

PROFICIÊNCIA EM LEITURA EM LÍNGUA INGLESA

**THE RELATIONSHIP BETWEEN STUDENTS' EXPOSURE TO TECHNOLOGY AND THEIR ACHIEVEMENT IN SCIENCE AND MATH**

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**[1] Introduction**

(...) Children are exposed to technology at home but also at school by new information and communications technologies (ICT). Due to having new computers and related technologies, schools are in need of new technology plans and designs. According to Kozma (2003), “Teachers in many countries are beginning to use ICT to help change classroom teaching and learning, and are integrating technology into the curriculum.” (p. 13). “Therefore, it is necessary to develop strategies for students to effectively use computers and advanced communication technologies that can help them to improve their academic performance.” (Lee et al., 2009, p. 226). According to analyses of U.S. data (NCES, 2001), teachers’ computer use for certain activities at school positively affects students’ science achievement. Papanastasiou et al. (2003) argued that students who have available computers at home and in the library have higher levels of science literacy. Lee et al. (2009) found in their study that students who were using computer 1 hour per day had better math scores. Kim and Chang (2010) stated that computer use for math was associated with reducing the achievement gap among different diverse backgrounds. It is obvious that there might be many factors affecting students’ science and math performance. Technology is one of these factors; that is why it is important to explore how we can explain students’ science and math achievements by looking at their use and accessibility of computers and related technologies, as suggested by Subrahmanyam et al. (2001). Notten and Kraaykamp (2009) stated that science performance is positively affected if there is a positive reading climate and computer availability at home. They also mentioned that “the absence of a television set at home seems to narrow a child’s worldview and knowledge of science.” (p. 379). According to Attewell and Battle (1999), mathematical performance was positively associated with having a home computer. Dumais (2009) also mentioned that using computers for fun was related to increasing math achievement. The aim of this study was to investigate how using computers and related technologies affect science and math performance among students.

**[2] Method:** The data for this study come from the 2009 assessment of The Programme for International Student Assessment (PISA) that is an internationally standardized assessment jointly

developed by participating economies and administered to 15-year-olds (9th graders) in schools. PISA assesses the domains of reading, mathematical and scientific literacy that is covered not merely in terms of mastery of the school curriculum, but in terms of important knowledge and skills needed in real life. Besides assessing these specified domains, PISA includes student, parent and school surveys to gather information on various social, cultural and economic factors such as students' and parents' background, and their attitudes towards ICT.

**[3] Conclusion** The aim of this study was to explain students' science and math achievement by looking at their use and accessibility of computers and related technologies, as suggested by Subrahmanyam et al. (2001). The results of this study indicated that students' exposure to ICT at home and school was a strong predictor of their math and science performance. Students' exposure to ICT out of school time had a larger impact on their math and science achievement than their exposure to ICT at school. This might point out the lack of the integration of ICT into classroom instruction at schools. Ziya et al. (2010) stated that students' using computers in line with their needs, parents' controlling the time their children use computers, the internet and computer for entertainment purposes can be beneficial. The results of this study showed that ICT usage had a positive impact on students' math and science performance in PISA.

**[4] Practical Implications of This Study** Projects for comparing students' achievement such as The Trends in International Mathematics and Science Study (TIMSS), Progress in International Reading Literacy Study (PIRLS), and The Programme for International Student Assessment (PISA) can enable countries to evaluate their system of education and to pursue their students in the fields of mathematics, science and reading by years rather than being projects for competition between countries (Ziya et al., 2010). This study focused on ICT usage and its effects on students' achievement. The findings of this study can be beneficial for educators and policy-makers in education in terms of constructing classroom environments and designing curriculums.

**[5] Results** This study can be also useful for comparing participating countries in PISA in terms of ICT usage and its effects on achievement. Previous international comparative studies showed that there are a number of factors influencing students' performance in comparative examinations such as PISA and TIMMS. Ozgun-Koca & Sen (2002) found that very little use of computers, calculators and other instructional technology, intensive lecturing and note-taking in classrooms, loading students with too much information in the curriculum, and problems associated with measurement and evaluations were the main factors. Askar & Olkun (2005) found that the students' access to computers in schools was quite low when compared to other countries. The methodology of this study can be repeated using PISA results from other countries, and the results can be used for international comparisons.

## Responda as questões abaixo de acordo com o texto:

1. De acordo com o parágrafo [1], Kozma (2003) defende que professores ao redor do mundo estão usando as tecnologias da ciência e da informação para mudar o ensino e a aprendizagem e integrar a tecnologia ao currículo. (2,0 pts).

- (a) Cinco outros pensadores se manifestam a respeito do uso das tecnologias. Selecione dois deles e diga o que defendem.

[errata] : há no texto mais de 5 pensadores, contudo esta informação não interfere nas possíveis respostas que contemplam apenas dois, à escolha do candidato.

