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Program for International Student Assessment (PISA) 2000: Analysis of
Questionnaire Data from United States Students

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Education

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By

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ABSTRACT

The Program for International Student Assessment 2000 (PISA) is an International Examination that was developed by the Organization for Economic Cooperation and Development (OECD) to assess the reading, mathematics, and science literacy of students in participating countries, including the United States. PISA is a two-hour paper-and-pencil examination that is designed to assess 15-year-olds' capabilities in reading, mathematics, and science literacy. PISA assesses how well prepared students are for life beyond the classroom by focusing on the application of knowledge and skills in everyday situations. PISA presents students with tasks that involve interpretation of real-world materials as much as possible. PISA assessment content areas reflect the knowledge young people will need for their future.

In addition to the two-hour paper-and-pencil assessment, students completed a background questionnaire providing information about themselves. The questionnaire covered school and home factors that help determine successful students. This paper analyzed the questionnaire data from students in the United States. Analysis of data revealed how United States' 15-year-olds perceived what happens in the classrooms and at homes in many different ways. The findings revealed that factors affecting the 15-year-olds' learning include disruptive classrooms, school culture and climate, teacher apathy, and lack of parental involvement in children's learning.

Introduction

It has been well documented that mathematics, science, technology, and reading are constructs that help determine school success. Success at school is a good indicator of success in life. The capacity to excel in science, technology, mathematics, and reading will help to predict who will lead a good life.

The Asia Pacific Economic Cooperation (APEC) used the occasion of its 1992 ministerial meeting to affirm that there is a direct link between education and economic development. The APEC ministers noted that high quality education has a positive impact on the quality of life. The ministers emphasized the need for all students to develop a strong skills foundation in literacy, numeracy, scientific reasoning, problem-solving, and become familiar with technologies that can make human interaction with nature and knowledge more fruitful (Asia Pacific Economic Cooperation [APEC], 1992).

Science and technology affect people in their daily lives. The various ways people communicate with one another, work, play, and stay healthy are largely influenced by the results of scientific inquiry (National Science Board [NSB], 2000). The future well-being of United States and its people will depend not only on how it educates its children generally, but on how well it educates them in mathematics and science specifically (National Commission on Mathematics and Science Teaching for the 21st Century [NCMST], 2000).

The inability to read puts a child at risk of truancy and dropping out of school (National Science Foundation [NSF], 1999). Research shows that children who are successful in later years begin reading well early and those who fall behind often stay behind in academic achievement (Snow, Burns, & Griffin, 1998). Children who cannot read well are more likely to drop out of

school and become destined to low-paying jobs throughout their lives (United States Department of Education, 2003).

As Ngwudike and Searcy (2004) stated:

Children who begin to read well early are more likely to succeed in school and later as accomplished professionals. Reading unlocks the door to learning mathematics, science, social studies, literature, language arts, and all other subjects. Children who are capable readers succeed in these subjects, read for pleasure and personal growth, and develop self-confidence in their abilities that propel them through school. (p. 12).

To evaluate its competitive edge in this rapidly growing global economy, United States participates in a number of international assessments as a way of measuring the achievement of its students against international benchmarks. Such international assessments include Trends in International Mathematics and Science Study [TIMSS], the Progress in International Reading Literacy Study [PIRLS], and the Program for International Student Assessment [PISA]. While TIMSS and PIRLS assess mathematics and science, and reading comprehension respectively, PISA assesses mathematics, science, and reading.

TIMSS and PIRLS are designed to measure progress toward students' mastery of specific knowledge, skills, and concepts. TIMSS measures progress toward United States national goals of improving its children's academic achievement in mathematics and science. PIRLS measures progress toward reading comprehension.

While TIMSS helps to measure progress in academic achievement in mathematics and science (United States Department of Education, 1996, 1997), and PIRLS seeks to measure students' mastery of knowledge, concepts, and skills to reflect curriculum frameworks (Lemke, Sen, et al., 2004), PISA focuses on how students can apply what they have learned in

mathematics, science, and reading in real life situations (Council of Ministers of Education, Canada [CMEC], 2001, Lemke, Calsyn, et al., 2001). All the international assessments that United States uses to measure the performance of its students against international benchmarks cannot be discussed in one paper. Therefore, this paper narrowed its analysis on PISA.

Statement of Research Purpose

The purpose of this paper was to analyze student questionnaire data of the United States 15-year-olds that participated in PISA 2000. The questionnaire was used to collect data on school and home factors that influence students' achievement. In analyzing the data, this paper examined the perceptions of United States 15-year-olds on school and home factors that determine successful students.

Research Questions

An analysis of PISA 2000 student questionnaire data will help United States educators, researchers, policymakers, and other education stakeholders answer the following questions:

1. How do United States 15-year-olds perceive school factors that influence achievement and success at school?
2. How do United States 15-year-olds perceive home factors that help to produce successful students?
3. What lessons can be learned from PISA 2000 student questionnaire data?

