



Factors determining educational quality: Student mathematics achievement in Nepal



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ABSTRACT

This study employed the multiple regression analysis to examine the effects of family characteristics, student characteristics, parental involvement, and school characteristics with regard to learning achievements in mathematics of students of eighth grade in Nepal. Mathematics test was administrated with 762 students (400 girls) of 21 secondary schools in nine districts of three ecological zones—mountain, hill and lowland (*tarai*). Findings indicated that family characteristics explained the largest amount of variance in mathematics achievement, followed by student characteristics, school characteristics and parental involvement. Variables – parental education, number of books at home, absenteeism, parental support for homework, school type and location, teacher training, the number of school days in the academic year and school physical facilities were significantly related to students' mathematics achievement. The implications of this study for improving educational quality are discussed.

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1. Introduction

Quality of education associated with high learning achievement improves the quality of human resources and is directly related to increased individual earnings and productivity, economic growth and governments' ability to alleviate poverty (UNESCO, 2005). Although educators and researchers have yet to agree upon a consensus on the nature of educational quality and its determinants, it is typically measured by higher achievement in examinations (Chapman et al., 2005). Learning is a product of families, communities and peers as well as formal institutions (Rothstein, 2000), and social, economic and cultural factors influence the extent to which family members support children's classroom learning. Coleman et al. (1966) claimed that family characteristics were more important than formal education for children's learning in the United States. However, based on data from 29 developed and developing countries, Heyneman and Loxley (1983) found that the overall proportion of variance in student achievement was largely associated with school characteristics as compared to student background characteristics particularly in less industrialised countries and that "the predominant influence on student learning is the quality of schools and teachers to which children are exposed" (p. 1162). In addition to the effects of family and school

characteristics, child characteristics such as motivation, academic effort, involvement in household chores, homework and gender influence academic outcomes (Konu and Rimpela, 2002; Keith et al., 1986; Veenstra and Kuyper, 2004). Moreover, parents who provide support and opportunities to their children to explore and express ideas make a vital contribution to their academic achievement (Fehrmann et al., 1987; Astone and McLahanan, 1991; Iverson and Walberg, 1982; Barnard, 2004).

Adopting a theoretical framework, the present study examined how family characteristics, student characteristics, parental involvement and school characteristics influenced students' mathematics achievement in Nepal. More specifically, the research focused on three issues: determining the various factors that influenced mathematics achievement of grade eight students in Nepal; identifying the factors that primarily affected academic achievement; and determining the extent to which differences in achievement are associated with family characteristics, student characteristics, parental involvement and school characteristics. This study differs from earlier studies as it examined the contribution of students' caste/ethnic group and preschool experience in addition to the effects of family characteristics, student characteristics, parental involvement and school characteristics on academic achievement simultaneously, which is rare in such studies and is very innovative in the context of Nepal.

A multi-stage random stratified sampling method was used. Initially, two stages – ecological zones and districts – were identified. Based on the proportion of students from three ecological zones – mountain, hill and lowland (*tarai*) – nine districts were selected: one

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mountain district, four hill districts and four lowland (*tarai*) districts. Altogether, the sample consisted of 21 secondary schools with 762 eighth grade students (400 girls). Students' academic achievement was measured by a mathematics test based on the national curriculum. Participating students received questionnaires that provided information regarding personal characteristics, family characteristics, and the extent of parental involvement in schooling. In addition, information on school characteristics was obtained from 21 head teachers and 21 mathematics teachers. To identify the factors underlying mathematics achievement, a multiple linear regression analysis was performed that tested four increasingly comprehensive models.

The structure of this paper is as follows. The Section 2 describes the cultural context of education in Nepal. Section 3 discusses the theoretical framework of the study, which primarily focuses on the relationship of learning outcomes to family characteristics, student characteristics, parental involvement and school characteristics. Section 4 presents the study methodology and describes the study instruments, sample and dependent and independent variables. Sections 5 and 6 present data analysis and discussions. Section 7 presents study conclusions and discusses the implications of study findings.

