

Developing Number Sense
A 2009 NCTI *Technology in the Works* Research Project

Final Summary Report

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Summary

With grant funding provided by the National Center for Technology Innovation, Technology in the Works grant program, Simmons College, EdTech Solutions and Cambium Learning Technologies implemented a research project to study number sense skills acquisition for students in grades K – 2 using Stages Math Number Sense software for skills practice. The software was created in accordance with principles of universal design for learning and differentiated instruction. Activities provided explicit and meaningful feedback in an accessible digital environment that permitted alternative methods of input and provided audio support. Students in three inclusive classrooms K – 2 in a suburban elementary school formed the convenience, purposive sample for this study. The research sought to investigate the effectiveness of the software when compared to traditional paper-and-pencil learning activities. The results reveal that the intervention holds promising potential for all student groups who traditionally experience fundamental academic failure. Results indicate that the Key Math pre/post test might be simply insensitive to positive and measurable changes evoked by the *Stages Math: Number Sense* software within the short duration of this study, thus rendering it impossible to statistically evaluate the learning outcomes of the six-week intervention. The implications of this project for future research and practice are summarized.

Introduction

According to the National Council of Teachers of Math (NCTM), number sense refers to a learner's general conceptual understanding of number and operations, along with the ability to apply this concept in flexible ways. Number sense skills encompass the foundation for the mathematics curriculum. Learners who develop number sense are able to make mathematical decisions and to develop useful strategies for solving complex problems. The skill set includes: foundational understanding of mathematical operations, effortless application of procedures, and automatic access to number meanings that together support effective and efficient problem solving. The Final Report of the National Mathematics Advisory Panel (NMAP), published in March 2008, stresses the importance of building these foundation skills because of the direct influence on learning for more advanced mathematics.

Further, the report stated: "Understanding core concepts is a necessary component of proficiency with arithmetic and is needed to transfer previously learned procedures to solve new problems. U.S. students' poor knowledge of core arithmetical concepts impedes learning of algebra and is an unacceptable indication of a substantive gap in the mathematics curricula that must be addressed. This is a serious problem, because poor number sense interferes with learning algorithms and number facts and prevents use of strategies to verify if solutions to problems are reasonable." (p. 26)

Researchers have recommended that building number sense skills increases the foundation for a person's general understanding of number and operations along with the ability to use this understanding in flexible ways to make mathematical judgments and to develop useful strategies for solving complex problems (Burton, 1993; Reys, 1991). Both NMAP and NCTM recommended that major goals for K–2 mathematics education be guiding learners to:

understand numbers, ways of representing numbers, relationships among numbers, and number systems; understand meanings of operations and how they relate to one another; compute fluently and make reasonable estimates. (NMAP 2008).

There are a number of reasons learners struggle with developing number sense. Direct teaching may lack continuity or strategic instruction may move too quickly and not provide some learners with enough practice to develop competency in one skill before moving to the next. The direct instruction of procedures without enough attention to the concepts provides learners with little foundation in the meaning behind the conceptual understanding. Difficulty with the language of math or ability to read can also hamper performance of students who are English Language Learners, experience language delay or have a learning disability. Some learners experience difficulties that are more specific, such as an inability to physically manipulate objects used to develop conceptual understanding or an inability to access standard tools used in math. Others may have memory or attention deficits that impact the development of automatic recall.

Gersten and Chard (2001) found that “We demonstrate how the number sense concept can inform and significantly enhance the quality of mathematics interventions for students with learning disabilities, just as the concept of phonemic awareness has informed the field of reading.” (p. 1). Although the body of research on effective instructional methods in math is not as extensive as in reading research, some strategies are well documented, especially for teaching students who struggle in developing math number sense. (Gersten and Chard, 2001).

Encouraging students to verbalize their current understandings and providing feedback to the student increases learning. Even non-speaking learners require this opportunity to apply language in the mathematical learning process. Even if learners are not automatic with basic facts recall, they still should be engaged in practice activities that encourage the development of number sense and math reasoning. Many learners show systematic error patterns that reveal limited conceptual understanding of the algorithms and strategies taught to them. Educators could examine all responses during skills practice in order to determine whether error patterns exist.

Not all students learn alike. Based on this understanding, differentiated instruction applies a method to teaching and learning such that learners can have multiple options for interacting with information and making sense of ideas. “Differentiated Instruction is a teaching theory based on the premise that instructional approaches should vary and be adapted in relation to individual and diverse students in classrooms.” (Hall, 2002, p. 3). In addition to the importance of strategic and systematic instruction, such variables as comfort with mathematical language ability can have direct impact on achievement.

Recently published research (Effectiveness of Reading and Math Software Products; U.S. DOE, NCEE 2009-4041, February 2009) examined the impact of using software designed with a focus on curriculum. However, the software selected was not designed for adaptive access or specifically for differentiated instruction. This targeted research effort was intended to analyze: 1) whether the software activities can be used to bring students with a range of abilities and disabilities up to grade level; and 2) whether the scaffolds for differentiated instruction that are built into the design of the software can be engaged to successfully include learners with challenges in a standard curriculum activity.