Methodology

Data for this study were obtained from PISA 2000 student questionnaire data. PISA was developed by the Organization for Economic Cooperation and Development [OECD], an intergovernmental organization of industrialized countries, to assess the reading, mathematics, and science literacy of 15-year-olds in participating countries, including United States. PISA is

conducted in three-year cycles beginning from 2000. Each cycle concentrates on one of the areas of reading, mathematics, and science, and minimally on the other two areas. PISA was first conducted in 2000 with major emphasis on reading. Therefore, the data from PISA 2000 were used to answer the research questions posed in this study in relation to reading.

Program for International Student Assessment (PISA) 2000 Study

The program for International Student Assessment (PISA) is one of the most ambitious international education projects ever to be embarked upon. Coordinated by the Organization for Economic Cooperation and Development (OECD), an intergovernmental organization of industrialized countries, PISA 2000 involved over 250,000 students from 32 countries (OECD, 2000; CMEC, 2001; Lemke, Calsyn, et al., 2001; Lemke, Sen, et al., 2004).

PISA, which began in 2000, operates on a 3-year cycle. Each assessment cycle focuses on one subject in particular. PISA 2000 assessment focused on reading literacy, with minor emphasis on mathematics and science. PISA 2000 defined reading literacy as an individual's capability to understand, use and reflect on written texts in order to achieve one's goal, to develop one's knowledge and potential, and to participate effectively in one's society (OECD, 2000; CMEC, 2001; National Center for Education Statistics [NCES], 2004).

Over 250,000 15-year-olds from 28 OECD and 4 non-OECD countries participated in PISA 2000. In addition to a two-hour paper and pencil assessment, PISA 2000 administered a 20-30 minute questionnaire to the students. OECD member countries that participated in PISA 2000 were Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Republic of Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Sweden, Switzerland,

United Kingdom, and United States. The non-OECD countries that participated were Brazil, Latvia, Liechtenstein, and Russia Federation (OECD, 2000; CMEC, 2001; Lemke, Calsyn, et al., 2001; Lemke, Sen, et al., 2004).

PISA 2000 assessment focused on 15-year-olds' capabilities in reading literacy irrespective of grade level. In United States, this age corresponds largely to ninth- and tenth-grade students. Nearly 4,000 students from public and non-public schools took the PISA 2000 assessment (NCES, 2004; Lemke, Calsyn, et al., 2001).

PISA is unique in that it differs from other international assessments. While other international assessments focus on curriculum frameworks, PISA emphasizes the application of knowledge to real life situations. As a result, PISA measures 15-year-olds' preparedness for adult life as they come close to the end of compulsory schooling by presenting them with tasks that require interpretation of real-world materials as much as possible (Lemke, Calsyn, et al., 2001).

PISA 2000 is significant to United States because it gives education researchers and policymakers comprehensive data not only on student achievement, but also on school and home factors that determine successful students. PISA 2000 gives United States another bank of quantitative information for education researchers and policymakers to analyze as they strive to enhance the country's education systems. The results of the data analysis that follow will bring to focus 15-year-olds' impressions about their learning environment in school and at home.

Findings

Analysis of PISA 2000 student questionnaire data revealed findings that will interest policymakers, educators, researchers, and parents. The findings are aggregated under home and school factors.

Home Factors

Students were asked how often their parents ate dinner with them around a table. About 7.6% of the students said never, 8% said few times a year, 5.3% said once a month, 11.1% said several times a month, 22.6% said several times a week, and 36.8% said every day.

On how often their parents discussed with them how well they are doing at school, 3.1% said never, 5.7% said few times a year, 7.5% said once a month, 14.7% said several times a month, 21.4% said several times a week, and 41.1% said every day.

Questioned about how often parents discussed books, films, or television programs with them, 11.7% said never, 15.1% said few times a year, 11.5% said once a month, 19.9% said several times a month, 19.2% said several times a week, and 16.2% said every day.

On how often their mothers worked with them on homework, 33.3% said never, 19% said few times a year, 12.1% said once a month, 12.8% said several times a month, 11.3% said several times a week, and almost 5.7% said every day. As for their fathers assisting them on homework, 45.1% said never, 17.3% said few times a year, 10.6% said once a month, 9.8% said several times a month, 7% said several times a week, and 3.2% said every day.

Asked how often their siblings worked with them on homework, 56.7% said never, 12.8% said few times a year, 7.4% said once or several times a month, 5.9% said several times a week, and 3.2% every day. As for tutors assisting them, 79.1% said never, 4.3% said few times a year, 2.4% said once a month, 3% said several times a month, 2.8% said several times a week,

and 1.1% said every day. Questioned on how often friends work with them on homework, 18.6% said never, 13% said few times a year, 10.8% said once a month, 18.1% said several times a month, 21.1% said several times a week, and 11.8% said every day.

Probing further on home factors that determine successful students, the 15-year-olds were asked if they have their own rooms at home. Almost 79.9% of the students said yes, and 14.6% said no. On having educational software at home, 73.2% said yes, and 20.9% said no. Asked about having Internet at home, 62.4% said yes, and 31.8% said no. On having computers at home, 18.7% said none, 46.5% said one, 21.5% said two, and 7.3% said three or more.

