

# JUMP MATH REPORT

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# INTRODUCTION

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JUMP Math, founded by Dr. John Mighton, first captured my attention in the winter of 2006 when I attended a training session at Waverley Elementary (Vancouver). I had read the Myth of Ability and recognized that it addressed many of the principles of teaching that I value not only from a structural frame but also in the deeply embedded philosophy. As a consultant who handles many situations where students struggle with learning for a variety of reasons but who truly have the capacity to succeed given the appropriate nurturing and learning structures, I was motivated to support such a process as JUMP Math which seemed to be providing students with just that success. That same year I held a workshop on “Brain, Cognition and Math” to work with teachers on the elements of brain research that support math practices with learners of particular needs. I invited John Mighton to this session so that he could speak to some of these elements through his JUMP program and practice. At that point I realized fully the tight fit between current brain research, effective strategic interventions and JUMP Math.

Following this workshop I worked closely with JUMP Math facilitating four teacher-training sessions and several JUMP Math mentorship sessions who were chosen to guide and support teachers during the year. The approximately 100 teachers who participated in the former workshops responded to the first set of surveys reported and analyzed in the ensuing text. Because of the grass roots interest and enthusiasm and as an opportunity to support leadership connected to JUMP Math it seemed logical to nurture mentor-led study sessions as a venue for teachers to share their growth and development. This initiative also met the needs of JUMP Math which hoped to establish a chapter in Vancouver. The core group of approximately twelve teachers (in these study sessions) became part of the second survey which focused on a more particular or specific set of questions.

The following teacher thoughts are intelligent with insight, depth and sensitivity. It has been a privilege to survey, interview, read and analyze the rich responses provided. The discoveries revealed definite themes that are supported by the recommended interventions and propositions in brain research such as those by David Sousa (How the Brain Learns) or De Fina and Fifer (The Neuropsychology of Mathematics). These themes include such examples as the importance of scaffolding, teaching patterns, incremental teaching and backtracking to build knowledge before moving on and as importantly the utmost significance of nurturing the affect of students both in the structure of the material and in the delivery to/with students. There is an overwhelming agreement that the infrastructure and process of JUMP math develops in students and in teachers a confidence, self-efficacy and a sense that they can do math and even love it. Teachers have noted that not only students but also the teachers themselves are

beginning to transfer the skill set and strategies to other content areas with success.

I would like to thank the many teachers who responded to the surveys and in particular the following teachers/staff who tenaciously kept the study sessions alive and/or participated in the second set of interview and surveys: Siew Lau, Elena Bodnaruk, Elisha Bonnis, Alison Diesvelt, Sheri-An Duckles, Maria King, Hillarey Uren, Donna Doerksen, Thomas Craik, David Lindstead, Rebecca Robins and Christine Nussbaum. It was also an honor to work with Dr. John Mighton whose patience, endurance and stellar teaching skills sustained the teachers and students involved. Finally, thanks to Liz Barrett, the Provincial Manager of JUMP Math who was consistently there at a moment's notice with all the materials and answers. Liz also contributed her remarkable technology and computer skills as well as her on-line expertise.

## REPORT ON JUMP MATH – YEAR 2006/07 POST TRAINING AND POST-TEACHING

This past year JUMP Math, otherwise known as the Junior Undiscovered Math Prodigies program, continued to experience growth in the Vancouver School District. JUMP Math, founded by Dr. John Mighton, author of the book “The Myth of Ability”, was particularly designed with the premise that all students can learn mathematics and even those who are perceived as not “being capable” can experience success in math. Dr. John Mighton’s assumption is that students will experience more success if the materials are presented in “meticulous, well formulated steps” (pg. 43, The Myth of Ability”) and are presented systematically with a consciousness that too much information at a time only serves to reduce the retention of concepts and material. Some key aspects that Dr. John Mighton proposes in his JUMP Math include the following:

- Isolate the particular skills required to solve the problem
- Learn to develop models/pictures to isolate essential features
- Flexibility in process – that is, your child/student may learn the concept after he/she learns to perform an operation
- If your students don’t understand your explanation, assume that there is something wrong in your explanation
- It is always possible to make a step easier
- With some learners, the second piece of information almost always drives out the first (introduce one piece of information at a time)
- Before you attack the work, verify that your students have the skills needed to complete the task
- Raise the bar incrementally
- Guided repetition and practice are essential
- Praise is essential!!
- Math is a powerful symbolic language and requires explicit instruction
- JUMP books teach the connection between the operation and the model
- Use of manipulative materials are best when mediated and guided
- The discoveries in mathematics are almost always made in tiny, painstaking steps
- Determine patterns and represent them (What patterns do you see?)
- Use of logic and systematic search
- Separation of steps is key (separate and verify at each step and articulate)

This past year four training sessions were held with the goal to help teachers understand the philosophy behind JUMP Math and to give them the skills to put the program into practice. At all times Dr. John Mighton emphasizes the importance of teacher input to increase the effectiveness of the JUMP program. This openness and reciprocal relationship with teachers has served to enhance the program over the past two years. The intention of the following surveys and report is three-fold:

- I. To establish what skills the JUMP Math appears to offer to teachers
- II. Analyze the JUMP Math processes and pedagogy on the basis of cognition and affect
- III. To determine what may require more specific attention in developing math skills in students

At each training session given the teachers were given a survey sheet to answer the following questions:

1. What led you to participate in the JUMP training?
2. What are the salient practices of the JUMP training that you think will help your math teaching practices?
3. How might JUMP Math work differently for you than what you are currently using?
4. How does JUMP Math appear to develop thinking skills?

The following responses of the teachers are indicators of the nature of the JUMP Math program and help to determine its direction in the district this coming year.

### ***1. What led you to participate in the JUMP training?***

#### **Sept 20/21, 2006 Session:**

- We have the program at our school so I wanted to see how it works. Also we have many reluctant math learners at our school. It was recommended for these learners.
  - New to a school which purchased JUMP last year and we have no other resources.
  - Wanting a program which addresses students who find their current math program too challenging and discouraging thus leading to a lack of confidence - also the description in professional development offerings.
  - Working with struggling students with multiple challenges
  - Recommended by teachers at school - will be supporting these teachers and new resource teachers
  - Recommendation of a colleague - need for better strategies to assist struggling learners
  - Looking for something that works – a colleague suggested JUMP math
  - I am using the material and I wanted to fully utilize them, which I have not had the opportunity to
  - I work with all level of students who have learning difficulties. I wanted training in a math format that was assessable to those students
- Lavana Heel – JUMP Math Report
- I am already trained as a math mentor and had heard of JUMP. I took the opportunity to come when it was presented to me

