Use of Computer Software to Teach Fractions

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We will be exploring the effectiveness of using precision teaching methodologies to teach neuro-typical clients how to reduce fractions. These clients are preparing for state assessments, to include the MCAS, and Regents. Pre-instruction is delivered through a short video clip and students work to a pre-determined level of fluency, with rate correct and rate incorrect. Feedback is delivered on both correct and incorrect answers. Data is plotted on a standard celeration chart. All work is completed on the computer, using a proprietary program, Math Facts. Baseline data shows that no clients are able to complete twenty problems within one minute and also that no clients are able to achieve 100% accuracy. We will be looking at the effectiveness of the video instruction and generalization of the skills from the computer to pencil and paper, to include achievement on state assessments.

Method

Participants and Setting

There were two participants in this study. The first participant (J.J.) was 18.9 years old, in eleventh grade, with an IQ of 110. He was preparing to take the Regents exam. The second participant (N.C.) was 15.10 years old, in the ninth grade, with an IQ of 89. He was also working towards taking the Regents exam. Both clients lived in one of JRC's group homes.

Both participants were in a classroom, with same aged peers from 9-3, Monday through Friday. They were in different classrooms, with different teachers. Academic instruction was delivered in a variety of ways, to include through use of a smart board, group lessons, 1-1 instruction, textbook work, working with the classroom teacher, working with the subject area tutor and on the computer.

Measures and Instruction

Participants completed lessons on reducing fractions, using the Math Facts software, which was developed at JRC. Material is broken down into small, manageable steps. Participants were able to watch a short video clip of the math teacher teaching the concept of what they were about to complete a timing in. This is shown in Exhibit one. Participants then completed a timing on the computer. There were many different settings that could be adjusted to meet the participants' needs. This included things like length of the timing, visual cues, audio cues and error correction. Exhibit two shows what a participant might see on their screen when they are completing a timing. Lessons are worked on until the participant meets a pre-set aim. They are then automatically moved to the next lesson. All data is plotted automatically on a standard celeration chart, in

real time. This data can be viewed from anywhere in the school, allowing any education staff to monitor progress.

