Reaching and teaching All math students

INTRODUCTION

Technology can assist students

Complete and/or develop functional skills
Access curriculum/information
Become more efficient learners
Bypass lack of skills
Reduce dependency
Become more productive
Increase endurance to persevere and complete tasks

Obstacles/Barriers to AT Implementation

The digital divide
Culture
Lack of knowledge and skills
Lack of awareness of technologies potential and availability
Lack of training
Difficult to setup
Failure to implement AT recommendations
Time
Funding challenges
Fears, concerns, reservations, and prejudices
Different expectations

SUPPORT IN THE CURRICULUM

Exploring Potentials With Many Ways of Being Smart - Multiple Intelligence's

Logical-Mathematical
Linguistic
Musical
Bodily kinesthetic
Spatial
Interpersonal
Intrapersonal
Naturalist

Gifts and strengths are often overlooked
Assessment process fails to identify strengths
Moves from deficit-oriented, remediation model of service delivery to student-centered, resource-oriented and compensatory model.
Use to develop activities for students
Less emphasis on passive learning, more emphasis on alternative ways of learning including movement, manipulation of objects, music, social interactions

Do you know your learning style? Do you know your student's learning style?

Universal Design for Learning Guidelines

Essential 3 Principles of Universal Design for Learning	
Multiple Means of Representation *(Recognition Networks)*	Provides learners with various ways of acquiring information and knowledge
Multiple Means of Expression *(Strategic Networks)*	Provides learners with alternatives for demonstrating what they know
Multiple Means of Engagement *(Affective Networks)*	Taps into learners' interests, challenges them appropriately, and motivates them to learn

Multiple means of Representation – *Recognition Network*

Recognition networks are specialized to sense and assign meaning to patterns we see; they enable us to identify and understand information, ideas, and concepts. *(CAST, 2003)*

Differentiate Content & Materials

Information can be obtained in a variety of ways

Auditory, visual, motor

Purpose is to reduce the perceptual/learning barriers and to adjust to the diverse ways in which students are able to recognize and understand information.

The "what" of learning - identify and interpret patterns of sound, light, taste, smell, and touch

To support diverse recognition networks (Presentation/Content)	
Provide multiple examples	Multiple versions of a story
Highlight critical features	Concept maps
Provide multiple media and formats	Text readers, videos, images, audio
Support background context	Links to additional resources

Multiple means of Expression – *Strategic Network*

Strategic networks are specialized to generate and oversee mental and motor patterns. They enable us to plan, execute, and monitor actions and skills. *(CAST, 2003)*

Differentiate How Learners Show What They Know

Students can respond with their preferred means of output. Students could

write answer, speak an answer, design a graphic to answer a question, utilize minimal motor abilities to make a multiple choice response, prepare a written report, speech, PowerPoint presentation, video, demonstration, poem, or song

Material accommodates different styles, preferences, strategic approaches and motor abilities of students

"the how of learning" - plan, execute, and monitor actions and skills

To support diverse strategic networks (Expression/Product)	
Provide flexible models of skilled performance	Multileveled examples
Provide opportunities to practice with supports	Talking word processors
Provide ongoing relevant feedback	Connect to peers
Offer flexible opportunities for demonstrating skills	Use multimedia, presentation, concept mapping, draw programs

Multiple means of Engagement – *Affective Network*

Affective networks are specialized to evaluate patterns and assign them emotional significance; they enable us to engage with tasks and leaning and with the world around us. *(CAST, 2003)*

Interest in learning is matched with the mode of presentation and response so that students are motivated.

Obtain a graphic in the middle of a reading passage

Longer words quickly defined

Materials have the ability to learn or remember the individual student's patterns and preferences and track their progress.

"the why of learning" – evaluate and set priorities

Differentiate Instructional Processes

To support diverse affective networks (Engagement/Process)	
Offer choices of context and tools	Selection of content, resource materials
Offer adjustable levels of challenge	Template to scaffold the process
Offer choices of learning context	Online, cooperative group, lecture
Offer choices of rewards	Type of feedback

Sample of Support Technology

Audio	Visual	Digital	Physical
Cassette tape	Videotapes	Computer hardware	Word processors
Radio	Video discs	Productivity software	Word prediction
Music CD-ROMS	Overhead projector	Educational software	Digital recorders
Talking Books	Other projection device	Presentation software	Hand-held spellers/dictionaries
Multimedia CDs	Models, Real objects	Graphic programs	Voice recognition
Recordings: Rhymes and reading	Boards (white, black, smart)	Streaming audio	Interactive whiteboards
Recordings: Musical Instruments	Cartoons and drawings	Streaming video	
Assistive listening devices	Document camera	Webcasts	
	Closed Captioning	Internet resources	
		Electronic Whiteboards	