- Passionate about helping teachers become better at helping students learn math.
- Heard that other teachers had success with it and looking for another math program that isn't so language based but very clear and sequential.
- I believe all students can succeed in math but have not been successful with all students
- Working with my daughter on the fraction unit which I downloaded from internet
- Personal quest to find a better way to teach math
- I heard about it from a colleague and decided to investigate the program calendar and voila – I signed up. I'm glad I did.
- First introduced through a workshop and chose further training because of the correlation that JUMP math has, i.e. recent brain research ( consolidation, Working memory, Build Executive functioning)
- Was a math associate with VSB and have learned Nelson and Addison Wesley texts are too language based with not enough practice - myself and school looking for a fresh approach to math
- I love the program - I have used it for 6 months and love its' grass roots approach and the way concepts are broken down
- Word of mouth - I heard wonderful things about the program. I have a class of students grade 4-7 all of different ability levels. I want to try something new with them. Too many worksheets (currently)
- My friend, a fellow teacher recommended JUMP for my daughter and

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also a group of students I would receive in the coming year. I did the fractions unit over the summer with my daughter whose morale in math was very low. Both her confidence and mine grew in leaps and bounds. We fell in love with JUMP math

- I bought and read (most of) Myth of Ability
- As a resource teacher a lot of students are struggling with (failing) math - I personally have tried to simplify and adapt, but read about JUMP in a magazine and then heard from a colleague that this workshop was being offered. I was eager to jump in.

## **Oct 23, 2006 Session**

- Word of mouth
- Read his (Dr. John Mighton's) book "Myth of Ability" in summer - 10 students with C- this past year and frustration in teaching math
- Suggestion by colleague
- Saw advertising on the VSB website
- Using it at school

- Piloted it in my school last year
- Resource teacher who took training earlier; now teaching grade 7 remedial math
- The 14 kids in my math resource group
- Recommendation by a colleague
- I heard about the program 1 year ago and wanted to learn more about it
- I started teaching the fraction unit and wanted more training
- Heard for years how great it is
- I have been looking for ways to support my students who are struggling math learners

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- Already math mentor for Math Makes Sense - hear that JUMP math has a clear methodology
- A colleague told me about it last year - I was her resource teacher and I assisted her with marking and teaching. She is on maternity leave so I need more information to advise other teachers
- Colleague currently teaching the program

### **January 16/18, 2007 Session:**

- Very positive feedback from other teachers who have already been introduced to JUMP Math and who are using it
- A big part of my day involves teaching math to my student; I would like to improve my math skills as I introduce a method that would truly benefit the student
- I have used JUMP with individual special needs students over the past five years in small group and one-one basis with much success. Although I find the material quite self-explanatory, I wanted to hear how to use the program from the author's point of view
- I have read John Mighton's book "Myth of Ability"; I am glad the VSB is offering this training
- An E-mail about the JUMP Math from the board; mention of the program from teachers in general education, resource and district program; visit to site and fraction unit
- I work with a boy in Grade six with a learning disability; his main difficulty is in math and problem solving

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- Once I saw the workbook and read the philosophy, I knew it was totally in line with my own teaching style and philosophy; I could not wait to take the training and begin with my class

- Currently teaching “Essentials of Math 8” and I’m having problems finding resources that are of the correct level for the students. Most resources I find are not in-depth enough or go too fast for the students
- I was interested in learning new techniques to make math more fun and interactive; I also wanted to learn how to teach for all the different ability levels
- From a friend
- I am currently looking at various math resources/programs to replace the outdated/unsuitable materials our school has now; the format of JUMP seems to be a better fit for my teaching style and my student needs that the other major commercial text series

### March 2007 Session:

- I heard about the program from a colleague and wanted to find out more; I don’t like the Pearson or Nelson texts and am interested in other options
- I kept hearing about it at workshops and heard good things about it; I also attended a workshop at Eric Hamber Secondary on JUMP Math in January which helped “fuel the fire”
- I teach Essentials of Math 10 and 11 to High Incidence L.D. and grey area students
- A colleague told me about it

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- Seeking good ideas for teaching the challenged learners whose coping mechanisms are beginning to fail; the idea is to encourage pedagogy switches for students
- I want to bring a good remedial math program to our school and more ideas to help with Essentials of Math students and/or Grade 8
- Someone mentioned it at a math conference I attended
- I heard of it at a Math conference
- I read the book and liked his (Dr. John Mighton’s) approach so much – I am so happy to have this opportunity
- I’ve heard about it and have seen John Mighton a few times the last several years; finally have time to be involved

In summary, teachers were mainly led to **participate in JUMP Math training sessions** in search of or for increased or more effective strategies (particularly with certain groups), a need for a more accessible math format, a math program that addressed their teaching style or meets their philosophical base and a wish to become more effective math teachers. Other themes include JUMP Math’s correlation to brain research, positive feedback from other teachers, a follow-up from reading “The Myth of Ability”, some initial work with the fraction unit, a

perception that JUMP has a clear methodology, a resonance with the perceived philosophy and an introduction through conferences.

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## ***2. What are the salient practices of the JUMP training that you think will help your math teaching practices?***

### **September 20/21, 2006 Session:**

- The idea of keeping the group together and “pushing” the students to their own level and bonus questions to challenge
- Building on each step and building my own confidence in doing math
- Determining necessary prior knowledge (basics), encouragement and praise, raising the bar and step-by-step incremental learning
- Progressive steps for each unit; teach, assess, bonuses
- Exchanges with colleagues
- There is more of an awareness of emotional intelligence in this program that I love ... the development of a sense of safety, the stimulation of self-worth and value, dignity and a sense of community ... reliability of logic....it weaves new positive connections in the brain not just math connections
- Each step explained
- The use of the following:
  - Incremental steps
  - Consolidating steps
  - Community of students and achieve success for all
  - The scaffolding
  - Use of explicit teaching
  - Engagement, encouragement and empowerment (use of psychology of learning)

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- Use of guided discovery appears to build ownership
- The way the materials are organized to ensure a concept is mastered by the design of the sequence of learning – I like the way praise and

focussing on accomplishments and planning and remediation to preclude deficits (excellent reminders for teachers)

- Learning math myself
- Success for all; praise, encouragement and pacing
- The use of the material and the philosophy behind JUMP
- Organized, clear and sequential – not so inhibited by language
- Small steps and enthusiasm
- Learning/remembering to break things down smaller and smaller and making certain they have the prerequisite knowledge to accomplish the task; sequential progression of concept learning
- Sequential progression of skills and concepts
- Manner in which math learning is broken down into small units, teaching in a more reflective manner and remember to infuse my teaching with excitement and encouragement
- Sequencing information, breaking down into simplified form and assessing prior knowledge
- Sequence of concepts and belief that every child can do this
- Backtracking
- All students can succeed and the step-by-step processes
- Incremental steps – planning

