear relationships. Because the study was attempting to clarify the nature of the relations among family background, aspirations, and attainment, regression surface analysis was used to examine associations between aspirations and attainment at various levels of family social status, for young adults from different ethnic backgrounds.

Regression surfaces were generated from models that included product and squared terms to test for possible interaction and curvilinear relations. The models were of the form

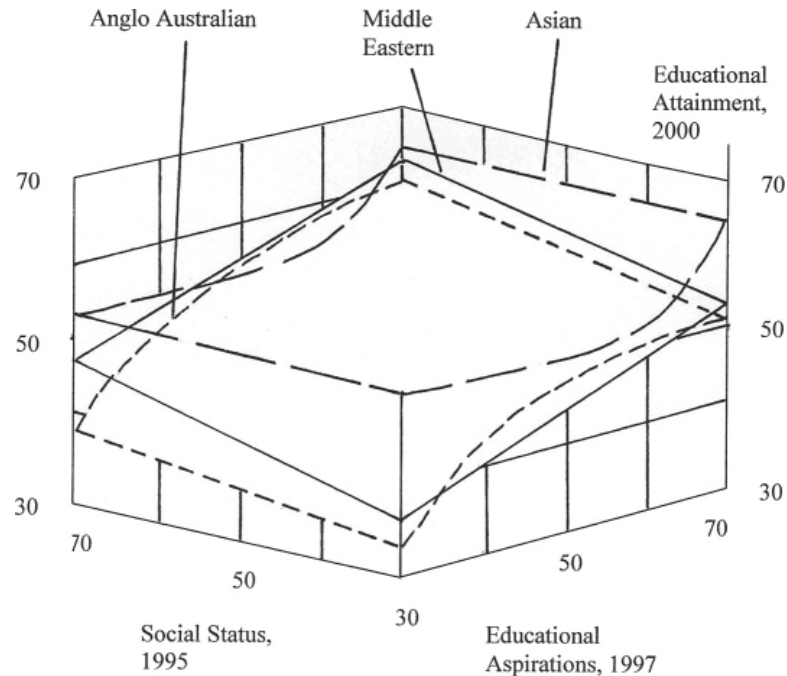
$$Z = aX + bY + cX.Y + dX^2 + eY^2 + \text{constant},$$

where  $Z$ ,  $X$ , and  $Y$  represented measures of young adults' educational attainment, family social status, and adolescents' educational aspirations, respectively. Because of space limitations, it was not possible to present all the surfaces that were constructed from the regression models. Instead, surfaces are presented that reflect the nature of the different associations among the measures. Scores for the surfaces were standardised with means of 50 and standard deviations of 10.

In Figure 1, the surfaces show the regression-fitted relations among family social status (1995), adolescents' educational aspirations (1997), and young adults' educational attainment (2000), for women from different ethnic groups. The surface for Asian women indicated that family social status was not related to attainment scores, whereas family status had a significant linear association with attainment in the Anglo Australian and Middle Eastern groups. In addition, the shapes of the surfaces show that aspirations had a curvilinear association with attainment in Asian and Anglo Australian families. For Asian women, aspirations acted as a threshold variable. At low



aspiration levels, changes in aspirations were not related to attainment scores. After mean aspiration levels were attained, however, further increments in educational aspirations were related to sizeable increases in attainment. In contrast, successive increases in aspirations were associated with smaller increments in attainment scores for Anglo Australian women. For Middle Eastern women, at each family social status level, educational aspirations had a substantial linear association with educational attainment.



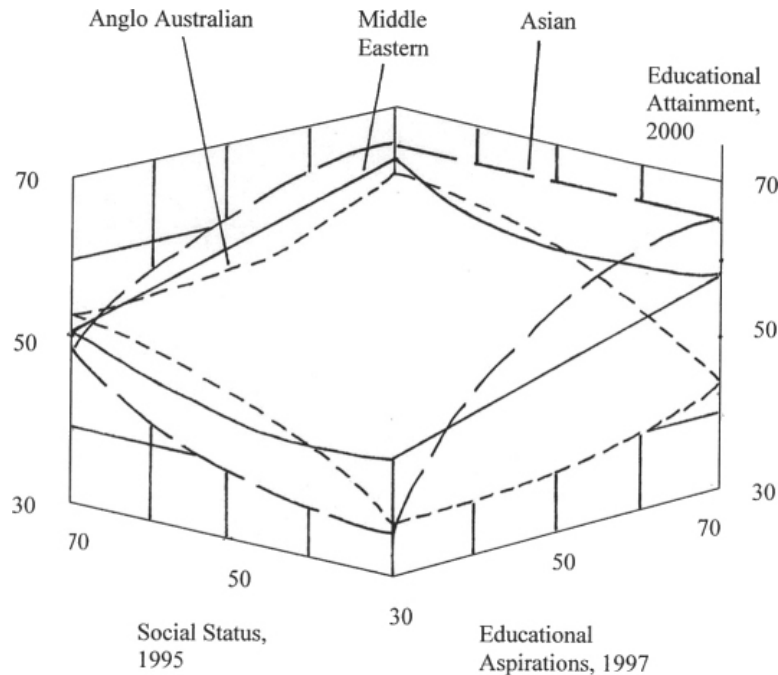
**Figure 1. Fitted-regression relations among family social status, adolescents' educational aspirations, and educational attainment for young adult women from different ethnic groups**

The elevated surface for Asian women and the lack of a relationship between social status and attainment in the Asian group provided further support for the findings in Table 1. That is, Asian young adults had the highest attainment levels and family social status was less important a predictor of attainment in Asian families than in other ethnic groups. In addition, the surfaces show that in each ethnic group, high social status and aspiration levels tended to reinforce each other, resulting in a minimisation of ethnic group differences in women's educational attainment.