In 1999 Babbit identified the ten most effective features for the design and selection of effective math software. Some of these features include: less clutter on the screen; curriculum practice that matches direct instruction; adjustable small incremental levels; helpful or meaningful feedback; limited the number of wrong answers for a single problem; detailed record keeping capabilities; and built-in instructional aids. Teachers should be able to turn on or off prompting, graphical support, help buttons or other tools, as a learner's needs demand. Teachers need to be able to change difficulty levels in increments to match progress and view reports to see learner progress over time. Meaningful feedback for a learner should help build conceptual understanding. Virtual manipulative tools such as counters, number lines, base ten blocks, hundreds charts, or fraction strips should be options without penalty.

The effective teaching technique to provide clues to the correct answer should be modeled within the practice software environment. There should be a limited number of attempts to answer a question. If a learner makes an error, the software should give clues to the correct answer, provide the correct answer, and then introduce a similar item again at a later time. This gives the learner an opportunity to generalize the content, apply new concepts in a different manner and provides a model for building future problem solving strategies. We believe *Stages Math: Number Sense* software offers these features. The NMAP also noted that "research on the application of instructional software has generally shown positive effects on students' achievement in mathematics" as compared with instruction that does not incorporate instructional software. Studies show that the use of software programs can support the development of concepts, development of automaticity of basic facts, application of skills and problem solving. (NMAP 2008).

This project investigated the use of a computer software program to provide skills practice in number sense for elementary students. The software was selected because it linked differentiated instruction and skills practice with procedural understanding through the use of electronic scaffolding with systematic corrective feedback in a universally designed environment. The questions being evaluated were: 1) Will the use of accessible instructional software allow all students to experience an increase in their conceptual and procedural knowledge of number sense? and 2) Will the use of electronic scaffolds for differentiated instruction, options for settings designed around principles of universal design for learning, and implemented with teacher professional development, allow all students to experience an increase in their conceptual and procedural knowledge of number sense?

Methods

Participants

Participants from kindergarten, first and second grades of a suburban elementary school formed the convenience, purposive sample for this study. None of the participants had any previously documented learning challenges. Their inclusion in the study was voluntary and was determined initially through discussions with their teachers (i.e., the teachers identified a number of potential participants who demonstrated some evidence of deficit in the area of number sense). These

students were then administered KeyMath3™ Diagnostic Assessment (Pearson Education, Inc.) to formally document such a deficit.

Procedures

Upon receiving approval from the Institutional Review Board, the research team met with the teachers of a suburban elementary school to select volunteers for the study. One teacher from a kindergarten, first and second grade was selected. These teachers attended a workshop to learn about the software then identified a number of students in need of additional instruction in the area of number sense.

The parents of teacher-identified students were sent consent forms, which were signed and returned. Participants were then pre-tested using the KeyMath3™ Diagnostic Assessment (Pearson Education, Inc.) to verify the teachers' verbal reports. Only the individual sub-tests of the KeyMath3™ Diagnostic Assessment that matched up with the eight content areas identified by the *Stages Math: Number Sense* software were assessed. As a result of these procedures participants from kindergarten, first and second grades formed the convenience/purposive sample for this study.

Data capture (skills practice) sessions occurred either in the student's classroom or in a resource room. Session duration was approximately 10 minutes and they were conducted daily in one-to-one or one-to-two groups. Students interacted with the software activities using an IntelliKeys, a touch screen or mouse input, depending on their need or preference.

A researcher was always present to monitor sessions. Although she interacted frequently with the students (e.g., chatting prior to and after the session, helping students navigate the software, pointing out the various scaffolds that could be used, praising on-task behavior, etc.) she never provided any additional instruction beyond the software strategies. It must be noted that students were still receiving typical instruction with the rest of their class.

A list of potential scaffolds and Universal Design settings that students, researchers or teachers could employ appears in Table 1.

Table 1. Universal Design and Differentiated Instruction Features and Scaffolds

Universal Design Feature	Description of Feature	Differentiation Scaffolds by Activity	Description of Scaffold
Question Setup	Set number of questions	Words for Numbers	Hide or show target number (student both sees and/or hears the number to make)
Speak Question	Most help – auto speak and use listen button	Counting	Enable auditory click counting cues (change visual task to multi-sensory task)
	Less help – use listen button		Show Help Button counting over 21
	Never speak – hide listen button	Sequence	Show cardinal number below objects
Accessibility	Periodically repeat	Math Facts	Show or hide support graphics as an option in all operations
	Keyboard and Mouse	Math Facts	Use Times Table Show or hide support graphics as an option in all operations
	TouchWindow IntelliKeys	Money	Use Times Table Click money to hear its value
	Scanning: Automatic	Money	Include “How Much Do I Have So Far” button Click money to hear its value
Feedback	Scanning: Two Switch		Include “How Much Do I Have So Far” button
	Scanning: Auditory Animated Reward Options Custom Text-to-Speech for Correct Responses Custom Text-to-Speech for Incorrect Responses		

