

JUMP FOR JOY!

THE IMPACT OF JUMP ON STUDENT MATH CONFIDENCE

**A Report on Research Findings 2003-2004
Junior Undiscovered Math Prodigies
Toronto, Ontario**

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July 2004

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I. EXECUTIVE SUMMARY

Introduction

Junior Undiscovered Math Prodigies (JUMP) is an independent non-profit organisation that has developed a unique education program which provides math instruction to high needs/high risk children and youth. JUMP is professionally managed and volunteer driven, and our vision is to make our programs available wherever there is a need across Canada, and in other parts of the world.

JUMP's areas of expertise include: In-class instruction with tutor support (focus on grades 3-6), including support for behavioural and remedial students at the 7 and 8 levels; one-on-one tutoring: before, during and after school; math curriculum development (currently JUMP has manuals that cover grades 3-6); volunteer tutor recruitment and tutor/teacher training.

The current goal of the JUMP organisation is the expansion of its method throughout Canada and then into the USA. JUMP is not about making money but about making math accessible to and easily learnable by children. Thus, within Canada and the USA, JUMP will seek community partners, supporters, funders and revenue-streams compatible with such a social entrepreneurial focus. While JUMP seeks to offer its programs to children and schools at no-charge, particularly to at-risk and inner-city children, we are prepared to ask for a cost-recovery fee from only those parents and schools that have the ability to cover such a fee, as a means to help ensure that JUMP can continue to provide no-charge programming to children in need.

Objective of Study

The purpose of the present research study is to examine the impact of JUMP on student math confidence, and what researchers in the field of math education refer to as *math anxiety*.

Approach and Methodology

This research study was conducted using qualitative and quantitative data gathered by senior JUMP staff members and researchers, including JUMP teachers/tutors, school teachers participating in this study, school administrators and university scholars.

A part of the study examined 14 classrooms in 4 elementary schools in Toronto, Ontario for a month-long period. A survey was designed by JUMP in consultation with academics from the Ontario Institute for Studies in Education (OISE/University of Toronto). The survey was administered by JUMP staff at the conclusion of the one-month study with the help of 10 interns from OISE.

The study also used a) Quantitative data from an independent study entitled "The Effects of the JUMP Program on Elementary Students' Math Confidence", OISE, University of

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Toronto, 2004. b) Qualitative data (independent reports, interviews, and testimonials) from pilot projects conducted by JUMP in other parts of Ontario, Canada and the United States.

Research Findings

Findings from the various components of this study suggest that the JUMP program has a **positive effect on student math confidence**. The survey results suggest that the JUMP program has a **positive effect on the enthusiasm for mathematics of weaker and stronger students**, as well as a **spill over effect on confidence in subjects other than mathematics**. Moreover, results also suggest that the JUMP program has a positive effect in **increasing students' willingness and abilities to follow instructions and attempt/complete difficult mathematical tasks**. Because all respondents **unanimously** agreed that the JUMP pilot program was a success and an asset, this suggests that **JUMP is a positive presence in the classroom** and has the possibility to **effect positive change** in both **student confidence/enthusiasm** for mathematics, as well in **math teaching methods**.

Highlights of Research Findings

(For full summary of research findings see section VI, Fact Sheets)

Independent OISE Study of JUMP 2004:

- ✓ The researcher who conducted the independent OISE study of JUMP found that there is “a very significant relationship between students’ math confidence and the JUMP program”.¹ Analysis reveals that “students both enjoy the program and feel more confident about their math education after receiving the program”.²
- ✓ Of the 74 students out of 116 who identified a difference between JUMP math and regular math curricula, 88% commented that they favoured JUMP to regular math or like both programs. Students were able to notice a change in their math program and most students responded positively to the change.³

JUMP Pilot Study 2004:

- ✓ When asked whether weaker students showed improvements in confidence in other subjects other than mathematics, out of 13 teachers surveyed, 46% of total respondents said that students showed **IMPROVEMENT**, and 54% of total respondents said that students showed **NOTICEABLE IMPROVEMENT** in student confidence in subjects other than mathematics.⁴

¹ Kaitlin Hughes, “The Effects of the JUMP Program on Elementary Students’ Math Confidence”, Master’s Research Paper, OISE/University of Toronto, Department of Curriculum, Teaching and Learning, April 2004, p. 2.

² “The Effects of the JUMP Program on Elementary Students’ Math Confidence”, p. 2.

³ “The Effects of the JUMP Program on Elementary Students’ Math Confidence”, p.34.

⁴ “JUMP Pilot Survey May 2004”.