In Figure 2, the surfaces show regression-fitted associations for young men. The potential complexity of relationships among family social status, aspirations, and attainment is revealed in the surface for Asian men, with the surface indicating the presence of significant curvilinear and interaction relationships. At low aspiration levels, family social status had a strong positive curvilinear association with attainment, whereas at high aspiration levels, family social status was not related to attainment scores. In addition, at low family social status levels, successive increases in the educational aspirations of Asian men were related to large increments in their educational attainment. At high social status values, however, increases in educational aspirations had a more modest association with attainment, reflecting the presence of a significant interaction between family social status and educational aspirations.

In the Anglo Australian group, changes in family social status had a strong negatively increasing curvilinear association with the attainment scores, whereas aspirations had a more modest positive curvilinear association with attainment. For Middle Eastern males, there was a curvilinear association involving family social status while aspirations had a significant linear association with attainment. The surfaces show that at high family social status and educational aspiration

levels there was a coalescence of educational attainment, for the men from each ethnic group. That is, while there were substantial ethnic group differences in men's attainment when low status levels were associated with high aspirations, the ethnic group differences were essentially eliminated when high status was combined with strong aspirations.



**Figure 2. Fitted-regression relations among family social status, adolescents' educational aspirations, and educational attainment for young adult men from different ethnic groups**

## DISCUSSION

In general, the investigation provides support for the propositions that, in the Australian context:

- a) family social status, ethnic background, and adolescents' educational aspirations combine to have large associations with young adults' educational attainment;
- b) relationships between educational aspirations and attainment are moderated, in part, by young adults' family social status and ethnicity;
- c) successive educational aspiration measures mediate, or partially mediate, the associations between family background and young adults' attainment; and
- d) there are gender differences in the linear and curvilinear nature of relationships among family background, adolescents' aspirations, and young adults' educational attainment.

More specifically, the study provided support for the theoretical framework that family social status and ethnicity provide varying opportunity structures for young adults. Within these opportunity structures, adolescents' educational aspirations have differential associations with young adults' attainment. At lower family social status levels, for example, there continued to be ethnic group differences in attainment at all aspiration levels. In contrast, for young adults from higher social status families, ethnic group differences in attainment were minimised at high aspiration levels.

This investigation was generated from the concern expressed by Kao and Thompson (2003) that our understanding of the relationships among family background, educational aspirations, and educational attainment remains unclear. The present findings suggest that to explain how similar

aspirations are translated into different attainment levels, it is necessary to examine how family social status and ethnicity combine to provide varying educational experiences for young people. Hao and Bonstead-Bruns (1998) proposed that when examining immigrant-group differences in young adults' outcomes, investigations should measure within-family and between-family social capital. Within-family social capital refers to opportunities, encouragement, and support provided by parents in education-related activities. In contrast, between-family social capital is generated from relationships that develop among families, schools, and other institutions.

For immigrant-groups, Hao and Bonstead-Bruns observed that between-family capital is reflected in the premium that some groups place on education, ambition, and persistence. Another form of such capital relates to trustworthiness and solidarity that allow some ethnic/immigrant communities to share economic and educational resources to support their children's education. Saha (2003) has observed, for example, the need to examine how social and cultural capital may interact differently in families from various ethnic groups. Similarly, Kao (2004) indicated that unless family capital is defined more clearly, there will be little advance in "the little we know about how families and peer groups affect educational outcomes among minority and immigrant groups" (p.175).

Much research has examined the relations between within-group family social capital and measures of young adults' educational outcomes. The present findings suggest that such research needs to be complemented by examining differences in the between-group experiences that families from various social status and ethnic or immigrant groups are able to provide for their children. That is, what are the experiences and conditions that families from certain ethnic or immigrant groups provide that allow their children's aspirations to be expanded into high educational attainment, when family social status conditions might be expected to constrain relationships between aspirations and attainment? This is the challenge that now confronts researchers who attempt to extend the explanation of family background differences in young adults' educational outcomes.

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# Factors influencing reading achievement in Germany and Spain: Evidence from PISA 2000

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*This article examines the factors fostering and inhibiting student achievement in Germany and Spain at the 15-year-old level in the OECD Programme on International Student Assessment (PISA) in 2000. Both countries performed significantly below the OECD average not only in Reading but also in Mathematics and Science on this occasion. Since the two countries are similar in average levels of student achievement, it is of interest to consider whether similar patterns exist in the ways in which factors operate to influence student achievement in these two countries. Preliminary analyses were carried out with PLSPATH and subsequent two-level models were analysed separately using Hierarchical Linear Modelling (HLM) software. Some similar factors influenced reading achievement in the two countries, but substantial differences in explaining reading achievement were also found. Much of the difference between the two systems arise from the large components of variance in Germany at the school level and in Spain at the between student within school level. Thus efforts to improve reading achievement should focus in Germany on low performing schools, whereas, in Spain remedial programs should be directed towards increased assistance at the individual student level in many of the schools.*

Hierarchical linear modelling, reading achievement, secondary school level,  
cross-national comparisons

## INTRODUCTION

In 2000, the Organisation for Economic Co-operation and Development (OECD) spearheaded a new approach to collect, on a regular basis, achievement data from students among its member states.