Results and Discussion

The results of this study answered the two experimental questions in the affirmative. First, the instructional software allowed the majority of students to acquire conceptual and procedural number sense knowledge that they previously did not possess. Second, the use of electronic scaffolds for differentiated instruction allowed the majority of students to increase in their conceptual and procedural number sense knowledge that they previously did not possess. The effectiveness of *Stages Math: Number Sense* software was demonstrated in a number of ways:

- First, the majority of students acquired number sense skills that they did not possess;
- Second, this was done within a relatively short period of time, in terms of the total instructional sessions for each student as well as the daily duration of sessions;
- Third, differentiation was fluid and allowed for researchers to quickly alter the instructional protocol based on student responding;
- Fourth, students acquired functional computer input skills as the result of using the *Stages Math: Number Sense* software. Each of these outcomes will be discussed.

Acquisition of Number Sense Skills

Individual student results were analyzed using a single subject A-B-C design (changing conditions design, Barlow and Hersen, 1984). In this design the initial condition served as a baseline that allowed the experimenter to make subsequent changes based on those initial data. Because the experimental adjustments in the settings were individualized, based on student performance using the software, some experienced a few instructional phases, others many.

Sample student results appear in Figures 1-3. Each graph's title, at the top center, identifies the student and the terminal mathematical task. Each datum point represents each student's percent correct performance (labeled along the ordinate) for a particular date (labeled along the abscissa). Instructional changes are noted along the top of each graph and separated by a dashed line.

The first datum point in each graph, represented by an open diamond, reports the student responding to a training/orientation session. During this session the researcher provided extensive assistance to the student to ensure that he/she was proficient with using all aspects of the software. This included modeling what would happen during both correct and incorrect responses and how to listen purposely to meaningful feedback for incorrect responses. Thus, this datum point should not be considered when evaluating student skill acquisition.

Figure 1 reports Kenny's data regarding the efficacy of using *Stages Math: Number Sense* software on his acquisition of sequencing numbers. Accurate sequencing was initially established and then progression was conducted by adjusting the software based on his responses. For example, Kenny was successful on the initial 0-10 sequencing during the Training Session so the next session increased the number range to 15. Because his accuracy decreased slightly the software was adjusted to return to 1-10 sequencing, establishing accurate responding before moving to 0-15. For the remainder of the study Kenny was exposed to eight sessions of sequencing, with a range of 1-15 and eight sessions of sequencing, with a range of 1-20. His accuracy during the 1-15 range, rarely below 80%, was substantially better than his accuracy during the 1-20 range, rarely above 80%. These data would identify for a classroom teacher

where Kenny was proficient (sequencing numbers between 1 and 15) and where he was experiencing difficulty (sequencing numbers between 1 and 20), thus allowing for more focused academic instruction.

Figure 2 reports Kathy's data (first grade student) regarding practice of subtraction skills using the *Stages Math: Number Sense* software. Initially, Kathy was unable to perform this task with any reliability (her accuracy during the first three sessions ranged from 40% to 80%). Across the next 10 sessions Kathy's accuracy gradually and steadily improved to 100% (4/2/10). Her performance then stabilized around the 70% - 80% accuracy range for the last nine sessions, with the exception of 4/15/10, during which she scored 40%. Data collection indicated that a number line scaffold, used in sessions prior to 4/15/10 was turned off during that session. However, when it was re-instated for the final session Kathy's accuracy increased substantially. It is unclear if Kathy did not have subtraction skills prior to the study or if this skill was only marginally within her academic repertoire. Regardless, the software provided valuable and preferred practice opportunities for Kathy that resulted in a steadily increasing accuracy. This activity could provide a valuable instructional adjunct to classroom teachers: a means to practice and reinforce math skills customized for students as learning needs indicate.

Figure 3 reports Irving's data (second grade student) regarding the practice of subtraction skills via the *Stages Math: Number Sense* software. Skills practice occurred on a strict alternating basis: a single digit minus single digit phase (represented by filled squares), followed by a mixed single and double digit minus single and double digit phase (represented by filled diamonds). This sequence then repeated itself for two more alterations. Irving was highly accurate during the three single digits minus single digit phases (represented by the closed squares), although the final phase (4/2/10) saw a slight decrease in accuracy (72%) as compared with the preceding single digit minus single digit phases (e.g., 87% accuracy or better). His initial responding to mixed single and double digit minus single and double-digit subtraction phase (closed diamonds) was quite good. However, during the second and third mixed single and double digit minus single and double digit phase Irving experienced some difficulty, of an unknown origin. Across both of the final two mixed single and double-digit phases Irving did evidence an increasing trend in his accurate responding, with the final three sessions at 85% or better accuracy.