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- ✓ 100% of total 13 respondents said YES when asked whether they would use JUMP in their class next year.⁵
- ✓ Out of a total 9 respondents, when asked whether the response or performance of their weaker students during the pilot math classes exceeded expectations in enthusiasm for mathematics, 44 % of total respondents said that performance EXCEEDED expectations and 56% of total respondents said that performance GREATLY EXCEEDED expectations.⁶

What teachers are saying about JUMP⁷:

(For full summary of teacher testimonials, see sections VII and VIII, 'Case Studies' and 'Testimonials')

- ✓ *“[JUMP] has been truly amazing in increasing the overall self-esteem of the majority of my students.”*
- ✓ *“The JUMP program is the most amazing program for teachers and students. It will increase both teacher and student math confidence. It will give teachers the understanding in math that they never had themselves.”*
- ✓ *“Students with behaviour and learning difficulties showed unprecedented progress in math. We are seeing students in all grades that have failed math and received D's and C's are now receiving C's, B's, and A's.”*
- ✓ *“It is difficult to determine which came first – the self-confidence or the academic achievement, but the result was obvious.”*

⁵ “JUMP Pilot Survey May 2004”.

⁶ “JUMP Pilot Survey May 2004”.

⁷ Taken from case study reports provided by teachers participating in JUMP pilot programs in Canada and the United States (see 'Case Studies' section below).

II. PROGRAM DESCRIPTION

Junior Undiscovered Math Prodigies (JUMP) is a federally registered charitable organisation in Canada that is provincially incorporated in Ontario as a non-profit society. JUMP - through its Founder Dr. John Mighton (an Adjunct Professor in Mathematics at the University of Toronto, an Ashoka International Affiliate and the 1992 Winner of the Governor-General's Award for Drama) - has developed a unique math educational method built on the foundational premise that math is learnable by all children. The JUMP math method has been successfully trialed with at-risk, inner city, children within Toronto's publicly funded educational systems.

The JUMP method of achieving success for children in learning math involves: confidence-building, self-esteem raising, personal attention, belief in children's potential for success, breaking down math problems into concrete steps, and teacher-training in the method. Principals and teachers in 18 inner-city schools in Toronto have become our biggest supporters. Students who formerly hated math write letters to their tutors saying "Math rocks." or "Math is so easy I want to be a mathematician." This is a success that will help lead kids to other successes in life - whether at home, in future studies or in the workplace.

After several pilot projects, national media attention on JUMP and our Founder's recently published, popular, book on the accessibility of math to any child (*The Myth of Ability: Nurturing Mathematical Talent in Every Child*), JUMP has been deluged with requests for its program. (The fact that a book on math has become a popular seller itself speaks volumes to how desperate parents are to find a way to help their children learn to grasp the subject matter.) JUMP already has over 400 schools on a list waiting to access the JUMP math method, revealing the huge need for our innovative program.

JUMP was founded in 1998 at Dr. Mighton's kitchen table, incorporated in 2001 as a non-profit society in Ontario, registered in 2002 as a charitable organisation in Canada, and is located in the Fields Institute for Research in Mathematical Sciences at the University of Toronto. Today, JUMP has over 300 volunteers whom, within the Toronto publicly funded educational system alone, tutor over 2,500 inner-city children in 18 schools. Recently, other JUMP programs have been added both within and outside of the school system through partnerships with various organisations:

- York Detention Centre Youth Program
- North Eastern Catholic District School Board, based in Timmins, Ontario
- Pathways to Education Regent Park Youth Program
- Pickering Special Education Program
- First Nations School in Mount Currie, B.C.
- JUMP individual groups in Montreal, Ottawa, Waterloo, Oakville, Oshawa, Ajax and Sarnia
- Chapters at the University of Toronto, York University, Queen's University and University of Western Ontario

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- Introduced into selected schools in Halifax, Nova Scotia
- The Kaleidoscope Project in the Monongalia County Schools in West Virginia, USA

In most neighbourhoods, where kids face life challenges within the realm of the ordinary, the JUMP program can be easily implemented in a classroom through the support and guidance of a single teacher. However, in at-risk neighbourhoods with at-risk kids, JUMP implements and manages all aspects of its program as a means to ensure its success. This includes managing the full in-school program that requires JUMP to recruit, train, place, recognise and manage the dozens of volunteer tutors for both in-class and one-on-one tutoring.

While JUMP will be introduced into a major urban centre through inner city and at-risk neighbourhoods, JUMP will never discriminate against children, parents or schools that are interested in using the method yet whose neighbourhoods are not targeted by the JUMP organisation. The JUMP method and teachers workbook will, on their own, be made available and accessible to all who ask for them but the method involving community tutors will be only be pro-actively introduced by the JUMP organisation into an identified community through that community's most needy neighbourhoods.

JUMP's vision is to make the beauty of mathematics easily accessible to and enjoyable for children the world over by revolutionising how math is taught in elementary schools through fostering the introduction of the JUMP math method involving community tutors. Working with mathematics, JUMP's mission is to help children in communities across Canada and eventually elsewhere in the world realise their full potential by learning about themselves and mathematics through the JUMP math method involving community tutors. For children, JUMP will be a vehicle for teaching mathematics and to build confidence, raise self-esteem, provide personal attention and demonstrate a belief in their potential for success.

"Our students who were doing poorly in math now love the subject and eagerly await their next session. Their teachers often comment on the confidence the students have gained and the improvement they have shown in their daily work - all because of JUMP."

Inez Johnson - Principal, Toronto District School Board.