The primary aim of the OECD Programme on International Student Assessment (PISA) was to compare students at a given level of schooling in key subjects, such as Mathematics, Reading and Science across countries. The information gained from these educational indicators, it was reasoned, would allow for a direct comparison of student performance between OECD countries. Moreover, if collected at regular intervals (currently set to three years), the educational indicators may be related to economic and social indicators and are, thus, an important instrument for economic forecasting and planning.

While these principal objectives have certainly been the main drive behind the establishment of PISA, another, equally important set of questions arises from the student achievement data themselves: which are the reasons why students do perform as they do, namely average or below or above average?

In order to answer these questions background data are required to explain student achievement. Such background data typically encompass information about students' home environment, their attitudes or expectations as well as teacher- and school-related factors. For cross-national comparisons it may also be helpful to include country-level data, for example, the percentage of GDP spent on education, which usually does not vary within a country but which can contribute to explaining differences in student achievement between countries.

The PISA study was designed not so much to focus on the factors leading to student performance but, rather, to measure and compare student performance itself. Still, the international data sets released by the OECD from the year 2000 data collection contain a number of student and school level background variables and scales which can be used to address the issue of why students in a particular country performed at a particular level.

This article takes a closer look at factors fostering or inhibiting student achievement in Reading in Germany and Spain at the 15-year-old level, the PISA target population. According to the PISA results (OECD 2001, 2003b; Adams and Wu, 2002), both countries performed significantly below the OECD average of 500 with Germany achieving at 484 and Spain at 493 in Reading, putting them between ranks 17 and 25 of 32 countries. Likewise, both countries performed significantly below the OECD average in Mathematics (Germany: 490; Spain: 476) and Science (Germany: 487; Spain: 491). As the two countries are similar in average student performance, it is of interest to examine whether or not patterns of the way in which factors operate to influence student achievement in the two countries are also similar.

### THE DATA

The data used to examine ways in which background factors operate to influence student achievement in Germany and Spain have been taken from the publicly available PISA website ([www.pisa.oecd.org](http://www.pisa.oecd.org)). As the study did not obtain data from teachers, it was possible to investigate variables only at two levels, namely the student and school level. Table 1 lists the number of cases in the international PISA data sets for Germany and Spain.

**Table 1. Number of cases for Germany and Spain**

Germany		Spain	
Student level	School level	Student level	School level
5073	219	6214	185

### THE ANALYSES

Based on results from previous analyses of student and school factors influencing student achievement in reading (Elley, 1994; Lundberg and Linnakylä, 1993; Lietz, 1996; Purves, 1973), factors and scales which were assumed to have an effect on reading achievement were extracted from the student and school data sets for the two countries. Another criterion for selecting variables for analysis was that the main aim of the analysis was to compare patterns of effects of factors influencing reading achievement in Germany and Spain rather than to optimise explained variance within each country. Thus, variables considered for inclusion in the analysis had to be available in both countries.

As a first step, descriptive statistics were run across the selected variables to check for missing data and to examine the frequency distributions. As the next step, single level path models, separately for Germany and Spain and separately for the student and school level, were hypothesised based on prior research on school achievement (Keeves, 1991; Kotte, 1992; Lietz, 1996) and analysed using partial least squares (PLS) analysis. For these preliminary analyses PLSPATH (Sellin, 1990) was used.

These exploratory PLS analyses served two purposes. First, they examined which of the hypothesised relationships between the predicting constructs as well as between the predictors and reading achievement in each country emerged in the two data sets. Second, using PLSPATH it was possible to identify to what degree a construct operated directly and indirectly to affect reading achievement in each country. Only those relationships between constructs with a direct effect of  $|0.10|$  on any other construct in the model were considered sufficiently substantial to be retained in the subsequent hierarchical analyses. Table 2 lists the student- and school-level constructs that were retained for the subsequent analyses.

A two level hierarchical linear model was then specified on the basis of these preliminary results. This two-level model was analysed separately for Germany and for Spain using Hierarchical Linear Modeling (HLM) software (HLM-5: Raudenbush, Bryk, Cheong and Congdon, 2000).

Using common cut-off criteria (Kotte, 1992; Lietz, 1996; Lietz and Kotte, 2000) final HLM models were estimated for the two countries (for a more detailed discussion on the statistical algorithms of HLM-5, see Raudenbush and Bryk, 2002). Any fixed effect with  $\gamma < |0.05|$  was omitted from the final model. In addition, fixed effects with a p-value  $> 0.05$  were generally discarded as being not meaningful.

## RESULTS

In this section, results of the two-level HLM analyses of the two data sets are reported, first for Germany and followed by Spain. In the last part of this section, results for the two countries are compared.

### Two-level HLM model of reading achievement for Germany

Figure 1 illustrates the direct effects that emerge from the HLM analyses in terms of the direct effects of student and school level constructs on reading achievement in Germany. As can be seen, a number of factors operate at the student level while others operate at the school level.

Thus, reading achievement (READACH) is influenced directly at the student level by CLSSIZE ( $\gamma=0.16$ ), GRADE ( $\gamma=0.13$ ), SELF ( $\gamma=0.11$ ), READINT ( $\gamma=0.07$ ), POSS ( $\gamma=0.07$ ), SES ( $\gamma=0.06$ ) and MISS ( $\gamma=-0.06$ ).

At the school level, eight different factors have an effect on READACH, namely ASSESS ( $\gamma=0.24$ ), SCHCLIM ( $\gamma=-0.22$ ), PRIMARY ( $\gamma=-0.17$ ), PARTTIME ( $\gamma=0.17$ ), RATCOMP ( $\gamma=-0.14$ ), ACCESS ( $\gamma=0.13$ ), IMPACH ( $\gamma=-0.10$ ) and SCMATEDU ( $\gamma=-0.09$ ). Table 3 displays the final estimation of fixed and interaction effects for the two-level HLM model for Germany.

