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Developing Money Concepts with a Special Needs Student

Estella P. De Los Santos (Corresponding author)
Professor, School of Education, University of Houston-Victoria
Victoria, TX, United States of America
delossantose@uhv.edu

Abstract

The student for the case study was a tenth-grade student at a public high school, grades 9-12, in South Texas. In preparation for creating a successful transition from high school to the workforce, the researcher in consultation with the parent, decided to work with the student on money concepts. The researcher has previously worked with the student since elementary school years (1st to 5th grade), through middle school (6th to 8th grades), onto the current high school years (9th to 12th grades) [1], [2], [3], [4], [5], [6].

Keywords: autism, learning disabilities, money concepts

1. Introduction

The student was in the tenth grade at a public school in South Texas and this action research was conducted during the school year, September through May. The student was in a special education classroom at a secondary school for grades 9-12. She received her academic instruction in the special education classroom and went to other classrooms for electives such as art and physical education. The student was diagnosed with mild learning disabilities in the elementary years and with autism during the middle school years. The student was performing at middle school grade levels in reading, writing and mathematics.

The parent was interested in placing the student in a transition program from high school to the workforce. The student was employed at a local café and had to work at the cash register on occasion. The student had a checking account with a debit card, so counting money to make a purchase was not as important for the student's needs as counting exact change for customers at a job site. There are cash registers at job sites, which inform the student as to how much change should be given to a customer. Therefore, counting exact amounts of money became the priority for this study.

2. Literature Review

The National Council of Teachers of Mathematics (NCTM) has set the following measurement standard for instructional programs from grades prekindergarten through 12, "understand measurable attributes of objects (e.g., time and money) and the units, systems, and processes of measurement; apply appropriate techniques tools, and formulas to determine measurements" [7]. The NCTM advocates that, "measurement is important in the mathematics curriculum from prekindergarten through high school because of the practicality and pervasiveness of measurement in so many aspects of everyday life" [7]. The Common Core State

Standards for Mathematics CCSS.MATH.CONTENT.2.MD.C.8 standard is, "Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?" [8].

2.1. Rationale

Money concepts are important concepts because of their application and use in everyday life. The student entered a transition program from public schools to the workforce. There was a need for the student to be able to count money to be successful at the job site. The purpose of this study was to assess the student's understanding of money concepts, create an individualized plan and implement the plan. Pre-tests and posttests were utilized to measure learning progress.

2.2. Cash vs. Credit Card

The use of cash has gradually decreased, while the use of credit cards has increased. The following are 19 cash vs. credit card spending statistics of 2020 [9]:

1. 80% prefer card payments over cash.
2. 76% of consumers have at least one credit card.
3. Only 10% of consumers make all of their purchases with cash.
4. But 88% of consumers use cash at least sometimes.
5. The average cash transaction is $22.
6. The average non-cash transaction is $112.
7. The average credit card user has 4 credit cards.
8. There are 459,000,000 credit cards in circulation.
9. Debit cards account for 67% of card payments.
10. 90% of households use more than one payment method.
11. The average consumer uses 3.6 different payment methods each month.
12. 45% of consumers prefer stored card information for online transactions.
13. There is $784 billion in outstanding credit card balances.
14. 45% of credit card holders pay off their spending each month.
15. 51% of card users said high interest rates were the most significant drawback of credit card use.
16. 38% of credit card users cite the inconvenience of carrying cash as their main reason for card use.
17. 41% of credit card users have retail and store-specific credit cards—the most common types of credit cards.
18. ATM withdrawals are declining in number but increasing in value.
19. Card payments are increasing in number and in value.

Although 80% of consumers preferred card payments over cash and the use of cash has decreased with only 10% of consumers making all purchases with cash, 88% of consumers use cash some of the time. Since cash purchases are still being used at the current time, it was deemed important that the student be proficient in counting money to be successful at the workplace.