Papanastasiou et al. (2003) argued that students who have available computers at home and in the library have higher levels of science literacy. Lee et al. (2009) found in their study that students who were using computer 1 hour per day had better math scores. Kim and Chang (2010) stated that computer use for math was associated with reducing the achievement gap among different diverse backgrounds. It is obvious that there might be many factors affecting students' science and math performance. Technology is one of these factors; that is why it is important to explore how we can explain students' science and math achievements by looking at their use and accessibility of computers and related technologies, as suggested by Subrahmanyam et al. (2001). Notten and Kraaykamp (2009) stated that science performance is positively affected if there is a positive reading climate and computer availability at home. They also mentioned that "the absence of a television set at home seems to narrow a child's worldview and knowledge of science." (p. 379). According to Attewell and Battle (1999), mathematical performance was positively associated with having a home computer. Dumais (2009) also mentioned that using computers for fun was related to increasing math achievement.

1º Papanastasiou et al. (2003) argumentam que alunos que tem computadores disponíveis em suas casas e em bibliotecas, têm níveis mais altos de letramento em ciências

2º Lee et al. (2009) descobriram em seus estudos que alunos que estavam utilizando o computador drante uma hora por dia obtinham melhores resultados em Matemática

3º Kim e Chang (2010) afirmaram que o uso do computador para Matemática estava associado com a redução do desnível de produtividade entre alunos de diferentes bases (de conhecimento). Obviamente devem existir outros fatores influenciando a performance em matemática e ciencia por parte dos alunos. A tecnologia é um destes fatores; esta é a razão da importância em explorar as formas de explicar o desempenho dos alunos em ciências e matemática por meio de sua acessibilidade aos computadores e tecnologias relacionadas, tal como sugerido por Subrahmanyam et al. (2001)

4º Notten e Kraaykamp (2009) afirmaram que a performance em ciências é positivamente afetada se houver um clima positivo de leitura e computador disponível em casa. Eles também mencionam que "a ausência de televisão em casa parece estreitar a visão de mundo de crianças bem como o conhecimento das ciências" (p. 379)

5º De acordo com Attewell e Battle (1999), a performance em matemática estaria positivamente associada com ter um computador disponível em casa.

6o Dumais (2009) também mencionou que usar computadores por diversão estaria relacionado com o aumento de produtividade em matemática.

(b) Qual é o objetivo deste estudo?

The aim of this study was to investigate how using computers and related technologies affect science and math performance among students.

O objetivo deste estudo foi investigar como o uso de computadores e tecnologias a fim afetam o desempenho de alunos em ciências e matemática.

2. De acordo com o parágrafo 2, os dados para a pesquisa vieram de um processo avaliativo.

Qual é o nome do processo e o que ele avalia? (2,0pts).

Programme for International Student Assessment (PISA) that is an internationally standardized assessment jointly developed by participating economies and administered to 15-year-olds (9th graders) in schools. PISA assesses the domains of reading, mathematical and scientific literacy that is covered not merely in terms of mastery of the school curriculum, but in terms of important knowledge and skills needed in real life.

O processo é o programa PISA – Programa para Avaliação Internacional de Alunos. Ele avalia os domínios da leitura, matemática e letramento científico que são cobertos não apenas em termos de performance do currículo escolar, mas em termos de conhecimentos e habilidades importantes para a vida real.

3. No parágrafo 3, o texto fala sobre o método utilizado para avaliar a exposição dos alunos a tecnologia. Qual é o método e o que ele inclui? (2,0 pts).

The questions in the PISA Student & ICT Survey were used. The survey includes questions about several topics such as students' possession of technological devices and how frequently they use these devices at home.

As questões no PISA e ICT foram usadas. Esta pesquisa inclui perguntas sobre diversos tópicos tais como a propriedade (posse) de equipamentos de tecnologia e a frequência com que estes são utilizados em casa.

4. De acordo com o parágrafo 4, qual é a importância de projetos como o TIMSS, PIRLS e o PISA? (2,0 pts).

They can enable countries to evaluate their system of education and to pursue their students in the fields of mathematics, science and reading by years rather than being projects for competition between countries.

Eles podem capacitar países para avaliar seus sistemas de educação e monitorar seus alunos nos campos da matemática, ciências e leitura durante anos, mais do que promoverem competição entre países.

5. Estudos internacionais comparativos anteriores mostraram que há um número de fatores que influencia o desempenho dos alunos em testes como o PISA e o TIMSS. Quais são esses fatores de acordo com o parágrafo 5? : (2,0 pts).

Very little use of computers, calculators and other instructional technology, intensive lecturing and note-taking in classrooms, loading students with too much information in the curriculum, and problems associated with measurement and evaluations were the main factors. Askar & Olkun (2005) found that the students' access to computers in schools was quite low when compared to other countries.

O uso muito reduzido de computadores, calculadoras e outros materiais tecnológicos instrucionais , palestras intensivas e tomada de notas em classe, sobrecarga de informação dentro dos currículos, e problemas associados com a medição e avaliação foram os principais fatores. Askar & Olkun (2005) descobriram que o acesso dos alunos aos computadores nas escolas era bem inferior comparado com outros países.