At the student level, class size emerges as the strongest predictor of reading achievement ( $\gamma=0.16$ ), while the grade a student is enrolled at ( $\gamma=0.13$ ) and a student's self-perception ( $\gamma=0.11$ ) show similar effect sizes. Smaller effects are observed with respect to home possessions ( $\gamma=0.07$ ), the student's interest in reading ( $\gamma=0.07$ ), the socio-economic status ( $\gamma=0.06$ ) and absenteeism from school ( $\gamma=-0.06$ ). With the exception of absenteeism, all effects have a positive impact on reading achievement. In other words, students:

- in larger classes;
- who are enrolled in a higher grade (ie, non-repeaters);
- who exhibit higher self-concept;
- who show more interest in reading;
- who come from homes with a higher socio-economic status; and
- who attend school more regularly than others,

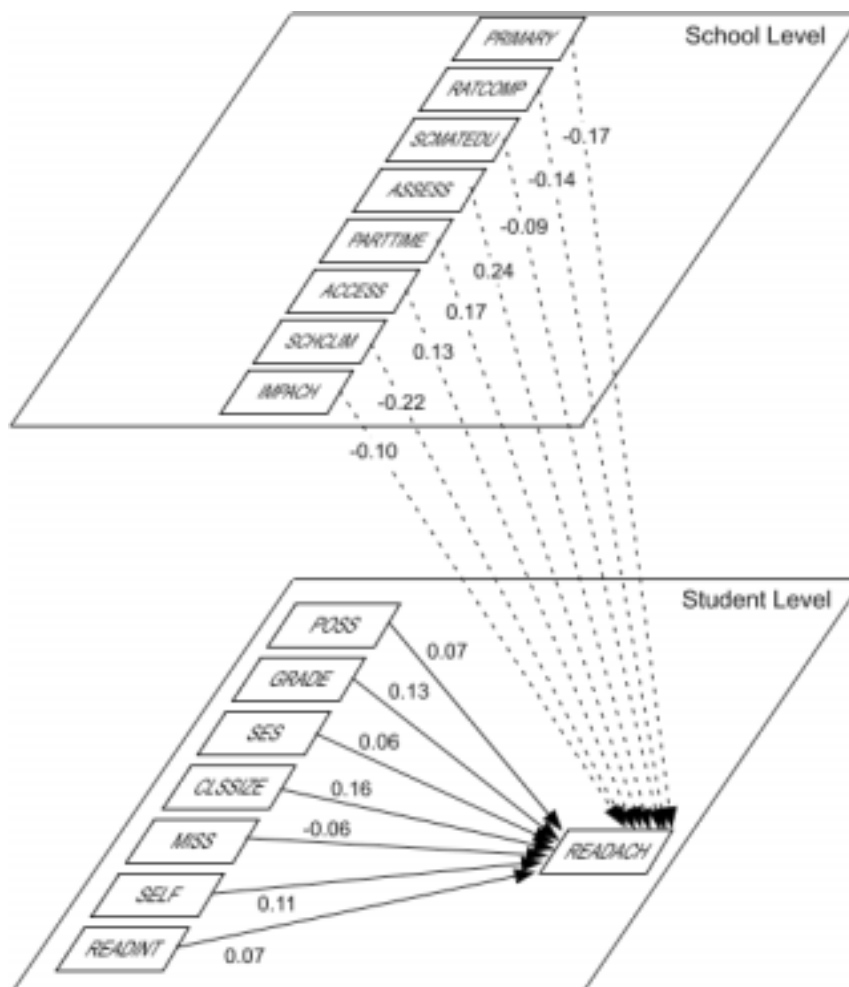
can be expected, overall, to read better in Germany.