Individuals with Math Difficulties *(GA Tools for Life)*

- Trouble with mathematical concepts (>,<, x , - ,+,=)
- Demonstrates inconsistent mastery of math facts and procedures
- Trouble with following sequential procedures and directions with multiple steps
- Problems with math concepts in word problems
- Trouble with left/right orientation
- Confuses similar numbers (e.g., 7 and 9; 3 and 8) or transposes numbers
- Reads numbers out of sequence
- Difficulty managing money
- Trouble balancing a checkbook
- Cannot do written calculations
- Cannot do simple mental calculations
- Trouble with basic skills assessment
- Difficulty using a calculator
- Cannot count money or make change
- Trouble with measurement
- Difficulty conceptualizing time and space

Students With Learning Problems:

- Perceptual, processing, and/or communication difficulties
- Need more repetition than other students
- Benefit from alternative techniques
- Will make more mistakes in computation so need to remember to check their calculations
- Some issues are intensified by stress, anxiety, time pressure, performance pressure, fatigue, and embarrassment which increase their errors

Principles:

- Math does not come naturally to everyone
- For some it's like learning a foreign language
    - Unfamiliar vocabulary
    - Do not use the concepts in their everyday thoughts
- Informational gaps
    - Lack of lower-level concepts or skills
    - Prevents from obtaining higher-level concepts and skills
- If you don't use it your lose it

Symptoms of Math Learning Problems: *(Cooper, 2005)*

1. Computation errors
2. Weak quantitative concepts
3. Poor performance in daily math activities

Computation errors

- Student may have most of the facts correct but makes one error on computation
  4+4=9 or 12-6=5
- Complex math problems are solved using computations that rely on basic number facts

Weak quantitative concepts

- Students who do not understand a concept may reverse numbers
  "What is 23 divided by 42?" and the student writes $23\sqrt{42}$
- May believe that double means more rather than twice as much or % is less or on sale
- Feel that math does not make sense

Poor Performance

- Difficulty in everyday math (counting money, making change, telling time, or measuring)
- To find out the number of chairs in the room they count each one because they can't multiply the number of rows by the number of chairs in the row
- Pay with bills instead of coins to avoid embarrassment

Root of Math Problems *(Cooper, 2005)*

1. Informational gaps
2. Insufficient or ineffective instruction
3. Learning differences, difficulties, or disabilities

Areas to Consider

Auditory Perception and Processing
Handwriting
Memory
Organization
Attention
Reading
Right/left Discrimination
Sequencing

Instruction

Universal Design for Learning

Essential Qualities of Universal Design for Learning

Multiple means of representation
Multiple means of expression
Multiple means of engagement

Summary of Strategies for Teaching Mathematics

- Present advance organizers
- Review prerequisite skills or concepts no matter how long ago they were taught
- Model procedures enough times for clarity
- Use step-by-step procedures
- Provide sufficient guided and independent practice
- Teach the skill of generalization specifically and directly
- User real-life and meaningful examples
- Focus on essential ideas for connections and foundations
- Use mnemonic strategies
- Teach self-questioning and self-monitoring
- Teach and practice and use of visual aids
- Teach gradually from the concrete to the abstract
- Use cooperative learning groups

Instructional Planning Matrix			
	Support Before Activity	**Support During Activity**	**Support Following Activity** (may include assessment)
Introduction of Skill/Concept (may be a group or class presentation)	Tell about content being addressed, connect to necessary prior learning, preview relevant vocabulary, show static form of activity, and/or demonstrate activity with modeling	Prompt for exploration, give systematic prompts to help students see patterns and make generalizations, discuss results of exploration	Remind about lessons learned from activity, use worksheet similar to that used during activity, ask for demonstration of knowledge with no prompts
Practice and/or Assessment of Skill/Concept (students use applet alone or in groups)	Remind about content being addressed, connect to necessary prior learning, review relevant vocabulary, show static form of activity, and/or demonstrate activity with modeling	Prompt for exploration, give prompts to help students see patterns and make generalizations, discuss results of exploration	Remind about lessons learned from activity, use worksheet similar to that used during activity, ask for demonstration of knowledge with no prompts
Remediation of Skill/Concept (students use applet alone or in groups with extra supervision)	Remind about content being addressed, review relevant vocabulary, connect to necessary prior learning, show static form of activity, and/or demonstrate activity with modeling	Prompt for exploration, give prompts to help students see patterns and make generalizations, discuss results of exploration	Remind about lessons learned from activity, use worksheet similar to that used during activity, ask for demonstration of knowledge with fewer/no prompts

From Technology in Action – Integrating Applets into Middle Grades Math Vol. 2 Issue 2 June 2006

Accessibility Strategies Toolkit for Mathematics (2002, Education Development Center, Inc.)

