



The diagram illustrates that classroom instruction is the result of teacher decision-making in real time. These decisions are assumed to derive from a number of sources: teacher knowledge and beliefs, and teacher assessment of student knowledge. The latter are generated when teachers carefully observe (and interpret) their students' mathematical behaviours and the mathematics artefacts that result from those behaviours.

Key features

Fennema *et al.* argue that the main features or tenets of CGI are: '(1) instruction must be based on what each learner knows, (2) instruction should take into consideration how children's mathematical ideas develop naturally, and (3) children must be mentally active as they learn mathematics' (1989, p. 203).

Cognitively Guided Instruction

**Elizabeth Fennema, Thomas P.
Carpenter, Wisconsin Center for
Education Research**



Cognitively Guided Instruction:

Children's Mathematics Thomas P. Carpenter, 1999 Accompanying CD ROMs provide examples of children's strategies and classroom examples of the concepts covered in the text *A Program Implementation Guide for Cognitively Guided Instruction (CGI)* Elizabeth Fennema, Thomas P. Carpenter, Wisconsin Center for Education Research, 1989* **Cognitively Guided Instruction** Elizabeth Fennema, Thomas P. Carpenter, Wisconsin Center for Education Research, 1997 An inservice program intended to familiarize educators with a Cognitively Guided Instruction CGI approach to teaching mathematics

Young Children's Mathematics Thomas P. Carpenter, Megan Loef Franke, Nicholas C. Johnson, Angela Chan Turrou, Anita A. Wager, 2017 This book is for pre K to 1st grade and shows how teachers can promote math development in ways that honor children's thinking *Cognitively Guided Mathematics Instruction and Teacher's Decision Making* Cheryl Ann Lubinski, 1989 *Professional Development Programs* Lane Andrew, 2006 Many people feel mathematics education in the U S is in need of improvement Fennema and Franke 1992 note that teachers knowledge or lack thereof is often associated with poor instruction and thus low student achievement on instruments which measure mathematical aptitude For this reason universities across the country have become mathematical and pedagogical re training grounds for future novice and even experienced teachers Fennema et al 1996 indicate that the object of many professional development programs is to instill in teachers the kind of knowledge which will enable them to modify their own teaching so that students understand mathematics in a more meaningful way But these authors also note that there is little agreement and even less evidence pointing to what specific knowledge is actually needed by teachers in order for them to better facilitate mathematical understanding among their students Is it merely more formal mathematical knowledge Is it exposure to reformed style classroom environments Is it more pedagogical knowledge If so is it a matter of becoming better trained in certain instructional strategies Or is it understanding how young people normally think about mathematical ideas their misconceptions their innate abilities Several professional development programs are currently being used in an attempt to explore and answer these questions Ball 1995 I will be outlining two approaches to professional development in the following essay The first is Cognitively Guided Instruction CGI and the second is Math As Text MAT I will begin by briefly outlining how the program is implemented I will also include information on the benefits it has shown for elementary teachers and in the case of CGI student benefits as well I will finish by describing which approach I would use and how I would implement my approach *Cognitively Guided Instruction and Teacher Change* Marilyn K. Annen, 1997 **Implementing Cognitively Guided Instruction for Instruction of Mathematics** Jamison J. Jensen, 2002 This project sought to determine whether the use of cognitively guided instruction would improve the ability of second grade students to solve mathematical problems Results indicated that cognitively guided instruction significantly improved the students ability to solve mathematical problems **The Big Math Shift** Jeffrey Lindstrom, 2005 **Effects of a Cognitively Guided Instruction** Gavriela

Ziu-Pires,2012 In this thesis the teacher s knowledge on the types of problems that exist in mathematics is discussed Also this thesis identifies the teacher s awareness on children s solution to the problems as well as students development of number concepts In addition the study proposes based on data and research the need for meaningful professional development that engages teachers in reassessing their knowledge of mathematics This professional development will require teachers to reevaluate their knowledge by examining children s intuitive problem solving strategies Also teachers will need to examine the correlation between the intuitive process of problem solving in students and the students development of number concepts in a meaningful way A questionnaire was developed to collect data from teachers in a Connecticut school The questionnaire was administered in the winter and it was anonymous The questionnaire had a bubble system and the answers were analyzed in a scale from 1 through 4 consecutively corresponding to strongly disagree disagree agree and strongly agree In this particular district an student assessment is given three times a year in the primary grades for math and reading For the purposes of the research the winter assessment and the spring assessment were compared for two Kindergarten classes on one specific mathematical concept quantity discrimination The data was analyzed and the researcher statistically determined the effect of a Cognitively Guided Instruction Program on the specific concept of quantity discrimination by comparing the mean scores of pre and post assessments for the experimental and control groups

Professional Development Series Alejandra Maria Biolatto,2019 Cognitively Guided Instruction CGI is a research based approach that leverages students invented strategies to inform teachers plans for instruction The purpose of this professional development series is to provide the teachers of Walgrove Elementary School with guidance during implementation of CGI The elementary teachers of Walgrove Elementary will develop a purposeful understanding of CGI warm ups problems counting collections and share outs Teachers will also understand how these components effectively implement the Common Core Standards and Math Practices CCSS M and can be used to understand the development of strategies on a trajectory Teachers will understand how to plan assess and differentiate for students with special needs using the CGI approach The facilitator seeks to guide teachers to understand how they can begin implementing CGI in their classrooms **Applying**