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### **October 23, 2006 Session:**

- I appreciate the clarity and the developmental organization of the workbooks, I love the clean uncluttered graphics and simple language and I am learning FIE strategies and these relate well
- Deals with basics
- The workbook is setup in a similar way to how I already teach math and I feel this will allow students to understand the methods more concretely as they work
- Accessibility, thoughtful scaffolding and increased degree of difficulty
- Being more open to accepting a “role” and understanding for students at the “bottom”
- Incremental steps
- Self-esteem building
- Structured
- Building on last skill learned and constantly challenging to next level
- Breaking a concept into small steps
- How to breakdown, student and teacher materials and ready to use
- Easy to read, teach, learn

- Fundamentals
- Scaffolding, building on prior knowledge and breakdown of skills
- The scaffolding, simplifying, and reinforcing
- Breaks lessons into smaller steps
- Bonus questions
- Wait time, incremental progression and breakdown

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- More time preparing lessons, breaks it all down - easy to complex and success for all students
- Breaking down into small or even tiny parts and repetitions packaged differently

### **January 16/18, 2007 Session**

- Being introduced to JUMP Math will assist my practice in school psychology by recommending to teacher certain strategies and approaches that students may benefit from, especially as related to the finding from their psycho-educational assessment and learning profile. I would also recommend the JUMP Math program to teacher and principals to consider using with all students.
- The simplicity of the logic behind the problems will come in handy when explaining problems to my student
- Kinaesthetic and “concrete” incremental learning are key concepts which are emphasized in this program. The philosophy of success = understanding (and vice-versa), nurture, encouragement and confidence building. Also stripping down concepts to the essentials and less language based.
- Because I am already familiar with JUMP, I am using a lot of the philosophy already but applied to a higher math course
- Okay and imperative to break down learning in small chunks and provide lots of practice, be deliberate in delivery of “whole” and “parts” and acknowledge that students don’t always have to know the “why” to everything

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- All students can learn and with self-realized success, confidence and self-esteem increases
- Gives me a better/broader understanding of various ways to solve a problem
- Step-by-step instruction, success/confidence for all students, a framework and permission to teach, rather than throwing students into the fire and trying to rescue them afterwards

- Breaking down the steps to the very basics and working from there
- I myself am not comfortable in math - I need to know the steps and little reminders (e.g., → pointing to which direction the fractions are being transferred) so that I don't get lost -this seems to offer what I need
- Filling gaps? Sequential?
- The emphasis on small incremental steps, the opportunity for constant review and assessment, greater teacher involvement in the lesson presentations and the ease with which students can be given extra challenges
- Small steps, breaks everything down and repeats and builds
- The very practical tricks to add, subtract, multiply and divide
- Breaking down math concepts into “smaller chunks” and repetition and guided practice before independent practice
- Concept of small steps with reinforcement and open ended lessons so can work with weaker student and fast kids can work at their level
- Step-by-step, continuous revisions to worksheet makes one realize that you can always make a poor lesson and improve it later, isolate a step and allow kids to master it - reminded me what it is like to learn as a child

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- Breaking concepts down to the incremental parts—discovering the barriers, teaching to individuals and the collective within same lesson, raising the bar, and guided discovery
- Systematic approach, specific skills based approach and gradual progression using brain-based ideas
- Very small steps, lots of praise and lots of repetition
- I think there are many things I've learned during this training. I think it's important to keep challenging our learners and constantly encourage them.

### **March 2007 Session:**

- The continual assessment during class lessons and the isolation of each step of a problem
- Step-by-step, lots of encouragement and praise, giving “challenging” questions for the faster student and making sure the concept is mastered before moving on; wait time
- Fill in gaps in understanding with small increments and practice steps (e.g., yesterday I gave a page with 65 ratio boxes, each with a missing number)
- Breaking it into steps and assessing and testing before moving ahead and providing bonus questions that focus on the skill you are teaching—not too difficult

- Cognition of what assumptions we are making that shouldn't be jumped over and assessing early/often for learning
- Working on math problems in a step-by-step sequential fashion, breaking it down and providing discovery opportunities for weak students

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- Testing simple skills
- I like the idea of breaking math into steps and slowly raising the bar
- “Organization” of thinking and numbering/alphabetizing
- Question 2, 3, 4 don't apply to me as I am an SSW
- Breaking down into basics and systems—looking for patterns

The **salient practices that teachers think will be addressed through JUMP Math** are quite consistent. The emotional or inclusive aspect is one key domain that is featured. It is described as having an “emotional intelligence” that provides a sense of safety. This supports David Sousa’s (Pg. 84) claim that the learning climate is critical to student learning. He says when “Students feel positive about their learning environment, endorphins are released in the brain. Endorphins produce a feeling of euphoria and stimulate the frontal lobes, thereby making the learning experience more pleasurable and successful. If students are stressed and have a negative feeling about the environment, cortisol is released. Cortisol is a hormone that travels throughout the brain and body and activates defensive behaviours, such as flight and fight.” Engagement, a sense of community, the confidence building exercises, wait time and the incremental step-by-step approach were major processes highlighted. The infrastructure and/or the presentation of text emerged as another salient feature that teachers felt could assist them with such tools mentioned as scaffolding, a systematic incremental approach, the use of sequential, progressive steps, the organization of the materials and the manner things are broken down. Other features include the simplicity of logic, the backtracking, the filling in of gaps, the use of patterns and the continual assessment.

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### ***3. How might JUMP Math work differently for you than what you are using now?***

#### **September 20/21, 2006 Session:**

- Simplifies even more, enlightens need to think about processing difficulties, uses incremental steps, provides tools for repetition and reinforcement and provides extension
- More interesting for the students and can get the class working more as a group rather than individually

- Success with students who have different challenges
- I can actually understand and get excited about math, I can extend my faith in my own ability to grow and learn - to my students and I have the tools to explain and describe and build and laugh and relax with math - I can do it
- Less risk for students, steps identified throughout and a workbook is included—no more photocopying of *Math to the Max*; variable entry point→ a great idea
- Text not so language loaded (is language approachable), more dependence on the teacher to mediate the language and the process, demands “conscious and intentional” teaching and the importance of modeling (much more time spent on instruction than seat work)
- Starting where the students are, opening kids up to the fun of finding patterns and focussing on learning not covering curriculum as a priority
- Completely different and demands you to reach all learners