2. The cultural context of education in Nepal

Nepal is a small landlocked country in southern Asia with a diverse population of 26.6 million that consists of 92 different language groups, 103 caste/ethnic groups and seven religious groups (CBS, 2011). Geographically, the country is divided into three distinct ecological regions. The mountain region at an altitude between 4877 and 8848 m comprises 35 percent of the land area, hills at an altitude between 610 and 4876 m comprises 42 percent of the land area, and the tarai region, which is an extension of the Gangetic Plains, lies below an elevation of 610 m and comprises 23 percent of the land area. For administrative purposes, there are five development regions, 14 zones and 75 districts. Currently, poverty is pervasive in Nepal. The Nepal Living Standards Survey (NLSS, 2011) estimated that 25.1 percent of the total population is below the poverty line, and the GDP per capita is approximately US\$ 480. In 2011, Nepal was classified in the medium human development category and ranked 157th (with a value of .458) on the Human Development Index (HDI) and 68th on the Human Poverty Index (HPI). Nearly 83 percent of the population lives in rural areas and the adult literacy rate (15 years and above) is only 56.64 percent (NLSS, 2011).

With the establishment of democracy in 1990, the government of Nepal considered education as a priority and committed to provide quality education to all, especially girls and disadvantaged. The share of the gross domestic product (GDP) devoted to the education sector increased from 2.1 percent in 1990 to 3.3 percent in 2009; during the same period, overall education expenditures increased from 13 to 17.5 percent. Despite a decade-long conflict, several projects and programs, such as the Basic and Primary Education Project I (1992–1998), the Basic and Primary Education Program II (1999–2004) and Education for All (EFA, 2004–2009) were implemented, leading to greater participation of children and students in formal education at all levels. The net enrolment ratio (NER) at the primary level increased from 67 percent in 1990 to 95 percent in 2011 (DOE, 2011). However, improving learning achievement continues to present daunting challenges as many children and young people leave school without basic skills and knowledge needed to improve their standard of living, function effectively in society and develop their potential. Assessments performed by the Research Centre for Educational Innovation and Development (CERID, 1999) and by the Educational Development Service Centre (EDSC, 2008) revealed poor learning outcomes in

core subjects, including mathematics. Average achievement score in mathematics of grade eight students was 28.8 in 1999 and 31.7 in 2008. However, prior researches have not investigated the factors that influence learning achievement of students in Nepal.

Recently, the country has experienced significant political change, and the transformation from a constitutional monarchy to a democratic republic has raised people's expectations and increased the demand for quality public education. To respond to the public demand for educational quality and opportunity, the School Sector Reform Plan (SSRP, 2009–2015) is in the fourth year of implementation. The plan aims at restructuring of school education between basic (grades 1–8) and secondary (grades 9–12) education. Grade eight is the final basic education grade level and it is supposed that grade 8 graduates achieve functional literacy and numeracy skills to fulfill the requirement of society.

The interim constitution of Nepal 2007 emphasizes on providing free education up to secondary level. In this context, it is important to examine learning outcomes of eighth grade students in mathematics. Currently, two hundred thousand teachers teach eight million children in a network of over 34 thousand schools; 11 percent of these schools are privately managed. The relevant age groups are 3–4 years for preschool/early childhood education and development (ECED), 5–12 years for basic education (5–9 years for primary and 10–12 years for upper primary education) and 13–16 years for secondary education. The Ministry of Education (MOE) is the chief body responsible for formulating education policies, while the Department of Education (DOE) supports central level agencies and the District Education Offices (DEO) in implementing programmes. Regional Education Directorates (REDs) are responsible for monitoring educational activities at the regional level, and the District Education Offices (DEOs) are primarily responsible for implementing educational programmes and managing schools at the district level with the support of School Supervisors (SS) and Resource Persons (RP). The Resource Centre (RC) is the lowest institutional agency at the district level that provides academic and technical support to schools.

3. Factors associated with educational quality: the theoretical framework

Many studies have investigated the factors that contribute to student learning outcomes across contexts. However, due to conflicting research findings consensus has yet to be achieved regarding the factors that determine student academic achievement. The effect of family socio-economic status (SES) is one of the most frequently examined factors because the family plays a crucial role in shaping children's educational experiences and academic achievement in every society. A widely accepted view is that SES consists of the financial, social and cultural capital that is transmitted from one generation to next (Buchmann, 2002). Parents with higher levels of SES are more likely to have financial and social resources to invest in education (Becker, 1964), and children in these families are more likely to succeed in school (Buchmann, 2002) and exhibit higher levels of performance (Veenstra and Kuyper, 2004). In the United States, Coleman et al. (1966) examined national survey data and found that family characteristics were more important than school characteristics in determining academic outcomes. SES as measured by parents' education, occupation and income, significantly influences students' educational attainment and achievement (Coleman et al., 1966; Cameron and Heckman, 2001; Schiller et al., 2002) because these students have access to greater economic and social resources (Coleman, 1988; Gregg and Machin, 1999; McNeal, 1999) to support academic success compared to families with lower levels of parental education (Schiller et al., 2002).

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