An analysis of his errors proved interesting. Irving made a total of 56 errors across the 24 sessions of the study (excluding the initial Training Session). Of these, 46 occurred during problems with double-digit numbers (82% of errors). As with Kenny, these data could potentially provide valuable diagnostic information to classroom teachers.

The pre/post assessment data were mixed: some participants showed an improvement in their number skills, according to the Key Math, while others showed no change. It is interesting that the youngest students failed to demonstrate improvement during retesting of the Key Math whereas the oldest did show improved number skills performance. The parsimonious explanation was that the *Stages Math: Number Sense* software did not produce changes that were sufficient to be measured by standardized testing. However, this explanation is inconsistent with the individual student data that documented improved performance throughout. Although it is unclear why some participants showed improvement on the Key Math and others did not, perhaps the lack of improvement across all participants has to do with maturation, development

or the acquisition of related academic skills. Another possibility may be that the Key Math is simply insensitive to positive and measurable changes evoked by the *Stages Math: Number Sense* software within the short duration of this study.

Duration of Instruction

Another benefit of the *Stages Math: Number Sense* software was that it required little time to implement. Table 2 reports the number of sessions, average accuracy per session, average number of questions and the average duration of sessions for each participant. The first two columns report total sessions and the average percent accuracy for each participant. Note the variability in the number of sessions for each participant (mean = 14.5; Sd=4.12). Given the highly accurate performances of most students (second column) the adjustment of the number sessions allowed for instruction to be tailored to the needs and learning styles of each student without sacrificing instructional integrity. Further, these results were achieved while session times were uniformly short across all participants (mean = 6.1 minutes; Sd = 1 minute). Thus, the use of the *Stages Math: Number Sense* software appeared to produce good results without interfering with other class-wide instructional activities (i.e., as a rule students spent six minutes of a six hour school day engaged with the software).

Table 2. The number of sessions, average accuracy per session, average number of questions and the average duration of sessions for each participant

	Grade	Total Sessions	Average Per Cent Correct/Session	Average Number of Questions/Sessions	Average Duration of Session (Minutes)
Alice	K	20	81.05	8.95	6.08
Jonathan	K	9	83.33	11.78	5.98
Robbie	K	20	83.65	8.75	5.17
Kenny	K	17	87.76	10	5.8
Irving	1	16	82.44	13.69	5.8
Kathy	1	11	66.45	12.72	6.07
Larry	2	9	92.11	13.56	8.46

Fluidity of Instruction and Differentiation

As noted in the previously discussed Acquisition of Number Sense Skills Section, the number of sessions each student spent engaged with a specific skill as well as the alteration the skill or the challenging nature of that skill based on student responses, was a key instructional component.

Some students required little or few program adjustments or changes in the settings. Other students required frequent and diverse adjustments. On average each student experienced 6.3 settings changes. The fact that such adjustments, based on student responses (correct or incorrect) could be made almost immediately, with little or no interferences with other, equally important academic activities, enhanced the successful experience of the students.

Computer Input Skills

All students were evaluated for need of alternate input device. Options included: IntelliKeys alternate keyboard, touch window or mouse. As the study progressed, all students became comfortable and fluent in mouse use to navigate the various pages of the *Stages Math: Number Sense* software. Although some students started out using a touch screen all eventually learned to use the mouse as the preferred input device. This simple skill acquisition may make other, more sophisticated computer skills easier to acquire.

At the conclusion of the study, researchers were asked to complete a Feature Monitoring Checklist that specified the settings and adjustments used for each participant. The results of this survey indicated that the researchers ranked the value of each of the Universal Design features and the ease of using each of the Differentiated Instructional Scaffolds at 100%.

Outcomes and Benefits

The results of this study documented that the use of instructional software, including the electronic scaffolds, resulted in the acquisition of conceptual and procedural number sense knowledge in elementary students. Additionally this acquisition was accomplished within a relatively short period of time, as measured in the number of instructional sessions as well as the duration of each session. Finally, the differentiation settings were fluid and allowed for researchers to quickly alter the instructional protocol based on student responding. Although the instructional value of the *Stages Math: Number Sense* software was well documented in this study, the findings were also suggestive of other benefits. For example, the data suggested an efficacious methodology for students to practice and generalize their mathematical skills.

The findings also indicated that the *Stages Math: Number Sense* software might be used in a diagnostic capability. For example, for at least two students, Irving and Kathy, the software identified the source of errors (Irving). By identifying the individual specific reason why one is experiencing difficulty the software may direct strategic instruction to make it more effective. In addition, student's reactions to study participation cannot be ignored. Students enjoyed the visual and auditory feedback when they provided a correct response. The flexibility of feedback options including the option to input a student's name and customize the auditory feedback is believed to be unique to the *Stages Math: Number Sense* software.