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- Everybody can be successful and kids can all learn basic facts now
- Essential Math 9 has no curriculum - I basically re-teach Math 8 without an appropriate textbook (or up to date!); JUMP material is going to be tremendous
- Clearer and follows a logical sequence
- Completely different approach
- Less language on each page means less time spent on deciphering questions and more time working on “math”; built in success for struggling learners
- Builds success especially for students who are struggling with math and math presented in heavily text language laden text books
- Smaller steps, more success and mastering is possible
- I like the idea that Workbook 1 is basic—then once basics are mastered you move on, working toward everyone achieving success; most math texts—current ones—are too cluttered and the language seems to be seldom transferable in their learning of concepts to new problems
- Explaining why things happened, not just how to do it and the lower students will have success rather than just moving along in the program in spite of their lack of understanding
- I’m not using anything right now, but had planned to “level” the kids and teach using 7 different text books
- It is “slower” and focuses on each part of each concept to ensure they truly understand and it focuses on the teaching of the math, not the exercises

- The breakdown and organization of how to teach a lesson to all students levels of understanding

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- It works because of the way the material is presented and the fun aspects—praise and energy generates a heightened level of learning

### **October 23, 2006 Session:**

- I am used to modifying the curriculum with the pullout Gr. 6/7 group that I work with in math. Now I will do this program and depart from what is happening in the class, but these children need basic math nourishment.
- Perhaps more success for all students
- It makes it easier for me to teach a step-by-step process than the “Math Power” and “Math Makes Sense” text I now use
- It offers options for clearer language of presentation of concepts and it offers added practice that covers gaps in our present math books
- A program unfamiliar to me and therefore might use the guide more than I normally would and adopt a less organic approach to challenging students and integrating skills
- Step-by-step, faster-paced and less language (less distraction)
- I’m in Resource so won’t be using it this year
- It will engage and fill in the parts for weaker students
- Not teaching Math currently, but in Skills→materials to remediate struggling students
- I am new to teaching Math with six years as a “reading” teacher
- I have already begun but have a much better understanding
- Less language use in workbooks
- More structured

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- Deeper understanding of math; start at basics; stop what I’m doing now and then re-teach
- I feel I can teach my whole class together and won’t have to teach them all separately

### **January 16/18, 2007 Session:**

- Being able to explain concepts in a more simple and visual way will benefit the student
- Having the opportunity to use it extensively at specific grade levels now (perhaps over a period of several years) in a “whole class” setting

with a large number of students (i.e. a wider academic spread of students) vs. 1-1 or small group settings as before

- Don't know—we'll see
- I will have a professionally developed, progressive framework to follow, rather than making my own program adapted/modified from a number of published resources
- JUMP Math starts from the foundation to an advanced level later on
- First of all, I understand it! I know my students will understand it. I have always tried to teach this way, but have felt I am constantly searching for resources and re-inventing the wheel, or re-writing the textbook in my head!
- Perhaps giving me more ideas on how topics can be taught along with a framework of practice examples that will support the method
- It seems to offer easy step-by-step procedure—very helpful. It also offers a lot of repetition

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- Hopefully it will be more kid friendly, less confusing and “hands-on”
- Much more involvement throughout the lesson, rather than just giving a 10 minute lesson, then getting the class to work on a page of questions; the materials seem to present the students with much more logical progression through smaller steps than other programs
- Common sense approach
- I am not doing math right now but feel excited to share several skills with students
- I work small group/1:1 with highly gifted kids who also have learning disabilities
  - How to go fast enough/have enough reinforcement
  - Getting these kids to explain their thinking better than just write answers
- The worksheets are clear and allow me to move around the classroom and address the “weaker” or “slower” students as the more experienced math students move ahead
- Less scrambling for manipulatives and less need for groups; offers range of questions
- I think it will enable me and my students to be more firmly grounded
- It will supplement many textbooks that teachers are presently using in their classrooms
- I'm not currently using anything (I'm a student teacher), but I imagine this will help me a lot by helping me keep myself on track in terms of progressing in steps

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## March 2007 Session:

- I am a substitute teacher so I am using all different programs. I find that JUMP has step-by-step lessons that are easy to pick up on.
- Be more conscious of wait time, praise and encouragement
- Key foundation of confidence that I will “not let them fail”—to quote John Mighton
- Do more assessing; gives me another way of explaining concepts; breaks the lesson into simpler steps
- I’m spending a lot of energy creating; you’ve done a lot of work
- Provides a graduated structure
- Provides the materials to do #2; more emphasis on numeracy
- I will spend more time breaking concepts into small steps and more practice to progressively harder
- Easier to implement; more time to teach; less time prepping
- Similar to many of my practices; therefore will be helpful in organizing

Several themes emerged as elements that JUMP Math **might address differently than the teacher’s current program**. The language of the text was mentioned along with a more simplified visual approach. Another theme again included the material presentation such as the incremental approach, the breakdown and organization, the logical sequence and the progressive framework. Other elements include the ease of accessibility such as reduced confusion, hands-on, not needing to search for materials, less distractive and that they can understand the material.

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### ***3. How does JUMP appear to develop thinking skills?***

## September 20/21, 2006 Session:

- Giving confidence to value our own thinking; not give up; my class slogan “I can’t do this...yet”
- Arouses curiosity; gives them opportunity to engage in the process; allows them to try higher levels and seek more good for problem-solving; seeing analogy; seeing generalizations/patterns; move from concrete to abstract

- Build step-by-step on own knowledge; promotes independent thinking
- Very detailed sequential approach
- It uses techniques of simplification and incremental growth to an exquisite level, but it is the lack of judgement and the presence of honest, untainted faith, of a delicious faith in the capacity of the mind to overcome obstacles in the presence of genuine humanity
- Appears to have several Q's that are easy which will build confidence to try and succeed at a higher level → students creating own difficult Q's; lots of review and scaffolding
- Asks student to compare predict (anticipate), analyze, reflect, make connections, use analogical thinking, use and reflect on their logic
- Giving kids the prerequisite skills, then challenging them to use the skills at greater degrees of difficulty builds motivation and self-confidence—what is lacking in unsuccessful students
- Increases attention; helps memory; increases confidence

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- Asking questions with conditions; asking kids to produce their own math questions; explaining how they got answers; preparing a safe environment where kids are respected and expected/assumed to be successful
- Breaking things into small steps will help the students and myself find their areas of weak basic skills? I hope!
- Throws the questions back to the students instead of having the teacher do all the instructing—this is a great method of teaching and promotes active learning
- Sequential, small simple steps coupled with the question for the next step
- By teaching the fundamentals behind the “magic” of math; progression of skill development
- Progresses from simple to more challenging as they develop/learn concepts like the ideas of the extension activities
- Through a process of building confidence in students' thinking—thus, changing level of self-confidence
- Helps students to become more aware of their own thinking process/reflective learning
- Developing the ability to see patterns; reducing concept/skills to the simplest components
- Breaks down the steps; teaches for understanding rather than formulaic or process only
- By building a foundation that is complete
- Based in problem-solving techniques; transfer practices: How can I use what I learned here in other areas of teaching