Cognitively Guided Instruction Through Word Problem Probes James Jackson Ploen,2010 *Children's Mathematics* Elizabeth Fennema,1999 *Children's Mathematics* Thomas P. Carpenter,2000 The Effect of Cognitively Guided Instruction on Primary Students' Math Achievement, Problem-solving Abilities and Teacher Questioning Juan Medrano,2012 The purpose of this study is to impact the teaching and learning of math of 2nd through 4th grade math students at Porfirio H Gonzales Elementary School The Cognitively Guided Instruction CGI model serves as the independent variable for this study Its intent is to promote math instruction that emphasizes problem solving to a greater degree and facilitates higher level questioning of teachers during their instructional dialogue with students A mixed methods approach is being employed to see how the use of the CGI model of instruction impacts the math achievement of 2nd through 4th grade students on

quarterly benchmark assessments administered at this school to see how students problem solving abilities progress over the duration of the study and to see how teacher practices in questioning progress Quantitative methods are used to answer the first of these research questions using archival time series Amrein Berliner 2002 to view trends in achievement before and after the implementation of the CGI model Qualitative methods are being used to answer questions around students progression in their problem solving abilities and teacher questioning to get richer descriptions of how these constructs evolve over the course of the study

How Does Cognitively Guided Instruction Affect High Ability Math Students

Angela M. Michelson, 2009 The research question addressed in this project was how does Cognitively Guided Instruction affect high ability math students The study documents one teacher's implementation of CGI into a fourth grade math classroom for high ability students Using research to guide instruction the author takes the reader through the process of setting up a CGI classroom This study documents student growth through NWEA data student math journals mathematical discourse and parent student surveys The author concludes that CGI had a positive affect on student achievement

Cognitively Guided Instruction Jessie Elizabeth Guerrero, 2014 This study examined teacher and administrator perspectives in regards to the adoption and implementation of an elementary mathematics teaching approach called Cognitively Guided Instruction CGI at three elementary school sites of a rural elementary school district located in the Central Valley of California A holistic exploratory case study analysis involving teachers and administrators from each of the three participating school sites and district office was conducted The study explores how one elementary school district aimed to improve student learning and began the shift into teaching the Common Core State Standards by adopting and implementing CGI as it is within the complexity of implementing new innovations there is oftentimes a lack of understanding of effective ways to fully introduce and integrate these improvements This study seeks to gain a better understanding of teachers and administrators perceptions of the adoption and implementation process of Cognitively Guided Instruction This study uses a combination of theories including Constructivism Cognitive Learning and Rogers Diffusion of Innovation The study participants are elementary math teachers representing grades one through six school site principals and one district office representative The case study design utilized classroom observations teacher interviews administrator interviews and a review of documents and materials related to CGI Research was conducted during the 2013 14 academic school year The data from these three sources were triangulated and analyzed for emerging categories and subcategories Six categories emerged from the data 1 Defining and Understanding CGI 2 Preparation for Implementing CGI in the Classroom 3 Professional Development 4 Using CGI in the Classroom 5 Institutional and Leadership Support for Adopting Implementing and Institutionalizing CGI and 6 Influences on Changing Educational Practices and Teacher and Administrator Beliefs as a Result of Implementing CGI The findings of the study indicate few differences between the three school sites in regards to their adoption and implementation of CGI teachers and administrators perceptions of the adoption and implementation of the

CGI approach was generally positive teachers felt supported by the school and district leadership and believed they benefitted from the various training opportunities provided barriers and challenges identified possibly had a slowing effect on the process of fully implementing CGI implications for theory and practice such as the importance for solid professional development administrator support and the recognition that anything new is a process and the process of adopting and implementing innovations such as CGI progresses through stages This study concludes with three areas of recommendations 1 Recommendations for Institutionalizing and Sustaining Cognitively Guided Instruction in the Mountain View Elementary School District 2 Recommendations for Educational Institutions and 3 Recommendations for Future Research

Children's Mathematics: Cognitively Guided Instruction ,1997 *Native American Pedagogy and Cognitive-Based Mathematics Instruction* Judith T. Hanks,2019-05-20 Native American Pedagogy details a study that investigated the teaching of mathematics to Oneida Indian kindergartners This study proves that Native American children who are taught with culturally sensitive methods will perform more successfully on mathematical problem solving tasks and that Cognitively Guided Instruction an approach that provides teachers with research based knowledge of how children learn mathematics enables such culturally sensitive teaching methods

Lost and Found and Found Again Gerald R Fast,2021-03-21 Lost and Found and Found Again A Math Mystery is a unique child s story that seamlessly weaves primary level mathematics into a fantasy adventure Ideal as a classroom read aloud for homeschool math instruction or pleasure reading Mathematics that focuses on solving word problems and developing number sense is carefully sequenced to correspond with the developmental stages of children s thinking as outlined by Cognitively Guided Instruction

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Cognitively Guided Instruction Introduction

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