Conceptual Processing
Language
Visual-Spatial Processing
Organization
Memory
Attention
Pyscho-Social
Fine-Motor

Technology Tools for Support

Types of Assistive Technology Tools for Reading

Color Filters, Highlighting, Reading Guides, Text to Symbol Processors, Electronic Books, Text Scanning & Readers, Talking Word Processors, Spell Checkers, Low Tech Communication Devices, Recorders

Types of Assistive Technology Tools for Writing

Supports for Handwriting, Portable Word Processors, Talking Word Processors, Dictation/Voice Recognition, Word Prediction, Outliners/Graphic Mapping, OnScreen Keyboards of Words/Pictures that produce Text, Spelling Checkers, Grammar Support, Multi-media Software

What are the Tasks: Math

Reading, Computation, Comparison, Measuring, Problem Solving, Time, Writing, Drawing

Purpose of Technology Use

Ted Hasselbring, Alan Lott, and Janet Zydney (2005) note six purposes of technology use for supporting student mathematical learning and their development of declarative, procedural, and conceptual knowledge:

1. Building computational fluency
2. Converting symbols, notations, and text
3. Building conceptual understanding
4. Making calculations and creating mathematical representations
5. Organizing ideas
6. Building problem solving and reasoning

Types of Assistive Technology Tools for Math

Categories of Programs

Tutorials, Skill-Building/ Drill & Practice, Comprehensive Courseware, Problem-Solving, Test Prep, Simulations & Visualization, Educational or Serious Games *(Mark Schneiderman, 2006)*

- LoTTIE Kit For Math (*Onion Mountain Technology*)
- Portable Calculators, Fraction Calculator, Coinculator, Money Calc (*NASCO*), Speaking Calculator, See N' Solve (*NASCO*), Calc-u-Vue (*NASCO*)
  Giant Calculator (*Onion Mountain Technology*), Calculator Tutor (*Attainment*), T1-15 Explorer Calculator (*Texas Instruments*), Talking Scientific Calculator (*Orion*), Audio Graphing Calculator (*ViewPlus*)
- Time, Talking Watches, Talking Clocks, Telling Time (*Attainment*), TimeScales (*Attainment*), Trudy's Time and Place, Intellitools
- MathLine (*Howbrite*)
- Number Pattern Line, DollarLine, CalcuLine, MeasureLine, Carry and Borrow Line, FractionLine, 100 Rule (*Attainment*)
- TouchPoints (*TouchMath*), Graph Paper (http://www.csun.edu/science/ref/measurement/data/graph_paper.html), Elementary Ruler, The Master Ruler (http://www.themasterruler.com/), Charts (http://math2.org/)
- Fraction and Decimals Flexitable (*EAI Education*), Coin Abacus (*NASCO*)