- Concrete to abstract; guided learning in a safe environment encourages the development of thinking skills

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### **October 23, 2006 Session:**

- It is so logical and reassuring; kids feel relaxed and the ideas stick
- Give all children opportunities to develop
- Step-by-step and concrete to abstract; develops methods of thinking and not just methods of completion
- It addresses learners' beginning levels and develops degree of difficulty carefully
- Presenting a strict method approach; there is a lot of thought about developmental processing at every level and skipping a step could be a fatal mathematical teaching error
- Breaks a problem into steps; makes connections; develops a positive math attitude
- Constant challenges, but step-by-step building of skills
- It provides guided discovery
- Breakdown of skills
- Allows kids to relax and learn
- Builds confidence
- Builds upon previous skills
- Amazing—in all ways; makes complex things simple
- Same as F.I.E. - making students aware of their thinking and organizing it

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### **January 16/18, 2007 Session:**

- By breaking the concept down into its many sequential steps that often times students cannot intuitively figure out on their own. The visual aspect, I think, is also very important in helping one grasp the concepts
- It allows you to see a simple concept rather than a complicated problem
- By focusing on building solid foundation skills slowly and sequentially from the simple to the complex; reviewing and reinforcing basic patterns and techniques to solidify key concepts initially which enables them to strategize a concept at deeper levels. It helps them to take

risks with critical thinking because the pre-designed smaller gaps in the learning steps make it possible to “risk and succeed”.

- It appears that it will show students how to “problem solve” their way to an answer using the tools they learn by practicing what I call “foundation skills”
- From what I’ve seen, JUMP is systematically taught in such a way that the learner is equipped to handle questions and problems presented in a number of different ways; the basis is that students, especially those who struggle with math or a result of LD or any other challenge, need to have math presented “simply”—in turn, the learner looks for “simple solution”
- Allows the students to feel more confident and promote independence by breaking down problems into smaller steps; JUMP appears to start to repair faulty foundations from the beginning
- By breaking concepts down to the foundation, step-by-step, scaffolding and gradually building complexity; also by providing (increasing) confidence and security

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- Using the fundamentals and developing from those ideas to explore higher level problems
- Again—repetition and easy sequences
- I have no idea, that’s why I’m here
- It seems to emphasize making sure that all students have a solid base, then building their skills incrementally and ensuring that they feel positive about their own abilities
- Small steps; break everything down; repeat and build
- Practice, clarity, motivation, step-by-step and build on success
- Understanding the whole process of “learning” math and being successful at math (meta-cognition)
- Sequencing, substitution build into basic lessons
- I love how students work together and teach one another
- Addresses fundamental concept and allows students to make discoveries both laterally and linearly; always asked to extend and make connections; analyze what changes and what stays the same
- I think it enables students to develop deep understanding; work as a group and remain working at their own pace
- Repetitive, logical steps and methodical
- I think it develops thinking skills by giving the students challenges and by leaving some of the questions open to kids—“How did you solve that one? Explain it to me.”

## March 2007 Session:

- I think it provides a lot of scaffolding which leads students towards the development of their thinking skills
- Students are given problems to solve and figure out on their own instead of just telling the student how to solve it
- Key function of math is thinking skills, from development???, ability to recognize and work with patterns to solve problems
- Allows students to see patterns and expand on ideas to develop their skills by building on what they know; gives them confidence to trust their knowledge and challenge themselves
- Gets at a deeper understanding/scaffold before moving on; the mathematics is there and highlighted without assuming transfer
- Increased numeracy and even the weakest students have a chance to discover instead of learning rules
- Builds confidence; isolates problem spots
- It got the teachers thinking about how we do things and why
- Breaks concepts down and builds thinking skills
- Sequential; “no one gets left behind” approach is very inspiring
- Patterning, basic skills, etc.

Some key elements that teachers perceived from their training **to develop thinking skills** include the promotion of independent thinking and the building of confidence. This was articulated as being addressed in the infrastructure such as breaking things into small steps, the sequential approach, the ability to see patterns (analogical thinking), building from a foundation and the ability to make students relax.

It also was described as helping students to analyze, to “problem solve” in their own way and the development of the base to make way for more sophisticated or complex tasks. There is also a sense that teachers also begin to think about how they do things.

During the year a group of VSB committed teachers facilitated by a district consultant met once a month in study sessions to discuss the JUMP math practices and to find ways to increase their skills through sharing and problem solving. For many of these sessions Mr. John Mighton was able to attend and provide support and direction to the teachers. The group was run by mentors who had been trained in JUMP Math, funded by the Vancouver School Board, with the specific task to train and mentor other teachers in the district using the

JUMP Math. This same group participated in a follow-up survey which helped analyze the practices that they had implemented this past year. This analysis is also based on the work of Reuven Feuerstein and analyzes the JUMP Math from two different perspectives:

- 1) **Use of cognitive functions**
- 2) **Mediation of affect**

The following questions were used to address the **cognitive functions** as they pertain to JUMP Math:

1. Does JUMP Math help students learn to **label things** so that they are able to appropriately **describe things**? How does it do this?
2. Does JUMP Math help students to **explore systematically**? If so, how?
3. Does the JUMP Math help students determine **relevant information versus irrelevant**? How does it do this?

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4. Does the JUMP Math help students **think about different possibilities** and the consequences of choosing one possibility over another? How?
5. Does JUMP Math help students **develop logic to prove things**? How?
6. Does JUMP Math help students **organize their thinking before they respond or begin a task**? How?

The following are responses that the group of teachers made to the first question: ***Does JUMP Math help students to label things so that they are able to appropriately describe things?***

- Yes, the process of introducing one concept (vocabulary word) at a time followed by repeated practice made it easier - for example, identifying the opposite, adjacent and hypotenuse of a right triangle as a prelude to trigonometry.
- The rules are clear at the beginning of each lesson. The labels are explicit at the outset and the hints demonstrate how to proceed (this starts with the teacher). The heading for example, starts “What is it?”
- Very direct simplification and clarity of language and when language is used it is direct and specific – because of this students are picking up the language more quickly. Concepts are broken down into more discreet steps within the larger process – language builds.
- Absolutely – it breaks all math concepts into simple, clear steps, systematically.
- The text is fantastic. It revisits terms and brings up terms lesson after lesson (very consistent)

- Absolutely- they are using the math language more often and more confidently when they (the students) talk to each other and answer questions.
- The amount of language was limited, so new terminology could be easily learned and/or retained. Much language was reviewed; however, the more review the better!
- Students are asked to do this in simplest form to complex. Labelling occurs early on and as time does they see how it fits (relevance); reinforcement of habits.
- Helps – if seeing building on things; not a lot of technical language and the language is consistent

The following are responses from the teachers to the second question: ***Does JUMP Math help students to explore systematically? If so, how does it do this?***

- Yes, the way each of the lessons is sequenced to super simple, one concept at a time and add to it on your own; holding (student) hands throughout and gradual release
- Yes, for sure. Breaking down into the smallest pieces is at first hard because you are used to the “whole thing”. In work the students are more conscious of the organization of algorithms and processes
- All activities are broken down into discrete steps and the units tend to build one upon the other. Repetition reinforces concepts and skills. Minimal intervention is required to fill in the gaps.