III. LITERATURE REVIEW: Research on Math Confidence and Math Anxiety

The phenomenon of *math anxiety* has been defined in the field of math education as “feelings of tension and anxiety that interfere with the manipulation of numbers and the solving of mathematical problems in a wide variety of situations, both in academic and ordinary daily activities.”⁸ Math anxiety is “a feeling of apprehension, out of proportion to any actual threat, which is experienced in reaction to a situation involving the use of mathematics.”⁹

One of the most important aspects of JUMP is instilling in students the confidence they need to approach, tackle and succeed in mathematics. JUMP has demonstrated that even children who have fallen behind, are failing math, or are labelled slow learners can excel at the subject.

Parents and teachers always comment on the tremendous increase in math confidence exhibited by students that have participated in the JUMP program¹⁰:

“Amazing results. Students with phobias about math quickly became successful and looked forward to math class.” Teacher, Duke of York School, Toronto.

“Excellent project. Very successful. Boosted confidence. A real overall improvement.” Grade 3/4 Teacher, Nelson Mandela School, Toronto.

“...I believe this has been a wonderfully positive experience that will contribute to an enthusiastic attitude toward mathematics...” Grade 1 Teacher, St. Paul School, Toronto.

“My class was definitely more focused and willingly took risks when answering questions! Thanks.” Teacher, Duke of York School, Toronto.

“The confidence of some of the weaker students in the class has definitely increased through the program.” Grade 4/5 Teacher, St. Paul School, Toronto.

“The students were excited for JUMP tutors to arrive, they were enthusiastic about the math lesson, and most importantly made comments about how easy JUMP math was. I felt an energy in each JUMP class that I had never felt

⁸ F.C. Richardson and R.M. Suinn, “The Mathematics Anxiety Rating Scale: Psychometric Data”. *Journal of Counseling Psychology*, 1972, 19(6), p. 551.

⁹ M. Boodt. *The Nature of the Relationship between Anxiety Toward Mathematics and Mathematics Achievement*. Unpublished doctoral dissertation, Indiana University, 1979.

¹⁰ All comments taken from a survey of teacher’s conducted by JUMP in May 2004 on the effects of JUMP on their classrooms (see this report for full summary of JUMP Pilot Survey - May 2004).

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teaching math myself in an elementary school.” Kaitlin Hughes, graduate student, OISE/Utoronto.¹¹

Research in math education over the past forty years suggests that mathematical ability is not inborn, and disabilities are a result of gender and other cultural misconceptions.¹² Researchers in education now know that math anxiety is a very real phenomenon that has had very real and often long-term negative affects on the math performance of all students -- male and female alike, from elementary school right through to university.¹³ As one researcher put it, “math anxiety is a *bona fide* anxiety reaction, a phobia with both immediate cognitive and long term educational implications.”¹⁴

Because learning and excelling in math is not an innate ability, the founding principle of JUMP is that every child, if given positive reinforcement, can do well in math. As John Mighton, a researcher in the field of math education and founder of JUMP insists, “***All children, except possibly those who are so severely disabled that they would not be enrolled in a regular public school, can be led to think mathematically.***”¹⁵

Studies confirm that low achievement in mathematics may be due to a number of other factors other than low mathematical ability: for example, high levels of math anxiety in

¹¹ This comment was taken from a Master’s thesis entitled, “The Effects of the JUMP Program on Elementary Students’ Math Confidence”, conducted at the Ontario Institute for Studies in Education (OISE), University of Toronto, 2004. For more on the findings of this university research study, see p. of this report.

¹² In her influential study, *Overcoming Math Anxiety*, Sheila Tobias noted that here is “a widespread myth – more common in our culture than other – that mathematical ability is inborn, and that no amount of hard work can possibly compensate for not having a mathematical mind.”, (New York: W.W. Norton & Company, 1978), p. 120-124. Tobias also notes that, “The myth of a ‘male math gene’ persists, and career data show women still avoiding math and the math-based fields in disproportion to men.”, *Overcoming Math Anxiety*, p. 14. John Ernest corroborates this: “Society expects males to do better in math than females. This affects attitudes, attitudes affect performance, performance affects willingness to study more mathematics and eventually males do better than females.”. John Ernest, “Mathematics and Sex,” *American Mathematical Monthly*, 1976, 83 (8), p. 595-614.

¹³ See for example, N. Adams, and W. Holcomb. “Analysis of the Relationship Between Anxiety about Mathematics and Performance.” *Psychological Reports*, 1986, vol. 59, pp. 943-8. N.E. Betz. “Prevalence, distribution, and correlates of math anxiety in college students.” *Journal of Counseling Psychology*, 1978, 25(5), pp. 441-448. X. Ma. “A Meta-analysis of the Relationship between Anxiety Toward Mathematics and Achievement in Mathematics.” *Journal for Research in Mathematics Education*, 30(5), pp. 520-540. H. Resnick, J. Viehe, and S. Sanford. “Is Math Anxiety a Local Phenomenon? A Study of Prevalence and Dimensionality.” *Journal of Counseling Psychology*, 1982, 29(1), pp. 39-47. C. Tocci, and G., Engelhard. “Achievement, Parental Support, and Gender Differences in Attitudes Toward Mathematics.” *Journal of Educational Research*, vol. 84(5), pp. 281-6.