- Money Skills, Software: Show Me Math, Match Time, Number Station, TimeScales, First Money, Spending Money, Making Change (*Attainment*)
- Number Concepts 1 & 2 (*IntelliTools*), Check your Math Books (*Attainment*),
- MathPad and MathPad Plus: Fractions and Decimals, IntelliMathics (*IntelliTools*)
- Basic Fractions (*Attainment*)
- Scholastic Keys (*Tom Snyder*)
- Kidspiration, Inspiration, Inspiredata (*Inspiration*)
- Meet the Math Wiz - www.hal.lamar.edu/~ANDREWSJF/math.html
- *Sunburst*: Activities, Algebraic Concepts, Geometry/Trigonometry, Measurement, Time and Money, Number Sense, Concepts and Operations, Problem Solving, Sorting and Classifying/Data Analysis, Addition and Subtraction, Fractions, Decimals, Ratios, Percents, Exponential, Graphing, Multiplication and Division, Place Value/Sequencing, Simulations
- Virtual Pencil (*HenterMath*)
- Tutor and Mentoring (*TutorAndMentor*)
- Personal Algebra Tutor (*CyberEd, Inc.*) - Solves algebra problems involving equations, expressions, polynomials, functions, graphs, inequalities, radicals, etc. For Algebra 1, Algebra 2, Intermediate Algebra, College Algebra, PreCalculus
- The Algebra Word Problem Solver *CyberEd, Inc*. - Solves 16 types of common algebra word problems
- Understanding Math K-10: Numeration (K-3), Whole Numbers & Integers, Percent, Probability, Graphing, Measurement & Geometry, Fractions, Exponents, Equations, Algebra (*Neufeld Learning Systems*)
- FASTTMath, Go Solve (*Tom Snyder Productions*)
- StudyWorks! Mathematics Deluxe: Pre-Algebra, Algebra I & II, Geometry, Trigonometry, Precalculus, Calculus I & II, Statistics, Business Math
- Voyager Math *(Voyager Learning*)
- Symphony Math
- Destination Math (*RiverDeep*): Real-World Math for Real-World Classrooms Destination Math is a comprehensive mathematics program that teaches basic skills, math reasoning, conceptual understanding, and problem solving.
    - Destination Math: Course I - Pre-Primary Mathematics for Grades K-1
    - Destination Math: Course II - Primary Mathematics for Grades 2-3
    - Destination Math: Course III - Intermediate Mathematics for Grades 4-6
    - Destination Math: Course IV - Advanced Mathematics for Grades 6-8
    - Destination Math: Course V - Pre-Algebra for Grades 6-8
    - Destination Math: Mastering Algebra Course I
    - Destination Math: Mastering Algebra Course II
- Math Advantage 2007: Basic Math, Pre-Algebra, Algebra I & II, Geometry, Trigonometry, Pre-Calculus, Calculus, Real World Math
- Microsoft Math 3.0 – (Microsoft)
- Geometer's Sketchpad® Dynamic Geometry® Software for Exploring Mathematics (*Key Curriculum Press*)
- MathType & MathPlayer(*Design Science*)
- MathTalk and MathPad by Voice (*MetroPlex Computing*)
- Quicken (*Intuit*)
- Talking Checkbook by Premier Assistive Technology

Final Notes

Questions to ask (Westwood, 1999)

1. What can the student already do without assistance?
2. What can the student do if given guidance and support?
3. What gaps exist in the student's previous learning?
4. What does the student need to learn next?

Cognitive Strategies include how to read, visualize, estimate, and compute and are easily taught

1. Repeatedly model the strategies
2. Monitor the students' use of the strategies
3. Provide feedback to students

Remember

- There are many ways to teach math
- Never assume a student who has a disability is unable to master the concepts and operations of math
- Understand why gaps exist is the first step in help them grasp the concepts
- Use good sound instructional strategies

Accessibility Strategies to Consider

General Instruction Strategies

- Provide both visual and auditory directions
- Provide frequent feedback
- Preview and review
- Use prompts, cues, and hints
- Use nonverbal signals
- Use frequent assessments
- Use multiple representations
- Use cooperative groups
- Set up a notebook organizational system
- Teach organizational strategies
- Teach problem-solving and metacognitive strategies
- Think aloud to model self-questioning/self-monitoring strategies
- Show examples of the finished product
- Change or personalize contexts to be more familiar to students
- Adjust the amount of time
- Adjust the pacing to optimize attention
- Adjust the amount of work
- Reduce the amount of copying for students
- Read aloud
- Have students paraphrase directions and questions
- Clarify directions
- Provide word banks for vocabulary
- Teach highlighting and color-coding strategies
- Offer tools such as highlighters and post-its to help students focus
- Offer manipulatives
- Offer technology supports such as tape recorders, overhead projectors, portable keyboards, calculators, and software programs
- Offer timers to help students with pacing

Curriculum Adaptation Strategies

- Reformat handouts to reduce distracting elements and increase white space
- Adjust the level of difficulty:
    - Use friendlier numbers
    - Use simpler language
    - Reduce the complexity of the tasks
- Change context to make it more familiar or appealing to students
- Use an alternative approach
- Provide additional problems
- Provide Graphic Organizers to help the students understand concepts and organize ideas
- Provide Project Organizers to help the students keep track of tasks
- Provide Templates for tables, graphs, writing, and other tasks
- Provide Study Guides with key information on concepts to reduce copying and note-taking