**Table 2. Student and school-level constructs extracted for further analyses using PLSPATH**

Student-level constructs		
Construct	Variable(s) used to form construct (PISA variable name)	Coding/comment
GRADE	Grade student is enrolled at (ST02Q01)	8=Grade 8, 9=Grade 9, 10=Grade 10
MISS	In the previous two school weeks, how many times student: Absent from school (ST29Q01) Late for school (ST29Q03), Time spent on homework (HMWKTIME*)	Scale/factor score based on the three variables; high value denotes high degree of absenteeism/low commitment
POSS	PISA index of home educational resources based on student reports on availability and number of the following in their home: dictionary, quiet place to study, own desk, text books, calculators (HEDRES*)	Rasch scaled index which is a weighted maximum likelihood estimate whereby a high value denotes availability/greater number of these resources*
READINT	PISA index denoting engagement in reading based on responses to 9 questions ranging from <i>I read only if I have to</i> to <i>Reading is one of my favourite hobbies</i> (JOYREAD*) PISA index denoting interest in reading based on responses to 3 questions ranging from, <i>I read in my spare time</i> , to <i>When I read I sometimes get totally absorbed</i> (INTREA*)	Scale/factor score based on the two indexes; high value denotes high interest in reading
CLSSIZE	Students' reports of the number of students in each of their Language, Maths and Science classes (ST28Q01-ST28Q03)	Higher values denote more students
SELF	Verbal self-concept (SCVERB), general academic ability (SCACAD), control strategies (CSTRAT), elaboration activities (ELAB), perceived self-efficacy (SELFEF)	Scale/factor score based on the 5 indexes; high value means high degree of self-concept/learning strategies
SES	Mother's main job (BMMJ) Father's main job (BFMJ) Educational level of mother (MISCED) and father (FISCED) Number of books at home (ST37Q01)	Scale/factor score based on five variables; high value denotes high socio-economic status
SEX	Student gender (ST03Q01)	1=female, 2=male
READACH	Reading achievement (PV1READ)	Rasch scaled reading score: Range: 0-1000, midpoint 500
School-level constructs		
ACCESS	Access to reading resources	Scale/factor score; high value denotes good access to reading resources
ASSESS	Assessment policy (school emphasises assessing students)	Scale/factor score; high value denotes strong emph. on assessm. by the school
IMPACH	Importance attached to achievement as reflected in principal's perception of frequency of student assessment through assignments/projects/ homework, freq. of performance reports to parents, teacher valuing academic achievement	Scale/factor score; high value denotes high importance attached to achievement by the school
LESSON	Number of lessons of instruction per week	
PARTTIME	Number of part-time teachers at school	
PRIMARY	School contains primary section	0=school without primary section; 1=school with primary (Grades 1-4)
PUBLIC	Public/private school	Dummy variable: 0=not public, 1=public
RATCOMP	Ratio of computers per student	
SCHCLIM	Principal's perception of a) extent to which student learning is hindered by lack of parental support, b) students coming from poor home environments, c) absenteeism and d) lack of respect	Scale/factor score; high value denotes poor school climate with bullying of students, high absenteeism, and principals concern reg. teacher-related variables hindering student performance
SCHSEX	Proportion of male/female students	
SCHSIZE	Size of school	Number of students enrolled in school
SCMATEDU	Instructional resources	Scale/factor score; high value denotes higher quality of instr. resources in school
TCHPARTI	Teacher participation in school affairs	Scale/factor score; high value denotes intensive teacher particip. in school

Notes: All variables were standardised with a mean of 0 and a standard deviation of 1; Data on variables forming "SELF" not collected in Spain; \* for further details see Adams and Wu (2002).





Note: For reasons of clarity, only direct effects are displayed. For interaction effects, please refer to Table 3.

**Figure 1. Final two-level HLM model for Germany for reading achievement**

It may be somewhat surprising that socio-economic status which includes the number of books in the home and the educational level of parents does not have a stronger influence on reading achievement. However, this effect has to be viewed in conjunction with the effect of POSS, that is the possessions in the home, on achievement. Taken together, these factors reflect the important impact of the wealth and educational human and material resources of the home on reading achievement.

It should be noted that the variables, Class size and Grade are disaggregated from the class to the student level where they have significant effects that would be lost if these variables were aggregated to the school level or ignored. This is less than optimal in the construction of the model.

It is interesting to find that the class size matters when it comes to reading achievement. Prior research on the issue has been inconclusive, with some studies showing higher performance for students in larger classes (Larkin and Keeves, 1984) and *vice versa* (Glass and Smith, 1978). Results of the two-level HLM analysis for Germany provide supportive evidence for the fact that 15-year-old students in larger classes perform at a higher level in reading, once other important factors at the student and school levels, such as home background, reading interest and school selection procedures and staffing levels have been taken into account. Moreover, this may reflect the fact that, in Germany, students of lower academic performance are placed in smaller instructional groups in order to enable teachers to address the special needs of those students.

**Table 3. Final estimation of fixed and interaction effects; two-level HLM model for Germany for reading achievement**

Fixed Effects on READACH	$\gamma$ -coefficient	Standard error	t-ratio	p-value
<b>Level 1/Student-level effects</b>				
POSS	0.07	0.01	8.87	0.000
GRADE	0.13	0.01	13.28	0.000
SES	0.06	0.01	5.50	0.000
CLSSIZE	0.16	0.01	12.34	0.000
MISS	-0.06	0.01	-6.54	0.000
>> by PRIMARY on MISS	0.03	0.01	3.56	0.001
>> by TCHPARTI on MISS	0.03	0.01	2.92	0.004
>> by SCHCLIM on MISS	0.03	0.01	3.73	0.000
>> by IMPACH on MISS	-0.03	0.01	-3.08	0.003
SELF	0.11	0.01	11.24	0.000
>> by PUBLIC on SELF	-0.08	0.01	-9.97	0.000
>> by SCHSEX on SELF	0.03	0.01	6.03	0.000
>> by RATCOMP on SELF	-0.06	0.01	-5.73	0.000
>> by ACCESS on SELF	-0.03	0.01	-2.84	0.005
READINT	0.07	0.01	6.52	0.000
>> by PUBLIC on READINT	0.15	0.01	17.33	0.000
>> by RATCOMP on READINT	0.03	0.01	5.18	0.000
>> by PARTTIME on READINT	0.04	0.01	3.55	0.001
>> by SCHCLIM on READINT	-0.04	0.01	-3.54	0.001
<b>Level 2/School-level effects</b>				
PRIMARY	-0.17	0.04	-4.39	0.000
RATCOMP	-0.14	0.04	-3.20	0.002
SCMATEDU	-0.09	0.04	-2.19	0.028
ASSESS	0.24	0.04	5.66	0.000
PARTTIME	0.17	0.04	4.43	0.000
ACCESS	0.13	0.04	3.21	0.002
SCHCLIM	-0.22	0.04	-5.08	0.000
IMPACH	-0.10	0.04	-2.42	0.016

Notes: for further information see Raudenbush and Bryk (2002)

>> Interaction effect

With regards to school effects, the two strongest predictors of reading achievement include clearly the extent to which assessments are used for instructional purposes ( $\gamma=0.24$ ) and the school climate ( $\gamma=-0.22$ ). The negative effect of school climate indicates that students in schools with more helpful home environments and more supportive teachers perform at a higher level in reading.