¹⁴ Mark Ashcroft, “Math Anxiety: Personal, Educational, and Cognitive Consequences”, *Current Directions in Psychological Science*, October 2002, 11(5), p. 184.

¹⁵ John Mighton, *The Myth of Ability*, (Toronto: House of Anansi Press, 2003), p. 5.

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students, teaching style and class organization, and negative perceptions about mathematics:

“Higher achievement consistently accompanies reduction in mathematics anxiety.”¹⁶

“It may be the organisation of the class and the teaching approach adopted by the teacher which affects pupils; mathematics anxiety rather than mathematics itself.”¹⁷

“Many researchers believe that math anxiety is influenced by the beliefs and feelings individuals have about mathematics.”¹⁸

JUMP has inspired children, especially those who are thought not to have aptitude for math, to successfully complete math curriculum well beyond their grade level. JUMP’s program is transformational not only for the students who participate, but for the educators, parents, volunteers and organisations that get involved. It is inclusive and engages people across many diverse social and cultural groups.

JUMP’s preliminary research findings have shown that JUMP’s effect on increasing student math confidence (and thus lowering math anxiety) has a positive effect on student math performance.

JUMP is now in the process of conducting a multi-year research study of the positive impact of the program on student math performance, as well as student attitude and behaviour.

¹⁶ Ray Hembree, “The Nature, Effects and Relief of Mathematics Anxiety”, *Journal for Research in Mathematics Education*, 1990, 21, p. 33-46.

¹⁷ Karen Newstead, “Aspects of Children’s Mathematical Anxiety”, *Educational Studies in Mathematics*, 1998, 36, p. 68.

¹⁸ Jeffrey Bisanz and Mark Gierl, “Anxieties and Attitudes Related to Mathematics in Grades 3 and 6”, *Journal of Experimental Education*, 1995, 63(2), p. 141.

IV. JUMP's PHILOSOPHY: 5 PRINCIPLES

JUMP's philosophy always upholds these 5 principles, which we believe are always the basis of any good lesson:

1. Every child can succeed and if they don't it's most likely OUR fault!

2. Praise & Encouragement are the key to a child's success!!

3. Verification, isolating steps and repetition ensure that no child gets left behind.

4. Raise the bar - kids LOVE bonus questions!!

5. You can always make a step simpler.

JUMP builds self-esteem -- a child who thought that math was only for 'smart people', quickly discovers that they too can learn math and so themselves *become* one of those 'smart people' that, before, they could only talk about!

V. FACT SHEETS

JUMP Fact Sheet #1

“Effects of the JUMP Program on Elementary Students’ Math Confidence”
Compiled from Kaitlin Hughes, Master’s Thesis
OISE/University of Toronto Master’s Thesis, April 2004

Introduction

Based on a graduate research study conducted under Dr. Rina Cohen at the Ontario Institute for Studies in Education (OISE) at the University of Toronto, this study examines the JUMP program and its effect on students’ math confidence. A pre- and post-survey were administered to 120 students in six different classrooms at three different schools. Participants ranged from grades 3 and 4 students who had never worked with JUMP curriculum before.

Findings

Analysis of quantitative and qualitative data shows that there is “a very significant relationship between students’ math confidence and the JUMP program”.¹⁹ Analysis reveals that “students both enjoy the program and feel more confident about their math education after receiving the program”.²⁰

Facts

- ✓ Research shows that with the pervasiveness of math anxiety and negative attitudes towards math in students, there is a need for math programs to encourage confidence-building.²¹
- ✓ Statistical analysis of math confidence scores reflects an overall growth and statistically significant increase in math confidence from pre-JUMP program implementation to post-JUMP program implementation, with the most growth occurring in males.²²
- ✓ Of those students who participated in this study, most felt confident about their math work after having completed the JUMP program. JUMP students said they were successful in doing mathematics, they were not worried about doing math,

¹⁹ Kaitlin Hughes, “The Effects of the JUMP Program on Elementary Students’ Math Confidence”, Master’s Research Paper, OISE/University of Toronto, Department of Curriculum, Teaching and Learning, April 2004, p. 2.

²⁰ “The Effects of the JUMP Program on Elementary Students’ Math Confidence”, p. 2.

²¹ “The Effects of the JUMP Program on Elementary Students’ Math Confidence”, p.31.

²² “The Effects of the JUMP Program on Elementary Students’ Math Confidence”, p.27.