Classroom Environment

- Reduce auditory and visual distractions
- Set up organizational systems
- Display organizational reminders and checklists
- Post homework assignments in a consistent location
- Post classroom rules
- Set clear guidelines for group work
- Display wall charts with key vocabulary and information
- Display examples of final products for students to use as models
- Seat students according to needs, e.g., attention, hearing, vision. Do not seat students who are easily distracted near windows or doors
- Have graph paper and templates available

Math Resources – Companies

Attainment	www.attainment-inc.com
CyberEd, Inc.	www.cyberedinc.com
Design Science	www.dessci.com/
Don Johnston Inc.	www.donjohnston.com
EAI Education	www.eaieducation.com/
Encore	www.encoreusa.com/
HenterMath	www.hentermath.com
Howbrite Solutions	E-mail: mathline@cmgate.com
Independent Living Aids	www.independentliving.com
Inspiration	www.inspiration.com
Intellitools	www.intellitools.com
Intuit	http://quicken.intuit.com/
Key Curriculum Press	www.keypress.com/x5521.xml
MathRealm	http://www.mathrealm.com/
MetroPlex Voice Computing, Inc.	www.mathtalk.com
Microsoft Math	www.microsoft.com/math/
NASCO	www.enasco.com
Neufeld Learning Systems	https://neufeldmath.powweb.com/
Onion Mountain Technology	www.onionmountaintech.com/
Priemeir Assistive Technology	www.readingmadeez.com/home.html
RiverDeep	www.riverdeep.net
Saxon	www.saxonhomeschool.com
StudyWorks	www.mathsoft.com/
SUNBURST	http://store.sunburst.com/
Symphony Learning	www.symphonylearning.com/symphonymath/
Tom Snyder Productions	www.tomsnyder.com/
TouchMath	www.touchmath.com/
TutorAndMath	www.tutorandmentor.com/
ViewPlus	www.viewplus.com
Voyager	www.voyagerlearning.com

Math Resources – Websites

The Access Center - www.k8accesscenter.org/training_resources/mathprimaryproblemsolving.asp

APlusMath – www.aplusmath.com/

Ask Dr. Math – http://mathforum.org/dr.math/

Diablo Valley College - www.dvc.edu/mathematics/

Different types of Math problems - www.ldonline.org/ld_indepth/math_skills/garnett.html

Free - Federal Resources for Educational Excellence - www.free.ed.gov/index.cfm

Internet4Classrooms – Secondary Mathematics - www.internet4classrooms.com/math_sec.htm

Math Dictionary for Kids – http://teachers.ash.org.au/jeather/maths/dictionary.html

Math Forum Internet Mathematics Library – http://mathforum.org/library/

Math Lesson Plans – www.sitesforteachers.com/resources_sharp/math/math.html

Math Playground - www.mathplayground.com/i

Math Websites for Teachers and Students - www.cumbavac.org/Math.htm

Mathematics Education @ Northern Kentucky University – www.nku.edu/~mathed/p12sr.html

Mathematics lessons that are fun! Fun! Fun! - http://math.rice.edu/~lanius/

Students will be engaged in activities from drawing online bar graphs resulting from solving simple equations to collecting and analyzing data and analyzing differences. Elementary topics span grade level k-12.

MathStar NM – http://mathstar.nmsu.edu/teacher/mathlinks.html

Mid-Continent Research for Education and Learning - www.mcrel.org/topics/Mathematics/

Middle School Math – Curriculum Guidelines for Math 6 -
http://web1.caryacademy.org/academicinfo/departments/msmath/guidelines/math6/internet.htm

Middle School Teachers' Place: Individual Lesson Plans - www.nku.edu/~mathed/p12sr.html

National Center on Educational Outcomes - http://education.umn.edu/NCEO/AccomStudies.htm

National Council of Teacher's of Mathematics: Illuminations imath investigations
http://standards.nctm.org/document/eexamples/index.htm
http://illuminations.nctm.org//ActivitySearch.aspx
Based on the Principles and Standards for School Mathematics, this NCTM online resource offers ready-to-use online interactive multimedia math investigations. There are pages for the teacher as well as the student. Teacher versions contain teacher notes and answers. Scroll down to find the elementary topics separated by grade level: PreK-2, 3-5, 6-8, and 9-12.

National Library of Virtual Manipulatives - http://nlvm.usu.edu/en/nav/vlibrary.html
Developed by Utah State University and funded by a National Science Foundation grant, this site is an extensive collection of virtual manipulatives and interactive concept tutorials. It offers activities and tools for grades k-2, 3-5, 6-8, and 9-12.