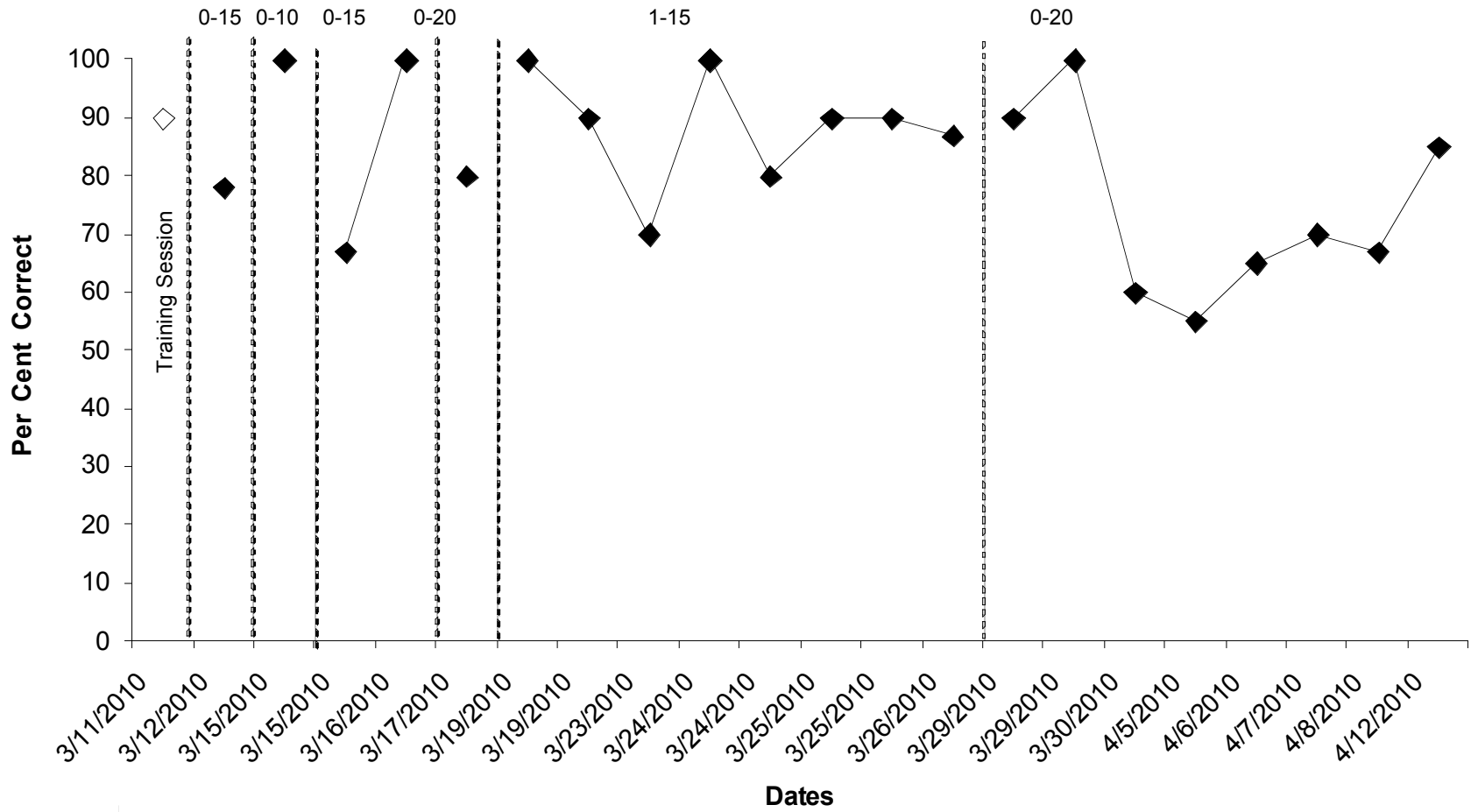
The current investigation should be viewed as a pilot study. Despite the positive outcomes the study did suffer from some limitations. First, the absence of a standardized and measurable pre-

post test limits the generality of the findings. In the future, a standardized test should be used that is sensitive to differentiation options available in *Stages Math: Number Sense* software. Second, future studies should look at math skills that participants clearly do not possess, as measured by a baseline (pre-treatment) phase. This, in conjunction with a sensitive standardized assessment, would go a long way toward demonstrating reliability and validity of the findings. Also, assessment of older elementary students using additional number sense activities that are part of *Stages Math: Number Sense* software is warranted. Finally, further study is needed including students with identified learning disabilities and students with more intensive needs.