Questioned on having a quiet place at to study, 85.2% said yes, and 8.8% said no. Asked about having a desk to study, 72.2% said yes, and 22% said no. On having reference books at home, 49.6% said yes, and 44.5% said no. Asked about having books of poetry at home, 49.6% said yes, and 44.5% said no.

School Factors

How and what students learn at school are largely determined by many factors. The 15-year-olds were questioned about many of these factors in regard to their English classrooms. English classrooms may also be understood to mean language arts, or reading classrooms.

The students were asked if they took remedial courses in English at school to improve learning in the last three years, 73.6% of the students said never, 13.7% said some, and only 5.8% said regularly. Questioned about remedial courses in other subjects at school, 68.6% said never, 18.6% said some, and 5.9% said regularly. On remedial courses in English outside of school, 87.6% said never, 4.8% said some, and 5.9% said regularly. Asked about remedial courses in other subjects outside of school, 73.2% said never, 16.6% said some, and 3.6% said never.

The students were asked if their teachers have to wait for a long time for students to quiet down in English classes, 12.5% said never, 54.5% said some class periods, 14.5% said most class periods, and 12.4% said every class period. Asked about noise and disorder during English classes, 16.7% said never, 48.3% said some class periods, 14.9% said most class periods, and 13.4% said every class period. Questioned about spending more than 5 minutes doing nothing at start of classes, 21.4% said never, 35.3% said some class periods, 16.7% said most class periods, and 20.5% said every class period.

Probing further on school factors, the 15-year-olds were asked if teachers want students to work hard in their English classes, 2% said never, 9.8% said some class periods, 20.4% said most class periods, and 61.7% said every class period. On helping students with work, 3.9% said never, 19.7% said some class periods, 26.3% said most class periods, and 43.8% said every class period. Asked if teachers show interest in every student learning in their English classes, 6.9% said never, 21.2% said some class periods, 23.2% said most class periods, and 42.4% said every class period.

Students were asked to state the number of hours they spend on homework and study in English, 13.9% said no time, 33.3% said 1 hour a week, 31.9% said 1-3 hours a week, and 11.9% said more than 3 hours a week. Asked about teachers checking homework, 5.6% said never, 23.1% said some class periods, 28.8% said most class periods, and 35.9% said every class period. About grading homework, 3% said never, 26.2% said sometimes, 35.2% said mostly, and 27% said always.

The 15-year olds were asked how many times they missed entire school day in the previous two school weeks, 54% said none, 30.8% said 1 or 2 days, 4.8% said 3 or 4 days, and 3.4% said 5 or more days. Asked about skipping classes in the previous two school weeks,

73.7% said none, 13.9% said 1 or 2 times, 2.8% said 2 or 3 times, and 2.3% said 5 or more times. On being late school in the previous two school weeks, 55.8% said none, 25.5% said 1 or 2 times, 6.3% said 3 or 4 times, and 5.1% said 5 or more times.

Questioned about not wanting to be in school, 10.2% strongly agreed, 25.3% agreed, 37.3% disagreed, and 19.6% strongly disagreed. Asked about computer usage at school, 13.1% said never, 17.2% said less than once a month, 19.3% said 1-4 times a month, 15.8% said few times a week, and 14.3% said every day. On computer usage at home, 12.9% said never, 2.8% said less than once a month, 7.8% said 1-4 times a month, 14.6% said few times a week, and 42.1% said every day.

Implications for Research and Practice

Policymakers, researchers, university and K-12 faculty, and parents may use PISA data in a variety of ways. Policymakers may use the data to inform their policy decisions for the enhancement of student achievement. PISA data may be used to improve classroom instruction for pre-service candidates by university faculty. It can be used to develop the framework for professional development for in-service teachers. K-12 educators may use PISA data to improve classroom teaching. The data can serve as the springboard for action research by K-12 educators. The data may be used for the improvement of parental involvement in the education of the 15-year olds, and all students in general.

PISA will help policymakers, researchers, university and K-12 faculty, parents, and other stakeholders in education to rekindle dialogue on how to improve teaching and learning in schools. There is no doubt that home and school environment severally and jointly help to determine successful students.

PISA data show the need for the improvement of school climate and classroom management. Missing school, not wanting to be in school, skipping classes, and disrupting classes constitute part of the culture of some schools. In this regard, university and college faculty need to organize professional development on leadership and classroom management for central office and K-12 administrators, and K-12 educators respectively.

PISA 2000 assessment was on how 15-year-olds apply the knowledge, concepts, and skills they have learned in school in real life situations. Therefore, K-12 educators need to integrate real life materials into their instruction. By doing this, K-12 educators will be preparing students on how to surmount real life challenges they will encounter after school. One's knowledge and skills have utility when used to overcome real life challenges.

Conclusion

PISA 2000 has enabled United States to know how its 15-year-olds measure against those of other countries, especially those of other industrialized countries. Like the National Assessment of Educational Progress (NAEP), the Trends in International Mathematics and Science Study (TIMSS), and the Progress in International Reading Literacy Study (PIRLS), PISA 2000 provides data that may be used for the improvement of teaching and learning in schools. The data are available to be mined, refined to meet local needs, and be utilized. This is the challenge to educators and researchers alike.

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