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and they felt confident about their skill level. 57.4% of respondents to the post-survey said they were good at math. 61.7% of respondents to the post-survey said they don't worry about doing math in class.²³

- ✓ Of the 74 students out of 116 who identified a difference between JUMP math and regular math curricula, 88% commented that they favoured JUMP to regular math or like both programs. Students were able to notice a change in their math program and most students responded positively to the change.²⁴

Conclusions

The findings of this study conclusively show that the **JUMP program made a considerable impact on the 6 classrooms in 3 schools that participated in the study.** The study also suggests that “the program is doing many things that influence the confidence of its students”.²⁵ While this study did not set out to isolate and identify the particular elements in the JUMP curriculum that determine and produce the outcomes that were observed, the findings suggest that **the JUMP program does offer “a framework for a new type of math education”²⁶** that is consistent with empirical research in math education that demonstrates a **positive correlation between lower levels of math anxiety and more engaged, positive and alternative teaching strategies.** JUMP’s accomplishments in the area of math teaching and in-class support suggest “that possibilities are endless in the education system and the boundaries need to be challenged”.²⁷

²³ “The Effects of the JUMP Program on Elementary Students’ Math Confidence”, p 32-3.

²⁴ “The Effects of the JUMP Program on Elementary Students’ Math Confidence”, p.34.

²⁵ “The Effects of the JUMP Program on Elementary Students’ Math Confidence”, p.36.

²⁶ “The Effects of the JUMP Program on Elementary Students’ Math Confidence”, p.36.

²⁷ “The Effects of the JUMP Program on Elementary Students’ Math Confidence”, p.37.

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JUMP Fact Sheet #2
Teacher Survey Administered During JUMP 2004 Pilot
May- June 2004

Introduction

This study examined 14 classrooms in 4 elementary schools in Toronto, Ontario. Teachers taught the JUMP fractions unit for a month with in-class tutorial assistance from 10 interns from the Ontario Institute for Studies in Education (OISE), at the University of Toronto. A survey was designed by JUMP in consultation with academics from OISE. The survey was administered at the conclusion of the one month pilot study to 13 teachers from grades 1-4/5.

Findings

Analysis of the survey answers by teachers suggests that the JUMP program has a positive effect on student math confidence. All classrooms who were first-time participants with JUMP showed a positive increase in the following areas:

- Willingness to attempt difficult tasks*
- Ability to successfully complete difficult tasks*
- Ability to follow instructions*
- Enthusiasm for mathematics*

Prior to the JUMP pilot, 4 teachers said that less than 60% of their students were confident about their math abilities. In contrast, during the JUMP pilot, these teachers said that student confidence in math ability increased a minimum of 10-30% above the initial pre-pilot levels.

Of the 9 remaining respondents who noticed more than 60% student confidence in math ability:

- 1 noticed a minimum 30% increase in student confidence in math ability
- 2 noticed a minimum 20% increase in student confidence in math ability
- 4 noticed a minimum 10% increase in student confidence in math ability
- 2 noticed no increase in student confident in math ability (both these respondents said that both prior to and during the pilot, student confidence was at 90-100%).

When asked whether weaker students showed improvements in confidence in other subjects other than mathematics, out of 13 teachers surveyed, 46% of total respondents said that students showed IMPROVEMENT, and 54% of total respondents said that students showed NOTICEABLE IMPROVEMENT in student confidence in subjects other than mathematics.

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100 % of total respondents (13 teachers) said YES when asked whether their stronger students enthusiastic about JUMP lessons.

100% of total respondents said YES when asked whether they thought the pilot was a success.

100% of total respondents said YES when asked whether they would use JUMP in your class next year.

Facts

9 out of the 13 teachers surveyed were not familiar with the JUMP program prior to their participation in the study. These teachers were asked whether the response or performance of their weaker students during the pilot math classes exceeded expectations in:

- ✓ Willingness to attempt difficult tasks:
56% of total respondents said that performance EXCEEDED expectations
44% of total respondents said that performance GREATLY EXCEEDED expectations
- ✓ Ability to successfully complete difficult tasks
78% total respondents said that performance EXCEEDED expectations
22% total respondents said that performance GREATLY EXCEEDED expectations
- ✓ Ability to follow steps:
11% of total respondents said that performance did not change expectations
78% of total respondents said that performance EXCEEDED expectations
11% of total respondents said that performance GREATLY EXCEEDED expectations
- ✓ Ability to follow instructions:
89% of total respondents said that performance EXCEEDED expectations
11% of total respondents said that performance GREATLY EXCEEDED expectations
- ✓ Enthusiasm for mathematics
44 % of total respondents said that performance EXCEEDED expectations
56% of total respondents said that performance GREATLY EXCEEDED expectations
- ✓ When asked how much they had learned about how to teach mathematics from participating in the JUMP pilot, all 13 respondents said they had learned a good/great deal.

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Conclusions

The survey results suggest that the JUMP program has a **positive effect on the enthusiasm for mathematics of weaker and stronger students**, as well as a **spill over effect of confidence in subjects other than mathematics**. Moreover, results also suggest that the JUMP program has a positive effect in **increasing students' willingness and abilities to follow instructions and attempt/complete difficult mathematical tasks**. Because all respondents **unanimously** agreed that the JUMP pilot program was a success and an asset, this suggests that **JUMP is a positive presence in the classroom** and has the possibility to **effect positive change** in both **student confidence/enthusiasm** for mathematics, as well in **math teaching methods**.