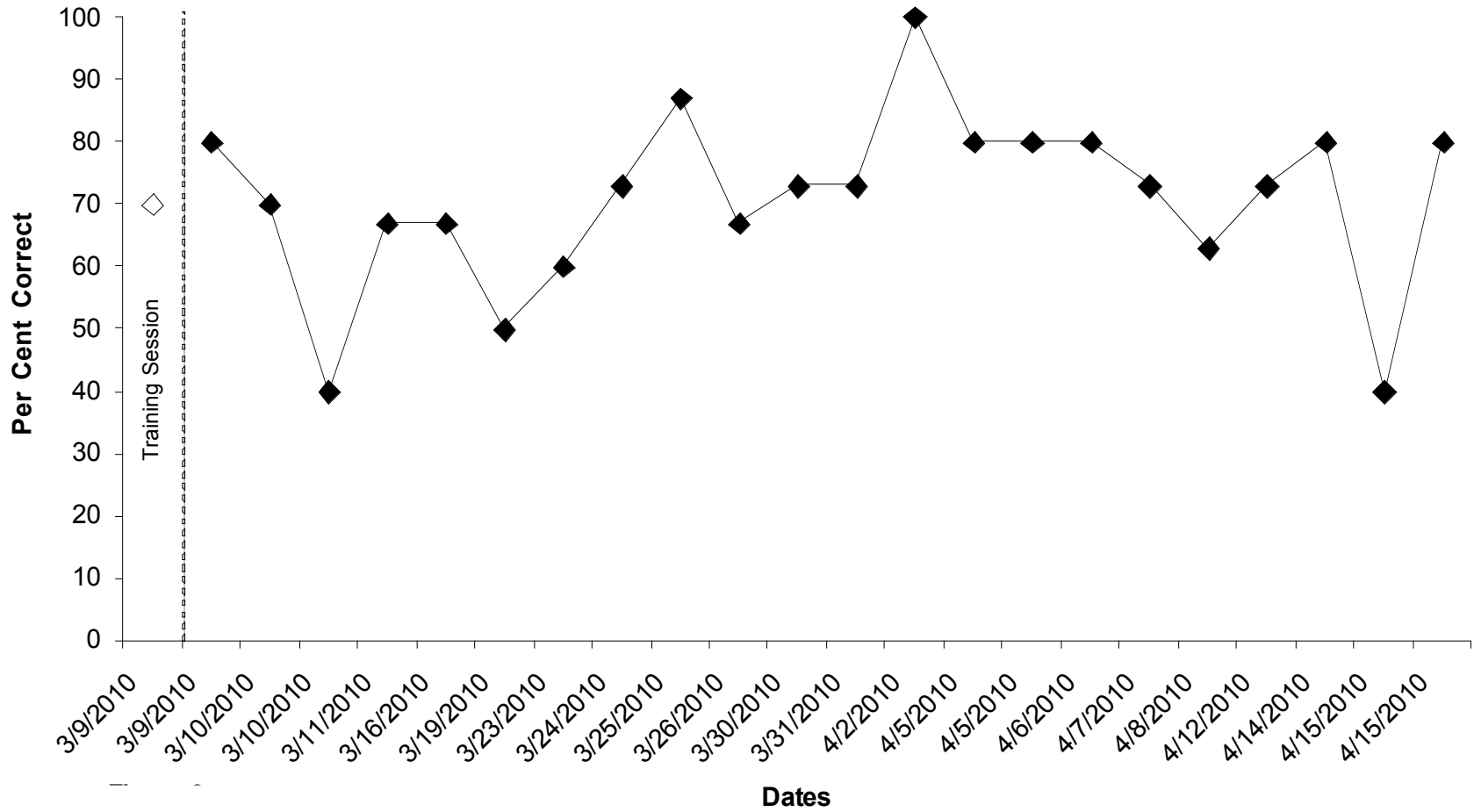
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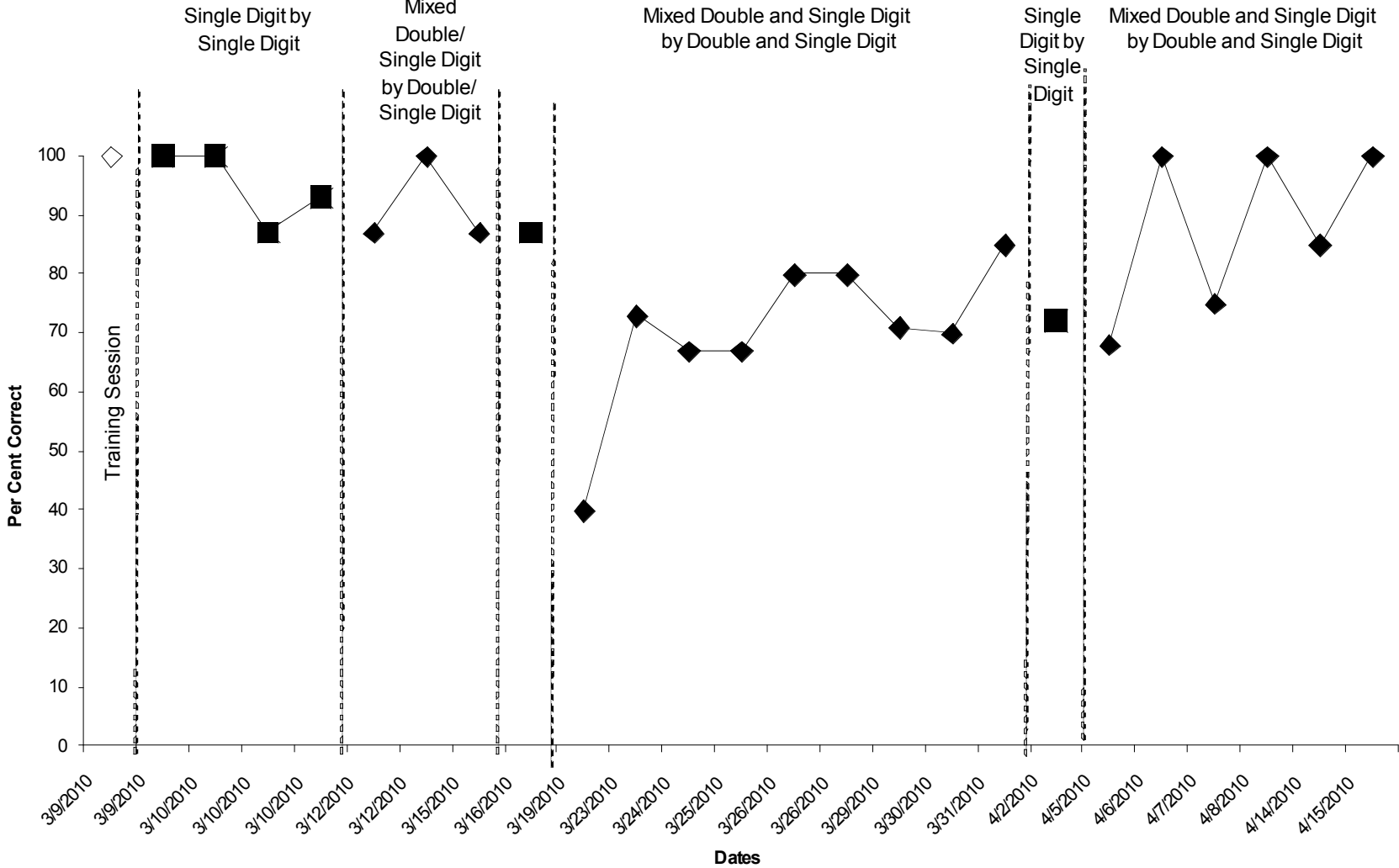
Kenny: Sequencing