Online Fraction Calculator - www.homeschoolmath.net/worksheets/fraction_calculator.php

Salem Elementary Math - www.salemes.vbschools.com/rrmath.htm

Sites for Teachers – www.sitesforteachers.com/resources_sharp/math/math.html

Teacher2Teacher at The Math Forum – http://mathforum.org/t2t/

Teaching With Technology – www.law.du.edu/daustin/k12tech/math.htm

The Tech Matrix – www.techmatrix.org/

WebMath - http://webmath.com/

More Websites
http://www.citeducation.org/mathmatrix/
http://www.learnalberta.ca/
http://www.education.gov.ab.ca/k_12/curriculum/bySubject/math/
http://www.ct4me.net/math_projects.htm
http://falcon.jmu.edu/~ramseyil/math.htm
http://www.dvc.edu/mathematics/
http://www.dansmath.com/
http://nlvm.usu.edu/en/nav/vlibrary.html
http://illuminations.nctm.org//ActivitySearch.aspx
http://standards.nctm.org/document/eexamples/index.htm
http://www.pbs.org/teachersource/standardslist.shtm
http://www.enchantedlearning.com/math/glossary/A.shtml

K - 2 Interactive Math Sites - www.avondale.k12.az.us/resources/cpt/k-2math.htm
3-4 Interactive Math Sites - www.avondale.k12.az.us/resources/cpt/3-4math.html
5-6 Interactive Math Sites - www.avondale.k12.az.us/resources/cpt/5-6%20math.html
7-8 Interactive Math Sites - www.avondale.k12.az.us/resources/cpt/7-8math.html
Grade 5 Problem Solving Movies - www.avondale.k12.az.us/resources/cpt/m3.htm
Visual Virtual Math Problems - www.avondale.k12.az.us/resources/cpt/vvm.html
Math Patterns - www.avondale.k12.az.us/resources/cpt/pattern.html
Math Links - www.wcusd.k12.ca.us/curricular/middle.html#math

Math Articles
Accessibility Strategies toolkit for mathematics –
www2.edc.org/accessmath/resources/strategiesToolkit.pdf

Hasselbring, T. S., Lott, A. C., & Zydney, J. M. (2005). Technology-supported math instruction for students with disabilities: Two decades of research and development. Washington, DC: American Institutes for Resarch. Available: http://www.cited.org/index.aspx?page_id=13

Math Resources – Books

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Butterworth, B. (1991). *The Mathematical Brain.* New York:Macmillan.

Cooper, R. (2005). *Alternative Math Techniques: When nothing else seems to work.* Longmont, CO: Sopris West.

De Klerk, J. (2007). *Illustrated Math Dictionary: An Essential Student Resource.* Lebanon, IN: Pearson Education Inc.

Dehaene, S. (1997). *The Number Sense: How the Mind Creates mathematics.* Oxford: Oxford University Press.

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Henderson, A. (1998). *Maths for the Dyslexic: A Practical Guide.* London, England: David Fulton Publishers.Westwood, P. (2000). *Numeracy and Learning Difficulties: Approaches to teaching and assessment.* Victoria, AU: McPhersons Printing Group.

Kirkpatrick et all. (2001). *Adding It Up: Helping Children Learn Mathematics.* Washington, D.C.: National Academies Press.

Ma, L. (1999). *Knowing and Teaching Elementary Mathematics: Teachers' Understanding of Fundamental Mathematics in China and the United States (Studies in Mathematical Thinking and Learning)*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Thomson, M. (2003). *Dyslexia Included: A Whole School Approach* London, England: David Fulton Publishers.

Van de Walle, J. *Elementary and Middle School Mathematics: Teaching Developmentally*

Westwood, P.S. (1999) *Teaching basic mathematics to students with learning difficulties: Priorities and issues.* In D. Barwood, D. Greaves & P. Jeffery (eds) Teaching numeracy and literacy: Interventions and strategies for at risk students. Melbourne, AREA Press

Westwood, P. (2000). *Numeracy and Learning Difficulties: Approaches to teaching and assessment.* Victoria, AU: McPhersons Printing Group.

Zorfass, J., Follansbee, R., & Weagle, V. (2006). Integrating applets into middle grades math: Improve conceptual understanding for students with math difficulties. Technology in Action, 2 (2), June.