Results appear to indicate that schools which comprise primary grades perform lower in reading than those without primary grades (that is, Grade 1 to 4;  $\gamma=-0.17$ ). This, however, seems to be an artefact for the type of school. Typically, academically oriented schools in Germany (Gymnasien) do not include primary grades while this, often, is the case for secondary schools that prepare students for a more general or vocational education (that is, Hauptschulen/ Realschulen).

Further to this, the number of part-time teachers in a school has a positive impact on reading ( $\gamma=0.16$ ). Generally, a secondary school in Germany would contain a high number of part-time staff if the enrolment of students is high, since the student-teacher ratio is pre-defined by the school authorities and budgetary constraints. Still, there is no ready explanation why the presence of part-time staff plays a positive role for reading achievement. It may be hypothesised that part-time staff – often hired among recent graduates who are unable to obtain desired employment due to rigid bureaucracy – are still unaffected by teaching routines of day-to-day schooling and are

more flexible to experiment with different tasks and exercises intended at raising student reading interest and reading performance.

Factors with less pronounced effects on reading achievement at the school level cover the ratio of computers per students in a school ( $\gamma=-0.14$ ), the access to reading resources ( $\gamma=0.13$ ), and the quality of a school's educational resources, though negatively ( $\gamma=-0.09$ ). Thus, while the availability of reading resources stimulates reading achievement, PCs and other educational resources may not be so favourable in the context of developing reading comprehension. Computers at school, it may be argued, are more likely to form a distraction and draw the attention of students to anything else but reading. Instead of using PCs for instructional purposes students might be tempted to play games, use chat rooms or surf the internet.

The importance teachers place on achievement at school seemingly has a small negative effect on students' performance in reading ( $\gamma=-0.10$ ). In other words, the extent to which principals say that teachers in their schools value assessment, monitor students through assignments, projects and homework and inform parents about student performance appears to influence achievement negatively. While this effect seems counter-intuitive, it must be noted that it emerges after the positive effect of using assessment for instructional purposes has been taken into account.

As can be seen from Table 3, the two-level model for reading achievement also contains several so-called 'interaction effects'. In the framework of this research project such effects indicate a possible causal relationship of a particular school-level variable on the relationship between a student-level variable and the outcome variable. As an example, the effect of a construct operating at the student-level (say, READINT) on READACH is itself influenced by, for example, PUBLIC, a school-level factor. Indeed, this interaction effect PUBLIC>>READINT emerged as remarkably strong with  $\gamma=0.15$ : Whether students took an interest in reading and, thus, performed at a higher level was positively affected when the students were enrolled in a private school.

Due to their strengths ( $\gamma>0.05$ ), two other interaction effects are worth noting here. Both interaction effects are found to operate negatively on SELF, namely PUBLIC>>SELF ( $\gamma=-0.08$ ) and RATCOMP>>SELF ( $\gamma=-0.06$ ). The positive effect self-perception has on reading achievement is lessened for students enrolled in schools that are (a) private; and (b) have a higher ratio of computers. For reasons of clarity it should be added that, overall, the German secondary education systems only comprised a relatively small number of private schools (less than five per cent).

In summary, students in Germany can expect a higher score in reading achievement when their school:

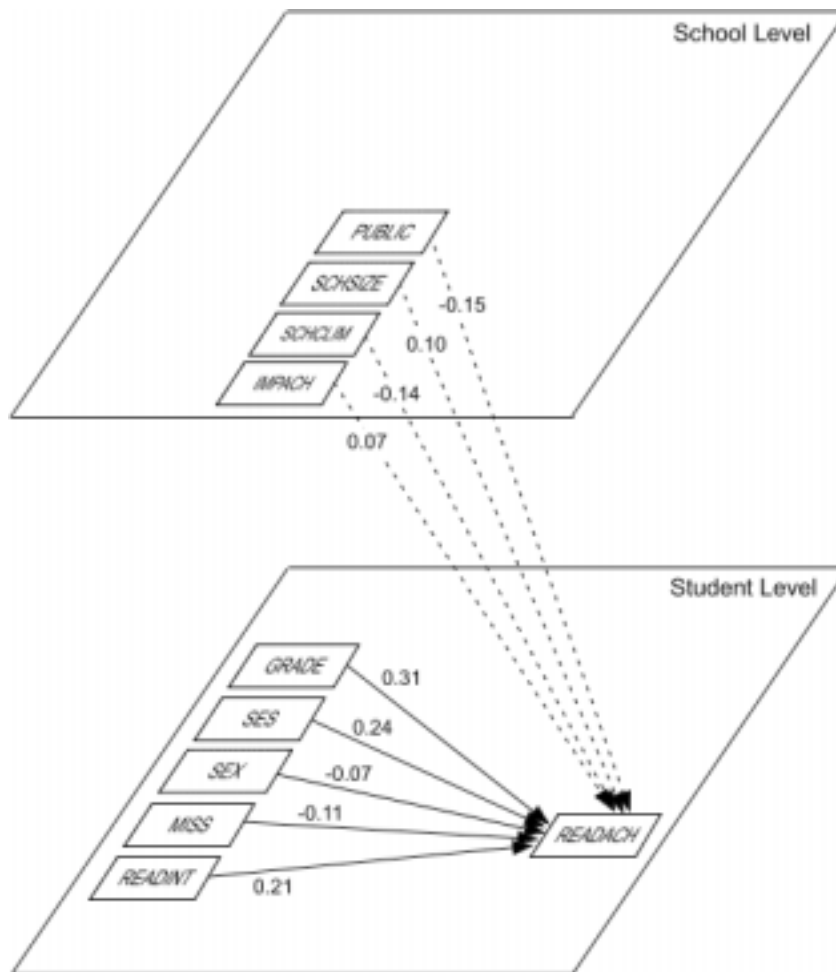
- uses assessment for instructional purposes;
- is not hindered by poor home environments or lack of parental support;
- is academically oriented (Gymnasien);
- has a larger number of part-time teaching staff; and
- offers ready access to books and magazines.