Kathy: Single Digit by Single Digit subtraction



Irving: Subtraction



Appendix A: Software Screen Shots
Illustrating Universal Design and
Differentiated Instructional Features and Settings

Universal Design Features

Question Setup, Speak Question and Number line Settings

The screenshot shows a settings interface with a blue header bar containing five tabs: "Question Setup", "Access Method", "Feedback", "Highlight", and "Voice". The "Question Setup" tab is active. Below the tabs, the interface is divided into three colored sections: light blue, yellow, and light green.

Question Setup Section (Light Blue):
Title: "Choose the number of questions, tries, and spoken support."
Number of questions: 5 10 15 20 100 Other:
You can stop after any question.
Maximum tries allowed: 1 (test mode) 3 (practice mode)

Speak question Section (Yellow):
Title: "Speak question:"
 Most help: when the problem is displayed, the answer is incorrect, or the Listen button is selected
 Less help: only when Listen button is selected
 Never speak (hide the Listen button) -- Good reading practice!
 Periodically...repeat it every: 5 seconds 10 seconds Other number of seconds:

Number line Section (Light Green):
Title: "Choose the number line you wish to use (starting at 0 or 1):"
 0 1 2 3 4 5 6 7 8 9
 1 2 3 4 5 6 7 8 9 0

Exit to Activities button

Accessibility Settings

Customize for Adaptive Access Devices and Accessibility Settings

Question Setup **Access Method** **Feedback** **Highlight** **Voice**

Select an access method to create or change settings.

Mouse and Keyboard
Including standard IntelliKeys overlays

Touchscreen

Auto Scan
switch

Step Scan keyboard,
IntelliKeys, 2 switches

Pointer
with dwell

Press the switch to start scanning. During scanning, press the switch again to select the highlighted object. To pause scanning, press <Esc> or wait for scanning to stop after several cycles. When scanning is paused, you can use the mouse to exit the activity. Press the switch or click the mouse button to resume scanning.

Choose a Scan Rate, the duration each object is highlighted.

The switch is connected to IntelliKeys or the learner is using IntelliKeys as a switch.

Slow (3 seconds) **Other number of seconds (from .5 to 10):**

Medium (2 seconds)

Fast (1 second)

Use auditory scanning
Targets speak their names when highlighted; useful for learners with visual impairments. Set the scan rate to a slow speed.