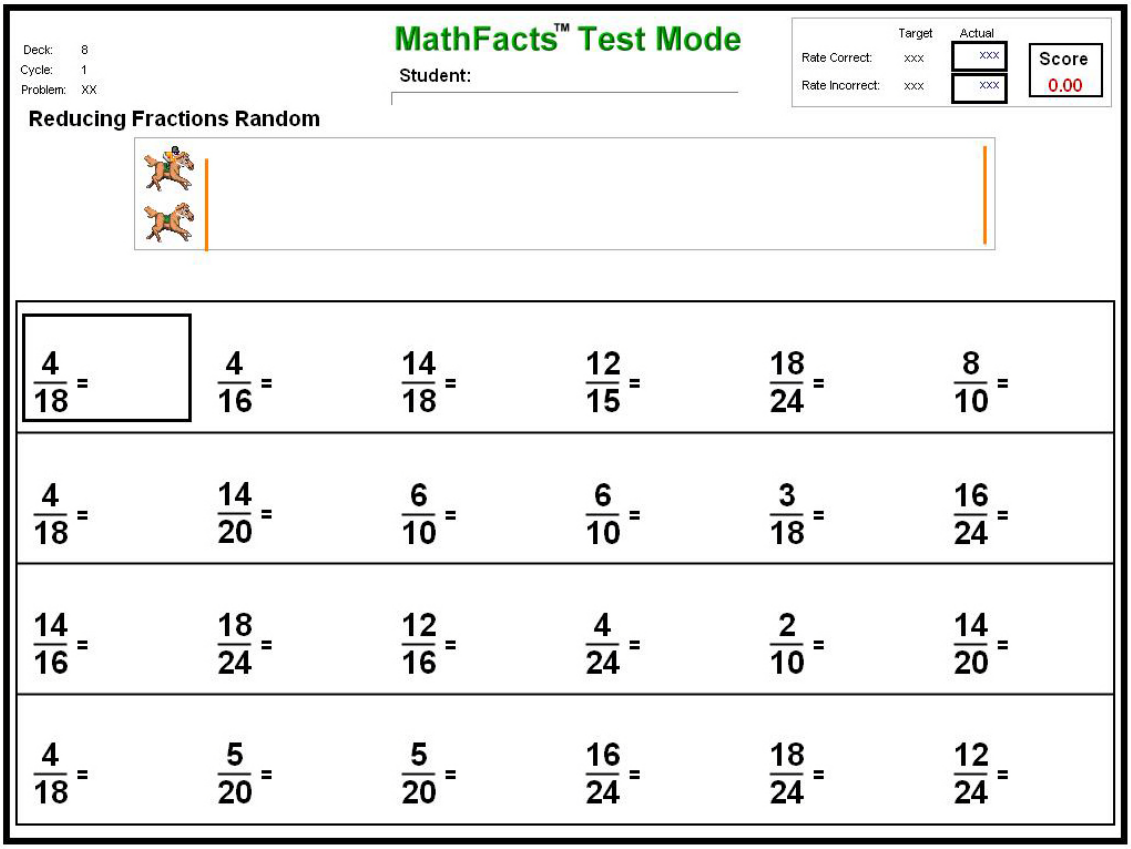

Exhibit 1

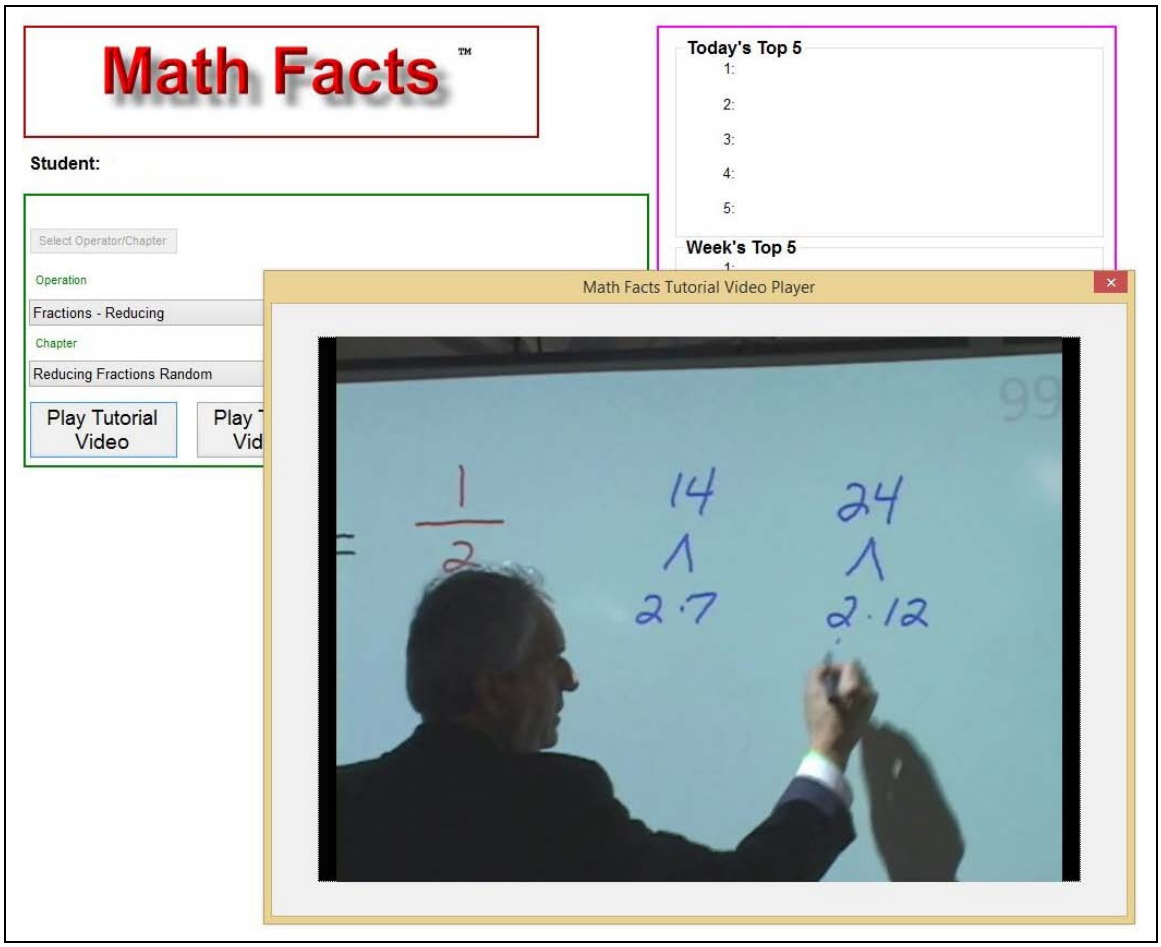

Exhibit 2

Results

Both participants completed all lessons in the Reducing Fractions unit. Both participants showed improvement from their baseline timing. This is shown in Exhibits three and four. When given a timing comprised of random reducing fractions problems, Participant J.J was able to complete eleven questions correctly and three incorrectly in ninety seconds. After working through all the chapters to mastery, J.J was able to completing sixteen correctly and three incorrectly in sixty seconds in the same random reducing fractions problems. He was also able to reduce fractions at an average of forty-one questions correctly in sixty seconds, with zero incorrect, when completing a paper test on reducing fractions. When given a timing comprised of random reducing fractions problems, Participant N.C. was able to complete ten questions correctly and four incorrectly in ninety seconds. After working through all the chapters to mastery, N.C. was able to completing twenty correctly and eight incorrectly in sixty seconds in the same random reducing fractions problems. He was also able to reduce fractions at an average of thirty-one questions correctly in sixty seconds, with zero incorrect, when completing a paper test on reducing fractions. It is important to note that N.C. was in an alternate learning environment for several

weeks, as is noted in Exhibit four. While in the alternate learning environment, N.C. did not have access to a computer or this software.