VI. SUMMARY CASE STUDIES

Case Study 1: Jesse Ketchum School, Toronto Ontario.

JUMP math was implemented in September 2003, in 6 different classrooms ranging from grades 3, 5/6, 6 and 7, using an “in-class” model. This is a summary of an interview with the teacher in whose classrooms JUMP was being implemented and is a part of a longer case study.

Testimonials

“[JUMP] was introduced to me when I taught Grade 3 at Queen Victoria PS last year ... JUMP was considered because other teachers had heard about it by word of mouth and because I am such a big advocate of the program. There are other math text books being considered for next year for the other teachers who picked up the program this year. I will continue with JUMP though.

It has been truly amazing in increasing the overall self-esteem of the majority of my students.”

Results

“In my classroom the results have been excellent. The only problem is some of the students who have severe academic problems, have slipped through and haven't been as successful as I would like due to a lack of volunteers.

I enjoyed the ‘light’ that would go on in many of my students eyes when they realized that they could do math as well as any other person.

My future plans are to continue with JUMP into next year and to have a lunch math club for those who are at risk.”

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Case Study 2: Mill Valley Junior School, Toronto Ontario

The JUMP program was introduced in September 2003 by the new principal, Liga Miklasevics. The JUMP program was administered in-class and used in Grade 3 (twice a week), 3/4, and 5 (3times a week). To support teachers and the students Liga organized a cadre of volunteers from the local high school and began an after school JUMP Math Club. This is a summary of a report written by Liga Miklasevics, Principal Mill Valley Junior School.

Testimonials

Liga Miklasevics, Principal of Mill Valley Junior School writes:

“The JUMP program is the most amazing program for teachers and students. It will increase both teacher and student math confidence. It will give teachers the understanding in math that they never had themselves

I came from a school where JUMP was running and I was impressed with the clarity of the lessons and the student response and enthusiasm; students would beg to go back to class for JUMP math if they happened to be in the office or participating in other activities (i.e., psycho/ed testing). This was unheard of!

The JUMP program is ingeniously designed to help students identify and recognize patterns in math. It also provides a foundation on which subsequent material and understanding is built, resulting in a positive self-esteem as a learner. The unit evaluations or tests are very comprehensive. The teacher clearly sees whether the student is understanding and where there is a misunderstanding or problems. A student will get marks for understanding the process and steps even if the final answer is wrong. It maintains students’ self esteem and motivation to continue learning. It is also based on a mastery learning model so that there isn't a student sitting in class not able to follow and participate.

Working with JUMP Math has increased my abilities in math!
JUMP Math is brilliant! It Works! Kids and adults working with it LOVE it!”

Results

“Students with behaviour and learning difficulties showed unprecedented progress in math. We are seeing students in all grades that have failed math and received D's and C's are now receiving C's, B's, and A's. They love the after school JUMP Math Club and continue to attend even when they are fluid in their math skills and no longer need to attend. They have become the new cadre of tutors and the high school volunteers thought that this group of students, were the top math students in the school.

We used a standardized test- Canadian Basic Skills in Math to gather base line data. The teacher's using the JUMP math assessments find that they give accurate data on student math knowledge and skills and influence further instruction.”

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Case Study 3: Monongalia County Schools (Brick Haven, Mason Dixon, MountainView, Riverside), West Virginia, USA

A total of 35 students participate in an after-school JUMP program across four schools. Children in grades 4 and 5 were selected for the program, with the exception of Mason-Dixon which also included 6th grade. Students are referred to the program based on feedback from the school and parents' willingness to have their child attend regularly after school. The program was launched by a District Administrator and implemented after about one month planning, at three schools in November 2003 and one additional school in February 2004.

This is a summary of a longer report written by Lynn Sobolov, Kaleidoscope Project Director, Monongalia County Schools.

Testimonials

A teacher who saw the impact JUMP can make writes:

“A student in my fourth grade classroom participated in the JUMP Math Program. The student had been referred to our Child Study Team because of academic difficulties, mainly due to lack of focus and motivation. The JUMP Math Program produced dramatic results for this student. Self-esteem skyrocketed, class participation increased, and math skills were acquired at a faster rate. It is difficult to determine which came first – the self-confidence or the academic achievement, but the result was obvious. The student is motivated and is demonstrating improvement in math. He willingly volunteers answers in class discussions and no longer requires the constant reminders to stay on task. JUMP appears to be the intervention that worked!!”

Results

Lynn Sobolov, Kaleidoscope Project Director, Monongalia County Schools writes:

“It is important for people not to be discouraged or assume the program doesn't work if they don't get complete cooperation from students or staff. It takes time to chip away at students' insecurities and they need to view the experience in a positive light.”

[I]n sites where on-site coaching was provided, all students who attended on a regular basis achieved a 90% or higher score on the fractions test. Some students were bored and dropped out, but this was because the instructor and site coordinator were not buying in to the program.”