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- Yes, it always begins with the simplest aspects of concepts and slowly, incrementally adds steps but only when prior steps are mastered; students always get excited about the next level of complexity because of previous successes at the first levels
- Absolutely – especially the division unit and the minute steps it was broken down into. As a math teacher we wouldn't have broken it down into such small pieces. Those with division phobia were able to be successful – they were ‘clicking in’ on the parts.
- Absolutely – very clear and it makes me **dance with joy!**
- Excellent – better than any program I have ever seen. It helps the teacher discover the process of building in a systematic way – more clarity; it is broken down conceptually and doesn't jump from concept to concept. The pre-learning of the concept is developed.
- Yes, the addition of logics and systematic search in each book (always refers to that) and different ways to attack a problem.

- The “one concept at a time” allows for thorough understanding before another concept is introduced. An example of this is a trigonometry lesson when students went ahead to explore the sine and cosine ratios after the tangent ratio was taught

The following are responses from the teachers to the third question: ***Does JUMP Math help students to determine relevant versus irrelevant? How does it do this?***

- The layout is limited in visual distraction and language demands - each page focuses on one concept and presents the concepts sequentially (step 1, step 2, step 3 etc.)

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- Yes, it does this more - helps to focus on relevant material; it breaks the habit of getting the “whole thing done” (how emphasized)
- Little bit of information at the top of the text is helpful (as an example or model); examples are throughout (like incremental examples); also the use of bolded text and hints helps
- The staircase in the unit conversion (Book 8) and the grid for scientific notation are examples of relevant information. I have not used enough of JUMP Math material to see examples of relevant versus irrelevant distinction.
- Yes, taking the domain of comprehension, for example, what’s important is bolded with examples and something to think about is usually a hint.
- Not so heavily language laden – language is very clean and relevant to the concept being taught; it accommodates multi-cultural, language different students and socio-economic language differences and not extra that make assumptions (in bits of information) and one can get a handle on the material.
- Yes, it cuts out all the extraneous information and makes a clear cut path to the way to understand.
- In the word problems this is most noticeable.
- There seems to be nothing irrelevant in the text – it’s the relevant things you need to know and word problems with no curve balls. It accesses skills studied.

The following are responses from the teachers to the fourth question: ***Does the JUMP math help students think about different strategies/possibilities and the consequences of choosing one strategy over another? How?***

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- There are strategies and skills used one at a time such as the use of skip counting and finger counting strategies rather than to memorize times tables - this also works with the brain and body affiliation; strategies are not overwhelming and students learn to solve in different ways.
- Absolutely – we do a lot of strategy work. We put the problem on the board and ask “Who can solve this?” and “Who can solve this in another way?” This validates their own personal strategies which addresses cultural differences and triggers thoughts in other students.
- Absolutely – it introduces concepts one at a time and then gives you a chance to choose what works.
- Patterns in numbers – looks at patterning in sequence for example; learn to see math as patterns and transfer this to the alphabet, different possibilities of how patterns work and how to approach patterns and looks at when we change patterns and how it changes the outcome.
- Use of Systematic strategies and word problems connected to real life. Recycled in different ways – e.g. multi-step present in words, numerals and diagrams.
- Insufficient experience to adequately comment but the strong component of “bonus” questions definitely fits here; I have students make up their own bonus questions when they have done the others.
- This is part of the JUMP philosophy- encourages looking at different ways of approaching problems (good for students).
- Yes, you celebrate even the smallest things – this idea transfers to science where we used different forms of graphs taught in math. Students are more willing to explore which is the philosophy of the teaching action of trying in whatever way you can

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- Allows flexibility for students to find their own method for problem solving; multiple approaches to reach a solution

The following are responses from the teachers to the *fifth* question: **“Does JUMP Math help students develop logic to prove things? How?”**

- As more difficult examples are presented students are encouraged to extend their thinking based on past experiences.
- Some of the students previously advanced are able to see it simply and be logical about it.
- Some of my students in a modified program have been able to “stretch” themselves and try more challenging examples. In addition, with the trigonometry functions in #2 above (systematic approach), they have done trig factoring and expanding.
- Yes, it is always reinforcing and uses the most efficient way to approach a problem - includes actual mathematical proofs – students love this.

- Logic is heavily integral to the program. It's not a matter of teaching logic but logic evolves out of the process (built into the infrastructure).
- Yes, it begins with skip counting and applies to all.
- The logic of strategy is stressed – “How did you know you were right?”
- To use logic you need a solid grasp of skill you need and scaffolding. If you understand how to solve (with appropriate tools) to go beyond to complexity

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The following are responses from the teachers to the sixth question: ***Does JUMP Math help students to organize their thinking before they respond or begin a task? How?***

- Yes, the layout of the books are very organized and structured so that visually there are, for example, little grids for numbers to organize where numbers need to go. By the time they need to respond to the task so many steps are already achieved.
- Yes, it's a process that is very systematic and clear.
- It gives students the language in a clean manner which allows them to self-talk and enables students to make language more readily their own.
- Yes, it is structured in a layout with the core concept at the beginning (and examples) and the use of different representations of the same concept (make connections). Practice feeds success.
- Yes, the strategies (again the discrete steps) are easier to recall (as well as a thorough understanding at the time of introduction) – e.g. students drew the “staircase” for the unit conversion on the final exam. My chemistry students comment on how helpful the steps have been in learning organic chemistry.
- Starting small works students through how to do and hopefully students internalize this structure.
- Yes, in the questions – the questions are set up to make students start small and build in order to do on their own. Everything is structured to end in a workbook - questions follow-up. Retention - not sure.
- Provides specific strategies, tools and models to work from. JUMP skills transfer to other subject areas – science.