### **Two-level HLM model of reading achievement for Spain**

As was the case for Germany, a two-level HLM model was analysed using the international data set for Spain obtained as part of the PISA 2000 data collection. Table 4 lists the different factors influencing reading achievement at the student and school level.

As illustrated in Figure 2, five factors, namely GRADE, SES, READINT, MISS and SEX influence directly reading achievement at the student level. Of these, three path coefficients are relatively strong: GRADE ( $\gamma=0.31$ ), SES ( $\gamma=0.24$ ) and READINT ( $\gamma=0.21$ ). In addition, MISS

shows a negative effect on READACH ( $\gamma=-0.11$ ) while the small negative gender effect ( $\gamma=-0.07$ ) indicates that girls performed at a higher level than boys (female=1; male=2), once other factors such as reading interest, grade level and home background are taken into consideration.



Note: For reasons of clarity, direct effects only are displayed. For interaction effects refer to Table 4.

### Figure 2. Final two-level HLM model for Spain for reading achievement

The grade a student is enrolled at ( $\gamma=0.31$ ) has, by far, the most influential effect on reading achievement. According to the Spanish educational legislation, effective until the academic year 2002-03, students are to repeat a grade during secondary education only as a result of the joint decision of all teachers and the subsequent parents' authorisation. For this reason, repeaters are generally those students involved in a nearly irreversible dissociation process from the education system.

Socio-economic status ( $\gamma=0.24$ ) and interest and enjoyment in reading ( $\gamma=0.21$ ) have a considerable influence on reading. In relation to socio-economic status it is interesting to add that among OECD countries Spain shows a high heterogeneity with respect to occupation (ILO 2003) and educational levels (OECD 2003a).

The two lowest predictors of reading achievement at the student level include MISS ( $\gamma=-0.11$ ) and SEX ( $\gamma=-0.07$ ). The negative effect of MISS indicates that students who are not attending class, being late for school or not doing homework, perform lower in reading. In relation to gender, the result means that girls obtain a noticeably higher score than boys, once other important factors have been taken into account.

**Table 4. Final estimation of fixed and interaction effects; two-level HLM model for Spain for reading achievement**

Fixed Effects on READACH	$\gamma$ -coefficient	Standard error	t-ratio	p-value
<b>Level 1/Student-level effects</b>				
SEX	-0.07	0.01	6.94	0.000
GRADE	0.31	0.01	27.46	0.000
READINT	0.21	0.01	18.34	0.000
by SCHSIZE on READINT	0.03	0.01	2.80	0.005
SES	0.24	0.01	20.14	0.000
MISS	-0.11	0.01	-9.64	0.000
>> by PRIMARY on MISS	-0.03	0.01	-2.41	0.016
>> by LESSON on MISS	0.03	0.01	2.36	0.018
>> by RATCOMP on MISS	0.04	0.01	2.87	0.005
>> by PARTTIME on MISS	-0.03	0.01	-2.76	0.006
>> by SCHCLIM on MISS	-0.03	0.01	-2.48	0.013
>> by IMPACH on MISS	0.03	0.01	2.64	0.009
<b>Level 2/School-level effects</b>				
PUBLIC	-0.15	0.03	-4.42	0.000
SCHSIZE	0.10	0.03	3.18	0.002
SCHCLIM	-0.14	0.03	-4.21	0.000
IMPACH	0.07	0.03	2.10	0.036

Notes: for further information see Raudenbush and Bryk (2002)

>> Interaction effect

These findings at the student-level can be summarised by stating that Spanish students perform at a higher level in reading when they:

- are enrolled in higher grades (that is, if they are non-repeaters);
- come from homes with higher socio-economic status;
- demonstrate a greater interest in reading; and
- do not miss school.

At the school level, only four of the factors tested remain in the model to influence reading achievement. While, PUBLIC ( $\gamma=-0.15$ ) and SCHCLIM ( $\gamma=-0.14$ ) have a negative impact on the reading score, SCHSIZE ( $\gamma=0.10$ ) and IMPACH ( $\gamma=0.07$ ) show a positive effect.

Factors with more pronounced effects on reading achievement are the school type ( $\gamma=-0.15$ ) and school climate ( $\gamma=-0.14$ ), both showing negative effects. Overall, private schools perform better than public ones in reading achievement. It should be pointed out that private schools play an important role in Spanish secondary education as 37 per cent of all schools are private. What is more, their average socio-economic status is considerably higher than that of public schools (INCE, 1998). Thus, what mainly defines public and private schools is the different socio-economic status of the parents who enrol their children in either school type. In the case of school climate its negative effect indicates that students in schools with more helpful home environments and more supportive teachers perform at a higher level in reading.