VII. APPENDICES

A. SURVEY QUESTIONS OF JUMP PILOT MAY 2004

B. TESTIMONIALS

C. WORKS CITED

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**A. SURVEY QUESTIONS OF JUMP PILOT MAY 2004 CORRESPONDING TO
FACT SHEET #2 (need to get from F drive)**

JUMP: Pilot Survey-May 2004

1. On a scale of 1 to 5 (where 5 is "greatly exceeded" and 1 is "did not exceed"), did the response or performance of your weaker students during the pilot **exceed your expectations** in these areas:

Willingness to attempt difficult tasks

1 2 3 4 5

Ability to successfully complete difficult tasks

1 2 3 4 5

Ability to follow steps

1 2 3 4 5

Ability to follow instructions

1 2 3 4 5

Ability to stay on task for an entire lesson

1 2 3 4 5

Willingness to ask for more work

1 2 3 4 5

Willingness to answer questions during lessons

1 2 3 4 5

Enthusiasm for mathematics

1 2 3 4 5

Ability to remember new material

1 2 3 4 5

Recall of number facts

1 2 3 4 5

Ability to complete tasks in roughly the same time as stronger students

1 2 3 4 5

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2. On a scale of 1 to 5 (where 5 is "significantly improved" and 1 is "did not improve"), did the response or performance of your weaker students during the pilot **improve** in these areas:

Willingness to attempt difficult tasks

1 2 3 4 5

Ability to successfully complete difficult tasks.

1 2 3 4 5

Ability to sequence or follow steps

1 2 3 4 5

Ability to follow instructions

1 2 3 4 5

Ability to stay on task for an entire lesson

1 2 3 4 5

Willingness to ask for more work

1 2 3 4 5

Willingness to answer questions during lessons

1 2 3 4 5

Enthusiasm for mathematics

1 2 3 4 5

Ability to remember new material

1 2 3 4 5

Recall of number facts

1 2 3 4 5

Ability to complete tasks in roughly the same time as stronger students

1 2 3 4 5

3. Please indicate the percentage of children in your class...

a) Who were confident about their abilities in math

Prior to the JUMP pilot

less than 60% 60 to 70% 70 to 80% 80 to 90% 90 to 100%

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During the JUMP pilot

less than 60% 60 to 70% 70 to 80% 80 to 90% 90 to 100%

b) Who showed a real interest in math lessons

Prior to the JUMP pilot

less than 60% 60 to 70% 70 to 80% 80 to 90% 90 to 100%

During the JUMP pilot

less than 60% 60 to 70% 70 to 80% 80 to 90% 90 to 100%

c) Who would regularly answer questions in math lessons

Prior to the JUMP pilot

less than 60% 60 to 70% 70 to 80% 80 to 90% 90 to 100%

During the JUMP pilot

less than 60% 60 to 70% 70 to 80% 80 to 90% 90 to 100%

d) Who would regularly concentrate during math lessons

Prior to the JUMP pilot

less than 60% 60 to 70% 70 to 80% 80 to 90% 90 to 100%

During the JUMP pilot

less than 60% 60 to 70% 70 to 80% 80 to 90% 90 to 100%

e) Who would complete tasks successfully during math lessons

Prior to the JUMP pilot

less than 60% 60 to 70% 70 to 80% 80 to 90% 90 to 100%

During the JUMP pilot

less than 60% 60 to 70% 70 to 80% 80 to 90% 90 to 100%

4. On a scale of 1 to 5 (where 5 is "learned a great deal" and 1 is "did not learn anything") how much did you learn from the pilot about

How to teach mathematics

1 2 3 4 5

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How to help weaker students

1 2 3 4 5

How to engage children whose behaviour need improving

1 2 3 4 5

Not underestimating students

1 2 3 4 5

5. On a scale of 1 to 5 (where 5 is "showed noticeable improvement" and 1 is "did not improve") did your weaker students **show improvements** in subjects other than mathematics in

Concentration

1 2 3 4 5

Confidence

1 2 3 4 5

Enthusiasm

1 2 3 4 5

Behaviour

1 2 3 4 5

6. Were your stronger students bored during JUMP lessons? YES NO

7. Were your stronger students enthusiastic about JUMP lessons? YES NO

8. Overall, would you say the pilot was a success? YES NO

9. Would you use JUMP in your class next year? YES NO

10. We would appreciate your comments on any improvements you noticed in your class as a whole or in individual students:

THANK-YOU

B. TESTIMONIALS

Subject: In Praise of Jump Math

I was introduced to Jump Math at an inner-city school. The students loved it and I was curious. John Mighton patiently explained how he began with the fraction unit. I immediately challenged him. Fractions were not pedagogically a sound place to begin. As an educator, I understand the powerful effect of the psycho-emotional component. I had never seen it applied to math so effectively. Severe behavioural students who threw desks and caused a multitude of distractions to avoid learning were learning to multiply, add, subtract, divide and loving JUMP Math. They were learning and doing things in math that their profile indicated were most unlikely for them to be able to do.