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The final questions the study group responded to concern the affective aspect of the JUMP Math using the principals of Reuven Feuerstein. Feuerstein emphasizes the importance of mediation to help students face the cognitive tasks presented in the learning process (i.e. the classroom) and places importance on such affective mediation such as the development of an “**internalized**”

**competence**” or a “**sense of belonging**” and “**reciprocity**”, for example. The following questions were utilized to determine from the teachers how students may be developing their affective learning in the process of using JUMP math:

1. Does JUMP Math practice help to develop a feeling of **internalized competence** in the students? How does it do this?
2. Do the JUMP Math practices help the students develop an **awareness of themselves as changing entities** or are they led to believe that they have the **potential to change**? Or do they encourage students **to take risks**? How does JUMP Math do this?
3. Do the JUMP Math practices **use intention and reciprocity** to assist the students’ learning? For example, is the teacher purposeful in asking students questions and is the **student led to self-reflect, gain insight and articulate his/her learning**? How is this done?
4. Does the process of JUMP Math foster in the students a **sense of connection or belonging to the larger group**? How does it do this?

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The following are the teacher responses to the first question: ***Does the JUMP Math practice help to develop a feeling of internalized competence in the students? How does it do this?***

- Yes, because of the success. They are assessed at each incremental step which is easy for them to learn and make sure they’re successful before a test/quiz. They feel mastery before they produce, gain respect from peers and students constantly have hands up (wanting to respond)
- Each question is built for success - solving one problem is motivation to go on to the next....success breeds success. This has improved attitude and attendance.
- Am not sure if it’s the infrastructure or the philosophy but already strong students are feeling really competent because things are broken down (can see the philosophy embedded); weaker students are more confident/competent because of the teaching philosophy/style.
- In particular I enjoy the aspect of praise. The fraction unit is motivating. JUMP drives students to want to do math, like the mental math – another way to do math.
- Certainly, the discrete steps allow for thorough understanding→success→motivation to learn→more success→better attendance and great attitude→more success.

- Yes, it's a conscientious design – you don't go on until everyone understands. The possibility for failure is minimized. Cues and signals manage the process and the philosophy heightens this process. The breaking down of steps eliminates any possible gaps.

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- JUMP builds success, starting from smaller units to build concepts – in smaller units students are able to do and see so much more. Students are feeling much more successful. Praise is built into the program – does much more than I would do. Students are feeling better - confidence builds competence and vice versa.
- Yes, by setting them up one step at a time – we can do it!!
- Yes, especially with the fraction unit – students who struggle are starting to have success - used only number below 5 for the first half of it – could do on hands and skip count. Students are passing tests and getting success when prior to this would not have success. Use of a lot of praise around successes builds internal competence.

The following are teacher responses to the second question: ***Do the JUMP Math practices help the students develop an awareness of themselves as changing entities or are they led to believe that they have the potential to change? Or does it encourage students to take risks? How does it do this?***

- Potential change – yes, partly from JUMP Math materials and partly the teaching practice. You do an affective assessment and establish safety and introduce it as if everyone can get math and if they don't understand, are told “You can learn it” – this encourages them to take risks and they respond with no fear even if wrong. They see work from “not getting it” to “getting it”.

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- Because of previous successes, students are eager to attempt the next lesson...frequent “aha” moments lead to a positive affect, which opens learning potential and success! Reducing input reduces elaboration required, thereby enabling them to self-monitor the output more successfully.
- Yes, they know they can do some of it which makes them realize that they can keep going. The patterning is progressive – allows for competence. 1-1 students are asking more questions personally.

- Some students have had a change in attitude.
- Yes, I have seen changes in some of my Essentials Math 9 students. These students have not found success in math before. However, the discrete steps in JUMP Math allow them to experience success, if not for the first time then in a long time. Over time they develop confidence→success→more confidence→try harder questions→begin to love math because they believe they can “do” math – “I get it!” The material minimizes the complexity of tasks.
- Yes, they experience success. The philosophy says: “If you don’t understand it’s not your fault – I need to re-teach”. Hands go up to take the risk of asking questions and questioning the teacher explanation.
- Philosophy (talking about) can change how we learn. Learning changes and how we feel about it will change. How we feel about math today can be viewed differently tomorrow - will get it, maybe not, but perhaps tomorrow. Previously students quiet are giving answers and wanting to participate and passive learners are now active.
- Yes, the bonus questions are phenomenal. The finger counting – they realize they can do it!

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- A lot of students are more confident math learners and they know there’s the potential for them to understand – for example, know “I can do some division” and don’t turn off of division. There is the philosophy that if you don’t understand the concept it doesn’t mean they can’t do it – can be taught in a different manner.

The following are teacher responses to the third question: ***Do the JUMP Math practices use intention and reciprocity to assist the student’s learning? For example, is the teacher purposeful in asking students questions and is the student led to self-reflect, gain insight and articulate his/her learning? How is this done?***

- Yes, the teacher’s role is very dynamic, clear and inspiring
- The program facilitates this although as an LAC teacher this is my practice; the lesson is so focussed the student can get on the same page with you
- Very reciprocal – integral to the philosophy of JUMP; the clean, clear process in JUMP helped understand how patterns build - teacher wants to communicate to students to foster some feeling to students of how concepts are structured. The teacher’s ability to articulate created the desire to facilitate this in the students
- One “step” is taught; students work while the teacher monitors, then the next step is taught – it’s a dynamic process where the teacher is constantly aware of where individuals and the group are at

- Often - it's fluid. Questions come up in the moment, material is a springboard and the teacher asks questions as they see the need in working with a lesson (driven by students). The material lends itself to/inspires the teacher to feel freedom and confidence to ask meaningful

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- questions, the teacher participates/shares student discoveries and students are always asking questions – takes problems to the next level (almost student leads the teacher at times). The teacher is reflective in the process and the students are honest about where they are at – if not ready for the test the teacher continues with other teaching approaches
- This is a quiet group of students – they will add comments but are still teacher driven. Grade 7s not as willing to take risks
  - Student questions are challenging – ask, for example, “How do you know?” – Helps them to think about and articulate their process
  - Yes – the teacher is open to student suggestions in mode of explanation (e.g. try a picture, chart); are then successful and can't wait for the next challenge; spilling over into language arts
  - The worksheets especially the fractions unit allow for practice of one skill at a time - I leave the concepts on the white board as they are being introduced (previous days ideas are included as preview when applicable) so the students see a “road map of sorts”

These following comments are teacher responses to the following question:

***Does the process of JUMP Math foster in students a sense of connection or belonging to the larger group? How does it do this?***

- Unfortunately the composition of this class changed too often this year; the first time this happened was at a crucial time when we had just completed the fractions unit - it was a challenge to build on the momentum; as well, there were students who were autistic, learning disabled and ESL!