It is interesting to observe that school size ( $\gamma=0.10$ ) has a positive effect on reading achievement. Until now, studies carried out in Spain on the topics of 'school organisation' and 'school effectiveness' have not led to any final conclusion. On one hand, these studies suggest that school size lacks any kind of significant effect on student achievement (Garín Sallán and Antúnez Marcos, 1993) and on the other, though indirectly only, that this effect becomes negative (CIDE, 2000). According to the results from Table 4, 15-year-old students in larger schools perform at a higher level in reading achievement. It may be hypothesised that school size is an artifact for a school's geographic location, as large schools, typically, are found in urban or metropolitan areas.

In fact, most cultural resources and infrastructures, private schools and families with higher socio-economic status are found in the larger cities.

The importance attached to achievement ( $\gamma=0.07$ ) is a less pronounced school effect. Its positive sign indicates that a higher frequency of student assessment seems to lead to better achievement in reading.

Thus, for students in Spain to achieve well in reading it is advantageous to be enrolled in a:

- private school;
- larger school ;
- school with a better school climate; and
- school which places importance on achievement.

Though it should not be overlooked that six interaction effects appeared to operate on MISS, their  $\gamma$ -coefficients turned out to be only small. Still, it is interesting to note that quite a complex network of factors is in place which impact on the relationship between regular school attendance and reading literacy. For instance, the differentiating effect that being absent from school has on the achievement levels of higher and lower performers in reading is greater in schools that (a) have a larger ratio of computers per student ( $\gg$ RATCOMP on MISS  $\gamma=0.04$ ); (b) assign greater importance to achievement ( $\gg$ IMPACH on MISS  $\gamma=0.03$ ); and (c) have more class periods per school week ( $\gg$ LESSON on MISS  $\gamma=0.03$ ).

### Comparison of results for Germany and Spain

A comparison of the results of the two-level HLM analysis of factors influencing reading achievement in Germany and Spain reveals both, similarities and differences. Thus, GRADE, SES and READINT influence reading achievement positively whereas MISS has a negative effect on reading achievement. In other words, students who are non-repeaters, have a greater reading interest, are absent from school less frequently, and come from homes with higher socio-economic status, perform at higher levels in reading in both countries.

Likewise, school climate operates similarly in both countries, in that students attending schools for which principals report a more supportive home environment, more respectful students and more supportive teachers perform at a higher level in reading.

In contrast, albeit only weakly in both countries, importance placed on achievement in terms of frequency of reports to parents on student performance or teachers valuing academic achievement operates differently in the two countries. While this factor influences achievement positively in Spain, the reverse seems to apply in Germany.

As indicators of the appropriateness of the HLM models for the two countries, the respective variance proportions for each level have been calculated. In Table 5 the variance estimates for the unconditional models and the final models are presented, together with the proportions of the variance available at each level and the variance explained at each level.

**Table 5. Estimation of variance components and explained variance: two-level HLM models for Germany and Spain**

	GERMANY		SPAIN	
	Students ( $\hat{\sigma}^2$ )	Schools ( $\hat{\tau}_\pi$ )	Students ( $\hat{\sigma}^2$ )	Schools ( $\hat{\tau}_\pi$ )
Number of cases	5073	219	6214	185
Fully unconditional HLM model	0.55	0.64	0.99	0.19
Final two-level HLM model	0.40	0.26	0.70	0.12
Variance at each level (between)	0.46	0.54	0.84	0.16
Proportion of variance explained	0.27	0.59	0.29	0.37

When looking at the variance proportions for the unconditional model it becomes evident that in Spain more of the variance is associated with the student level (84%) whereas in Germany most of the variance is associated with the school level (54%). This finding – which is in line with previous results of German and Spanish school achievement data (OECD 1998) – is of key importance if remedial steps are to be taken to improve reading achievement in either country. But this finding also underlines, especially in Germany, the importance of school- and teacher or teaching-related factors for student performance in reading. In contrast and despite the segregation into private and public institutions, the Spanish education system appears to be more homogeneous and less prone to perpetuating differential levels of reading achievement. Indeed, the Spanish education system features one common path for students up to the end of lower secondary schooling. Here, remedial efforts would seem to have to focus on the individual student level if performance in reading is to be improved.

Both final HLM models show fairly similar proportions of explained variance at the student level (Germany: 27%; Spain: 29%), while there remain sizeable differences at the school level (Germany: 59%; Spain: 37%).

### CONCLUSION

As could be shown using hierarchical linear modelling, a range of factors contributed positively or negatively to reading achievement among students that had been assessed as part of the OECD's PISA project. While the two-level HLM models identified some commonalities between the way in which reading achievement is influenced in Germany and Spain, substantial differences in explaining reading achievement in the two countries remain.

GRADE, which may be perceived here as a substitute for scholastic aptitude in that it reflects whether or not a student had repeated a grade, READINT, SES and MISS were identified as factors common to both countries at the student level. School climate and importance assigned to achievement by teachers were the two factors that operated at the school level both in Germany and in Spain. A home environment with higher parental education and occupation, students' greater interest in reading and a greater commitment to school as illustrated through fewer instances of being absent from or late for school tended to foster reading achievement in both countries.

Much of the differences between the two education systems apparently stemmed from the fact that in Germany much of the variance was associated with the school level whereas most of the differences in performance between students in Spain was associated with the student level. Thus, efforts to improve reading achievement in Germany would have to focus on supporting schools whereas in Spain remedial action would revolve around providing increased assistance at the individual student level.

In order to provide more detailed recommendations, further investigation could focus on introducing teacher and instructional variables into the model to examine the way in which such factors contribute to explaining differences in student performance. Whereas PISA-2000 data collection did not include such variables, recent efforts to develop this assessment program further appear to be aimed at addressing these issues.

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