I brought Jump Math to Mill Valley P.S.. As a new administrator I had to be careful not to make changes, learn the culture of the school and build relationships. I took the risk to introduce JUMP math. Anyone who wanted to volunteer at Mill Valley was sent to JUMP math training. Curious teachers invited me into their classes to demonstrate. It didn't take long before they took over. Every student responded. We didn't have enough tutors and began to train our own students to support each other as tutors in the class. We invited the students from a local high school to come after school to work with our students in the after school JUMP Math club. The after school club provided extra practice and support for those students that needed more reinforcement and support. One afternoon the high school students were chatting and I was surprised to hear that they thought that they were working with the brightest students in the school. They were shocked to learn that these were the struggling mathematicians. We had a new student join us in December. He was upset and negative about having to come to JUMP math after school. I overheard another student comforting him, " Give it a chance. You are going to love it! You'll see how smart you are!" All the original JUMP Math students have gained fluidity and confidence and are achieving A's in math for the first time in their lives, but they refuse to stop coming. They have become our new cadre of tutors. Their confidence in their math abilities has transferred into all areas of learning. JUMP math is so brilliantly organized that it allows students to see and incorporate patterns. They are now seeing patterns in reading, writing and other subjects. Our math results in the classrooms using JUMP Math are skewed to reflect success in math!! Students who were in Grade 3, 4 and 5 and who had never achieved higher than a D in math are now achieving between 80 and 90 percent.

Research compiled in a book called, "How People Learn - Bridging Research and Practice" cites, "To develop competence in an area of inquiry, students must a) have a deep foundation of factual knowledge, b) understand facts and ideas in the context of a conceptual framework, and c) organize knowledge in ways that facilitate retrieval and application", supports the design of how JUMP Math is taught. It is designed by a mathematician who has an in-depth understanding and who knows how to transfer factual knowledge into useable knowledge. John saw the patterns, relationships, or discrepancies

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that are not apparent to novices. His expertise allows him to identify what is relevant and subsequently organize the mathematical information into conceptual frameworks that allow for greater student transfer.

Lastly, working with JUMP Math has increased my abilities in math!
JUMP Math is brilliant! It Works! Kids and adults working with it LOVE it!
Please feel free to contact me at any time!

Sincerely!
Liga Miklasevics
Principal
Mill Valley Jr.

Subject: Good Morning from the Sunny but still kind of cold North

It has been awhile since we last spoke so I thought I should drop you a line. We have a few sites using the Fractions unit at the present moment, and as usual it is working well. I am working occasionally with a Grade 7 Special Education class and the results are amazing. Children who were told they could not multiply without a calculator are multiplying without a calculator. The teacher is thrilled and the kids are being successful at fractions. We have children who are telling us at the Grade 5 level that the Fractions unit is too easy. Another teacher from Kapuskasing will begin to use it shortly in a weak Grade 4 classroom. I am looking forward to seeing the results from that class.

We also have a school in Iroquois Falls that wants to pilot the project in their whole school. We will need to talk to figure out how that is going to work. Keep in touch. Have a great day.

John

John D'Alessandri
Program Principal Successful Pathways For All Students
Northeastern Catholic District School Board

Subject: Xit'olacw School, British Columbia

We at Xit'olacw have introduced JUMP for our Math program and what is happening is nothing short of a miracle. This program will be incredible in developing math students and teachers in our First Nation Schools.

Liz Barrett
Teacher
Xit'olacw Community School

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Subject: Edmonton Teacher

I have tried the JUMP approach with my students when introducing long division and coordinate geometry. It is amazing how quickly the students caught on to both concepts. They became confident and capable mathematicians. I will definitely include more of this approach in my teaching, as the students look forward to math, knowing they are going to succeed."

Bev den Ouden
Teacher
Edmonton, Alberta

Subject: Classroom teacher, Halifax Pilot

A boy in grade 5 who literally has cried through Math class has been working on JUMP with his tutor since about October. He is a character, and came up to me in the hall when I was talking with the superintendent. I introduced him as one of the JUMP students, and he proceeded to tell the Superintendent about how much he used to hate Math, and at how well he is doing now, and how he is so far ahead of his classmates. He said that he loves his tutor, and that he loves JUMP and that he loves Math. She needed no more encouragement from me.

Cathy Stockermans
Classroom teacher, Halifax Pilot

Subject: Kaleidoscope Project, West Virginia

The kids are so excited about what they've learned--they beg to go to math class every day, including "fun" Fridays and are inviting their classroom teachers to watch them perform feats of math in our afterschool program!

Lynn Sobolov
Kaleidoscope Project Director, Morgantown, WV

Subject: In-Class Program--Teacher Testimonial

"The JUMP volunteers are always greeted with excitement and anticipation by my students as they arrive in class. The children love the step-by-step approach that is always followed by immediate positive feedback as they work through increasingly challenging skills and concepts with ease. There is a contagious enthusiasm as they race through the problems, wave their hands to give answers and then ask for more."

Catherine McLeod
Grade 5 Teacher, Queen Victoria Public School, Toronto, ON

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