

LANGUAGE OF Mathematics

Instruction in French Immersion Programs



By M. Bournot-Trites and K. Reeder

This study examined how learning math in French affects immersion students' performance on mathematics tests administered in English. Two cohorts of French immersion students were followed from Grade 4 to 7. One group studied 80% of the core academic curriculum, including math, in French. The other group received 50% of the core academic in French and 50%, including math, in English. Student math scores were reviewed at the end of Grade 6 and determined that students who had completed 80% of their studies, including math, in French showed an advantage in math compared to the 50% French group.

The Issue

- Some parents and school districts have become concerned that elementary French immersion students may be handicapped because mathematics is taught in French.
- Much of this concern is based on assumptions that elementary-level Early French Immersion students lack the necessary French-language proficiency required for success.
- Immersion programs have taught math in French for close to forty years and research has demonstrated that French immersion students match or surpass the math achievement of their peers in the English program.

What the research shows

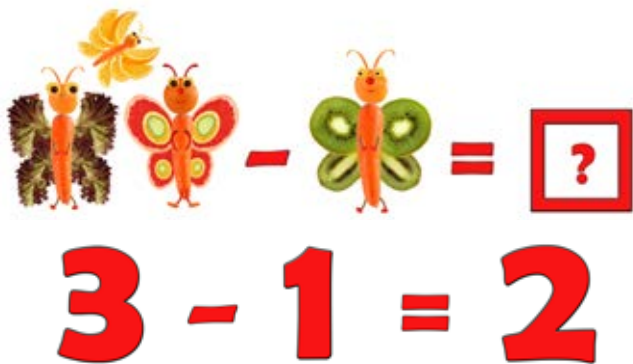
French Immersion students learning math in French achieve higher scores on standardized tests of mathematical ability than those of French Immersion students taught math in English. [Bournot-Trites, M., Reeder, K. (2001); Barik, H., Swain, M. (1978); Barwell, R. (2010); British Columbia Ministry of Education, (2000); Dicks, J., et al (2008); Dube, L., MacFarlane, A. (1991); New Brunswick Dept. of Education (2000); Turnbull, M., Hart, D., Lapkin, S. (2003)]

Why it works – pedagogical factors

- Intensity at the beginning of second language programs. Students in Early French Immersion, which provides intensity at the beginning of the

program, quickly achieve sufficient second-language proficiency to understand math and other subject content taught in French. [Bournot-Trites, M., Reeder, K. (2001); Netten, J., (2007); Netten, J., Germain, C. (2004)]

- Time on task. Early French Immersion students spend nearly twice the amount of time working in the French language than students in partial immersion programs and perform almost as well as francophone students in French listening and reading comprehension by the end of elementary school. [Netten, J. (2007); Netten, J., Germain, C. (2004); Turnbull, M., Hart, D., Lapkin, S. (2003); Wesche, M.B. (2002)]
- Interdependence of Languages. Language skills learned in the second language are transferred to the first language, and vice versa. French Immersion students who study math in French in intermediate years are not handicapped when they switch to math taught in English at high school [Bournot-Trites, M., Reeder, K. (2001)]
- French Immersion students who studied subjects in French in high school had no trouble studying them in English at post-secondary level. [Canadian Parents for French (2005)]



Detecting and addressing learning difficulties in French Immersion

- Some parents and educators express concern that Early French Immersion students with reading difficulties can't be identified until about grade 3 due to the delayed introduction of English Language Arts. This concern may be addressed by the fact that first- and second-language reading difficulties can be identified at the Kindergarten level using standard English-language testing instruments so that remedial assistance can be provided in a more timely fashion. [Erdos, C., Genesee, F., Savage, R. (2013)]
- Students with reading difficulties, lower academic abilities, or learning disabilities achieve at the same level programs as do their peers in the English program. Special Education support provided in French, or if necessary English, is effective at supporting students and will allow them continue and succeed in the French Immersion program. [Erdos, C., Haigh, C., Genesee, F. (2010)]

Why it is challenged - administrative factors

Faced with increasing demand for French Immersion, school districts feel compelled to use French Immersion cost-reduction strategies to prop up low-enrolment English-language programs. ■

Students with reading difficulties, lower academic abilities, or learning disabilities achieve at the same level programs as do their peers in the English program.