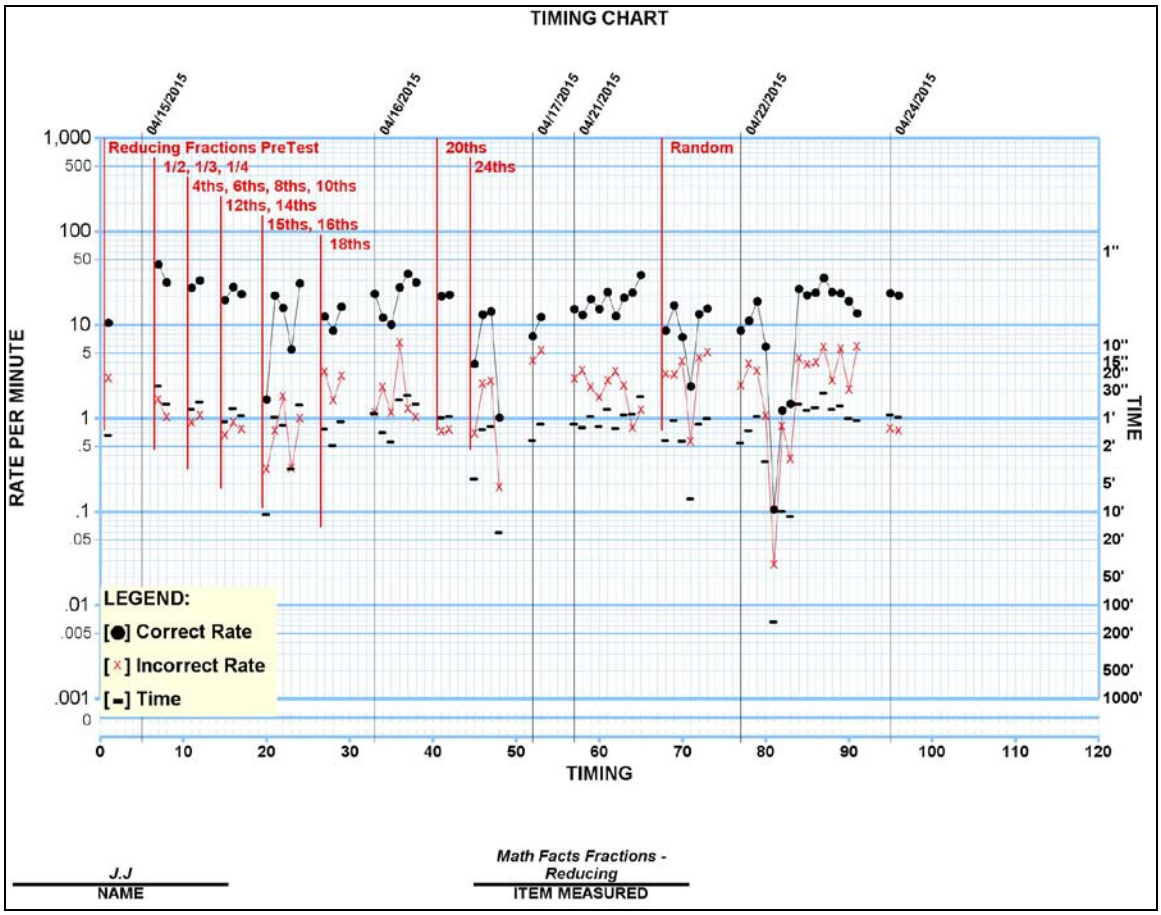

Exhibit 3

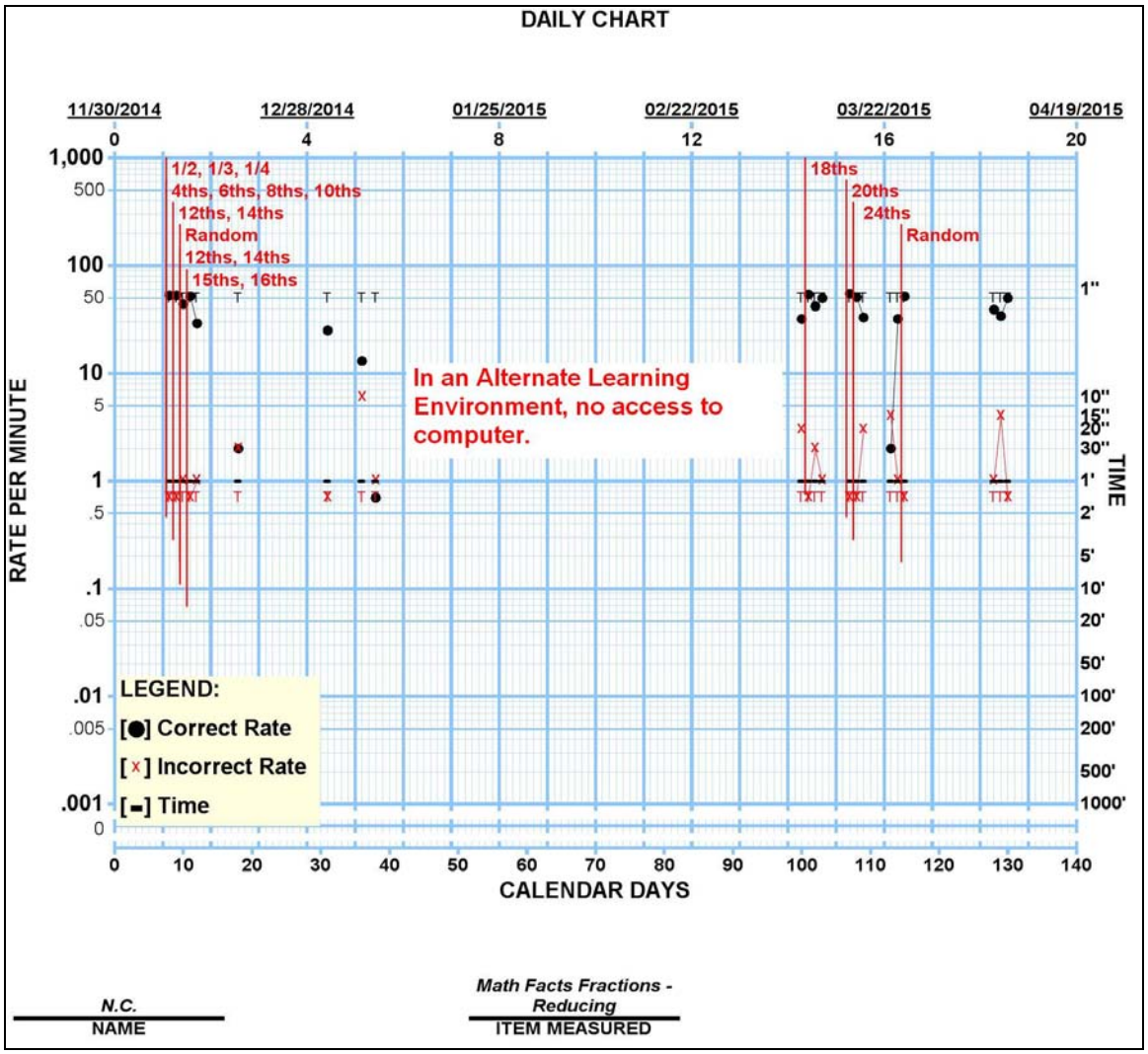

Exhibit 4

Discussion

This has shown to be an effective way of teaching reduction of fractions, for the two participants. Further work will be done with a larger group of participants. More lessons will be created that cover decimals and percents. As participants go through these lessons, we would like to examine if there is an effect on their state assessments scores or the participants self-reported ease of the exam. Many of the clients we work with are lacking in basic tool skills in mathematics. Our hope is that by building these tool skills, they will achieve greater success on state exams.