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- Absolutely – all help each other with problems, questions and inquiry; any question is valid and not remembering is okay; all learning styles are respected; in addition, teachers not strong in mathematics really are understanding and getting pro-d every day (through this resource)
- Not able to comment at this point
- Students are bringing up students who struggle to be part of the collective group; stronger students might be a little isolated
- So much – for example, some L.D students even some several years behind are able to go as far as they need within JUMP teachings (e.g. a depressed student completely changed – consistently got A's; huge

- affective changes – significant; sharing tests with other students and all students are excited – there’s a buzz (sharing with each other); teacher respect fosters student respect
- The group sticks to the same page at the same time, so we would share a sense of group “mission” and “discovery” - a group ethos of concentration, discipline and mutual support!
  - JUMP Math brings “top” and “bottom” students together because of the way it is broken down – the pre-conceptual process lifts students not normally “getting it” on to the “learning train”; all students are interested and motivated and want to do the walk (engaged) – for example, one student can say, “You got this, you are really smart” or will stay after class to say “Can you go back and explain this to me?”
  - No one is left behind – math may not be the favourite subject for these students but they know that they can do the lessons; there’s a real sense of inclusion – a few students in Grade 6 requested Lesson 5 in class and Grade 6 JUMP math for homework and subsequently did a Grade 6 test and got a Grade 6 mark (true adaptation)

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- Absolutely – my 12 LAC students are integrated into my class – the knowledge, interest and motivation are amazing!

## **SUMMARY AND CONCLUSIONS**

In the analysis of the post-initial training teacher responses the JUMP Math program and philosophy emerges as a logical and sequential program with a clear methodology that not only offers to help teachers become better and more confident in teaching math but offers to help students gain efficacy and confidence in their attitude and skills. It also is perceived by teachers to be an accessible, structured, self-explanatory program with a conscientious developmental focus that uses scaffolding, incremental teaching, and back-tracking to most enable students to gain success. The teachers felt that the simplification, incremental steps, repetition and reinforcement offered reaches all learners and give students the chance to overcome obstacles as well as build the memory of strategies and concepts. This includes the reduction of language. There is also a perception that progressions of steps from simple to complex or concrete to abstract builds the students’ foundations slowly and solidifies key concepts that liberates them to strategize at deeper levels as well as take more risks. The teachers also reported that the use of the JUMP Math unfolds the students’ thinking skills, promotes independent thinking and serves to create excitement and curiosity. The use of praise and encouragement, more teacher involvement and student engagement in the process are all thought to be positive qualities of the JUMP Math that perhaps create more success in math and stronger learning skills overall (i.e. there is a transfer to other subject or content areas). This reinforces David Sousa’s earlier quote on the importance of creating a positive climate to stimulate endorphins.

In the analysis of the **post-teaching responses** gained from the study session group re: **cognitive functions** again the responses would re-iterate Dr. John Mighton's propositions and the initial post-training responses from the workshop sessions. Teachers of the study sessions felt that the introduction of one concept at a time, clear rules at the beginning of each lesson, clarity of language, the simplification and limited language which revisits terms and the movement from simple to complex all do, in fact, **help students to label so that they can appropriately describe things**. The gradual release from simple to complex, breaking of concepts into pieces or discrete steps or slowly, incrementally building concepts in a systematic way are seen as tools **to help students explore systematically** and gain more understanding as a result. The limited layout of the text, reduced language demands and the minimization of extraneous information are seen as a means to create a clear path to understanding and do help students **determine relevant information versus irrelevant information**. The little bit of information at the top of the text, the bolded text, models and hints are also seen to further **increase the student ability to determine relevant information versus irrelevant**. In the third question which focuses on the use of **strategies and different possibilities** and the **consequences of choosing these strategies** the teachers indicated that the consistent strategies of skip counting, for example, finger counting, use of patterns and systematic strategies all help students to feel more comfortable with the different possibilities of approaching problems, that strategies are not overwhelming and that the personal strategies they pursue are validated and create an inclusive and safe environment. On the question, "**Does JUMP Math help students develop logic to prove things?**" the teachers agreed that the JUMP Math program and process does support and facilitate the development of student's logical thinking. It was felt that logic was inherent in the program or evolved out of the process. The scaffolding, systematic approach and efficiency all were seen to create an infrastructure that enhances the student ability to develop logic. In the final question "**Does JUMP Math help students to organize their thinking before they respond or begin a task?**" the teachers

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unanimously agreed that the cognitive process of organized thinking was facilitated and emphasized in the JUMP Math program. The structured layout of the books, the clear and systematic process, the discrete steps, and the incremental approach to questions, from their perspective, helped students develop the cognitive skill of organized thinking.

The final post-survey looked at the **impact of the JUMP Math program and its practice on the student affect**. Teachers felt that the incremental approach which leads to mastery, the success that leads to more success, the use of praise at each step and the pattern approach **help students develop a feeling of internalized competence**. In particular, the motivational fraction unit used strategically at the outset and the intentional design and infrastructure of JUMP Math not only motivated students but led them to a sense of internalized

competence and a better attitude toward math and learning in general which also transferred to other subject areas. Secondly, the question of **whether or not the students develop an awareness of themselves as changing entities or are led to believe that they have the potential to change or take risks** was recognized as addressed in the JUMP Math text and process. The reduction of input, the patterning, the discrete steps and the adaptations such as the finger counting all were described by the teachers as tools that **promote risk taking** and develop in the students the sense that they can become better math students. In particular, the philosophy that “even if they don’t get it at this point you will get it” further serves to **build confidence and a willingness to take risks**. In answer to the question as to **whether the JUMP Math practices uses intention and reciprocity to assist the student’s learning and whether this led students to self-reflect, gain insight and articulate his/her learning** most of the teachers except for one class where the teachers felt the students were particularly not willing to take risks agreed that this occurred. They felt that students were more willing to question,

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challenge and move forward with excitement. In addition, the dynamic process of learning in which the teacher continually monitors the individual and group learning and is open to challenging student questions is a teacher practice inherent in the JUMP Math training that was experienced as intention and reciprocity. In the final question “**Does the process of JUMP Math foster in students a sense of connection or belonging to the larger group**” teachers asserted that the process of JUMP Math does foster a sense of belonging or connection to the larger group. There was a feeling that all students are motivated and learning together in a shared discovery and that all learning styles were respected. Top and bottom students are integrated in an inclusive “learning train” with the intent of mutual support.

The JUMP Math program serves as a model to view closely as a means to explore and study inclusion, teaching practices, memory devices, differentiated instruction and the importance of affect in the teaching process. The reciprocal relationship with the students, the intentional clarity and infrastructure of the text, the systematic and scaffolding approach all serve to enhance student retention and transfer. Finally, the critical factor is that teachers are able to successfully develop their math skills and utilize these in the classroom setting with the same confidence and safety as the students.

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