[Dicks/Kristmanson (2008)]

BEST PRACTICES/RECOMMENDATIONS

- Continue to offer mathematics in the French language in Early Total French Immersion programs (a) to maintain intensity at the beginning of second-language programs and (b) to maintain French Immersion students' math performance, which matches or surpasses student performance in English programs.
- Adopt the use of literacy and numeracy assessment instruments in Kindergarten or Grade 1 to identify 'at risk' students and offer remedial and special education support rather than counseling students out of French Immersion.
- Establish Ministry and school district policies and procedures to ensure equitable access to remedial and special education services for French Immersion students.
- Take full advantage of teacher mobility agreements via the Council of Ministers of Education to ensure that qualified French Immersion math teachers may be employed anywhere they are needed.
- Undertake recruitment and retention campaigns to attract more candidates for French-Second-Language teacher education programs if supply and demand issues can't be resolved via mobility agreements.

REFERENCES

- Barik, H., Swain, M. (1978) Evaluation of a French immersion program: The Ottawa study through Grade five, *Canadian Journal of Behavioural Science* 10(3), 192-201 http://psycnet.apa.org/index.cfm?fa=buy_optionToBuy&id=1980-01934-001
- Barwell, R. (2010) Tensions in Teaching Mathematics Through a Second Language, *ACIE Newsletter* 13(3), CARLA, University of Minnesota http://www.carla.umn.edu/immersion/acie/vol13/no3/may2010_rr.html
- Bournot-Trites, M., Reeder, K. (2001) Interdependence Revisited: Mathematics Achievement in an Intensified French Immersion Program; *Canadian Modern Language Review* 58 (1) p 27-43
- British Columbia Ministry of Education (2000) British Columbia Foundation Skills Assessment 2000: Provincial Results Report; BC Ministry of Education
- Canadian Parents for French (2005) University Students and French Immersion Programs, The State of French-Second-Language Education in Canada 2005, p31-39, Ottawa: Author <http://cpf.ca/en/files/FSL-2005-EN.pdf>
- Dicks, J. et al (2008) Open Letter to the Honourable Kelly Lamrock, Minister of Education, Second Language Research Institute of Canada, Fredericton http://www.acpi.ca/documents/open_letter.pdf
- Dube, L., MacFarlane, A. (1991) Middle immersion: Is it a better option than early or late? *Immersion Journal* 14(3), Canadian Association of Immersion Teachers, Ottawa. <http://www.acpi.ca/journaux/V14N3.pdf>
- Erdos, C., Genesee, F., Savage, R. (2013) Predicting Risk for Oral and Written Language Learning Difficulties in Students Educated in a Second Language, *Applied Psycholinguistics*, Cambridge University Press, UK
- Erdos, C., Haigh, C., Genesee, F. (2010) At-Risk Students in French Immersion, *Second Language Learning Research Roundtable*, Department of Canadian Heritage
- Netten, J. (2007) Optimal Entry Point for French Immersion, *Revue de l'Université de Moncton*, Numéro hors-série, 2007, p. 5-22. <http://on.cpf.ca/wp-content/blogs.dir/1/files/Optimal-Entry-Point-for-FI-Joan-Netten-University-of-Moncton-Revue-20071.pdf>
- Netten, J., Germain, C. (2004) of Intensive French, *Canadian Modern Language Review* 60(3), University of Toronto Press, Toronto, ON <http://utpjournals.metapress.com/content/t576871543w1/?p=fa115bfd80444ec4a5be9937589c3ff5&pi=43>
- New Brunswick Dept. of Education (2000) New Brunswick Report Card 2000; Dept. of Education, Evaluation Branch
- Turnbull, M., Hart, D., Lapkin, S. (2003) Grade 6 French Immersion Students' Performance on Large-Scale Reading, Writing, and Mathematics Tests: Building Explanations, *The Alberta Journal of Educational Research* Vol. XLIX, No. 1, Spring 2003, 6-23, Alberta
- Wesche, M.B. (2002) Early French Immersion: How has the original Canadian model stood the test of time? *An Integrated View of Language Development*, Petra Burmeister, Thorsten Piske, and Andreas Rohde (Eds), WVT Wissenschaftlicher Verlag Trier www.fmks-online.de/_wd_showdoc.php?pic=865