[Click here to resend Switch overlay after using IntelliKeys overlay.](#)

Test Area
(Try out preference settings.)

Exit to Activities

Feedback Settings

Customize for Student Personalization and Unique Prompting



Question Setup **Access Method** **Feedback** **Highlight** **Voice**

Choose feedback for correct and incorrect responses.

Choose reward type: spoken (customize below) recorded speech no speech reward




include animated reward




An animated reward (selected at random from a set of 5 rewards of each type) appears when the learner selects the correct answer. Choose the type of reward that is appropriate for the learner.




Child Teen/Adult

Choose spoken rewards: Enter text for spoken rewards. You may wish to use the learner's name. Click the 'Listen' button to check for correct pronunciation, and edit spelling as necessary.

Choose incorrect answer feedback: Select text to be spoken when the learner answers incorrectly. Unchecked boxes will not be picked. If no boxes are checked, the phrase "Look again" will be used.

Exit to Activities

Differentiation Scaffolds by Activity

Words for Numbers

Hide or show target number (student both sees and/or hears the number to make)

Words for Numbers

Select the activity and the number range you wish to include.

Find the Number

The learner is shown 3 numbers within a range and asked to find a specific one. The question shows the target number spelled out.

Write the Number

The learner sees a number written out and is asked to type the number.

require a comma when typing numbers > 999

Make the Same Number

The learner is asked to make a number using place value buttons.

Include this range of numbers:

up to 999

up to 9,999

up to 99,999


up to 999,999


up to 9,999,999


hide the target number
(click the upper Listen button to repeat the target number)

Enter the number range to use for
Find the Number or Write the Number:

smallest	largest (to 9999)
<input type="text" value="1"/>	<input type="text" value="100"/>

 Exit This Activity



Start 

Counting

Enable auditory click counting cues (change visual task to multi-sensory task)

Show Help Button when counting over 21

Count

Please select the activity and settings you wish to use.

Count to 100

Show Me Counting

Smallest number to count (from 1):

Largest number to count (to 100):

Enable clicking the background for auditory counting cues

When counting to 20 or less:

Include these types pictures of objects of objects: plain shapes

present identical objects in each question

When counting to 21 or more:

show Help button (report will indicate if learner uses it)

Count Place Values


Show Me Place Values

Include these place values: hundreds, tens, ones
 tens, ones
 ones


For both activities:
Smallest number to count (from 1):

For Count Place Values:
Largest number to count to (to 699):

For Show Me Place Values:
Largest number to count out (to 999):

 Exit This Activity

[Change Settings](#)

Start 

Sequence

Show cardinal number below objects

Sequence

Choose the activity and content you wish to include.

What Comes Next?

The learner identifies the number that comes next in a series.

count by 1s
 count by 2s
 count by 5s
 count by 10s

count up
 count down

Smallest number (from 0):

Largest number (to 999):

Ordinals

The learner identifies an object based on its ordinal position.

Lowest ordinal (from 1):
Enter 1 for first, etc.

Highest ordinal (up to 10):
Enter 10 for tenth, etc.

Show cardinal numbers below objects


Put Them in Order


The learner puts numbers in order.


Sequence by:
 1s 2s 3s
 4s 5s 10s
 use random numbers

Sequence from:
 low to high high to low

Set number range:
Smallest starting number (from 0):
Highest ending number (to 999):
How many items to sequence (2 to 10):

 Exit This Activity



 Start

Math Facts

Show or hide support graphics as an option in all operations

Use Times Table

Math Facts Setup: Multiply

Largest number (up to 10):

Largest product (answer):

Use random numbers within the range
(2 x 3, 7 x 4, 6 x 5, etc.)

Use same multiplier in each problem
(same fact family: 2 x 3, 2 x 4, 2 x 5, etc.)

Multiplier to use:



Include zero (0)? Yes No

Make times table available? Yes No

Question layout: $\begin{array}{r} 4 \\ \times 2 \\ \hline \end{array}$ 4 x 2
 4 x ___ = 8

Hide support graphics.

Graphics to help the learner solve the problem are available for products up to 81. If you do not wish to include graphics with the problems, check the box to hide support graphics.

 Back Start 

[Show sample problem](#)

Money

Click money to hear its value

Include "How Much Do I Have So Far" button

Money

Choose the activity and content you wish to include.

Count Money

Make this Amount
 Include 'How much so far?' button


Include these coins and bills:

<input checked="" type="checkbox"/> penny	<input checked="" type="checkbox"/> nickel	<input checked="" type="checkbox"/> dime	<input checked="" type="checkbox"/> quarter
<input type="checkbox"/> \$1.00	<input type="checkbox"/> \$5.00	<input type="checkbox"/> \$10.00	<input type="checkbox"/> \$20.00

Most number of coins/bills for learner to use (up to 9):

Highest amount of money to practice: \$

Click money to hear its value.

 Exit This Activity

[Change Settings](#)

Start 