2.3. Life Centered Career Education

Aguilar [10] investigated Brolin's [11] Life Centered Career Education (LCCE) program with a group of Students with Special Needs (SSN) to determine if the program prepared special needs students with skills necessary for independent living and employment. Counting money and making correct change were among the LCCE skills that were investigated. Special needs students require a life centered approach to be successful after graduating from high school. Educators must take responsibility to teach students competencies necessary for adult living. Aguilar's [10] case study involved 16 students in grades 8-12. All students except one scored 80% or higher on the five competencies tested. Attendance was an issue with the student, who was not successful. Students scored highest in the personal finances competencies because they were interested in money concepts. The LCCE program was shown to be successful in preparing students with skills necessary for employment and independent living.

2.4. *Instructional Needs*

Parmar et al. indicate that students with learning disabilities have different needs in the mathematics classroom [12]. Thorton and Toohey [13] describe basic guidelines when planning the learning of basic facts with learning disabled students. Factors to consider include prerequisite knowledge, monitoring and assessing, the sequence that facts are presented, teaching strategies prior to drill, learning styles of the student, pacing, verbal prompts, and self-monitoring skills.

Students with learning disabilities may have difficulties expressing themselves verbally or in writing. They may have difficulties following a set of verbal or written instructions. They may have cognitive difficulties with memory, attention, and language. Teachers should make adjustments so that children with learning disabilities can master the concepts and knowledge being taught. Teachers should use explicit and systematic instruction, provide additional support and instruction, adjust the environment, re-explain, model and describe the outcomes desired [14].

3. Methodology

The single-subject study served to (a) identify the unique needs of the student, (b) guide the selection of instructional content and materials, (c) create an individualized education plan (IEP), (d) monitor student progress, and (e) evaluate learning [15]. Adequate representation of content, appropriate scope and sequence of the content and developmentally appropriate content were addressed to ensure accurate measures. Pretests and posttests were completed by the student to determine knowledge of money concepts. Concrete manipulatives, real coins and currency, were used to provide motivation, interest, and success for the student. An IEP was developed to provide instruction by the researcher and learning for the student. Student progress was monitored and recorded. The learning was assessed throughout the duration of the study.

A pretest and posttest were used to assess three sets of instructional sessions and one set of independent sessions. There were ten instructional sessions counting money using one coin type, eight instructional sessions using two coin types, ten instructional sessions using all coin types, and ten independent sessions using all coin types.

3.1. Subject

The student was in the tenth and eleventh grade when this investigation was conducted. The student was in a special education classroom at a secondary school for grades 9-12. She attends regular classes for physical education and art. The student was diagnosed with mild learning disabilities and was performing at the fifth-grade level in math, reading and writing. The student was also diagnosed as having autism.

3.2. Materials

The 100 price cards with prices from .01 to $1.00 were used for instruction and independent sessions and assessment. Sets of pennies, nickels, dimes, and quarters were used to count change.

3.2. Research Design

A single-subject multiple baseline design [16], [17], [18] was used. The data was recorded for the instructional and independent sessions and assessment. The 100 price cards were randomly placed into10 sets of 10 price cards with prices from 0.01 to $1.00 [19]. Multiple baseline designs are useful for measuring the acquisition of skills over a period of time [20], [21].

The researcher had worked with the student in six previous studies [1], [2], [3], [4], [5], [6]. The student's previous knowledge and history were used to develop an individualized education plan to help her count money and change. In the current study, the sessions were conducted once per week. The instruction process took two years because the student attended school, began working after school and was not accessible each week.

Instruction sessions were conducted once per week and consisted of instruction on counting coins. Counting with one coin type was first (See Table 1 and Figure 1), followed by counting with two types of coins (See Table 2 and Figure 2), then instruction with all coin types (See Table 3 and Figure 3) for results. The last sessions were independent work by the student, using the 10 sets of 10 cards (See Table 4 and Figure 4) for results.

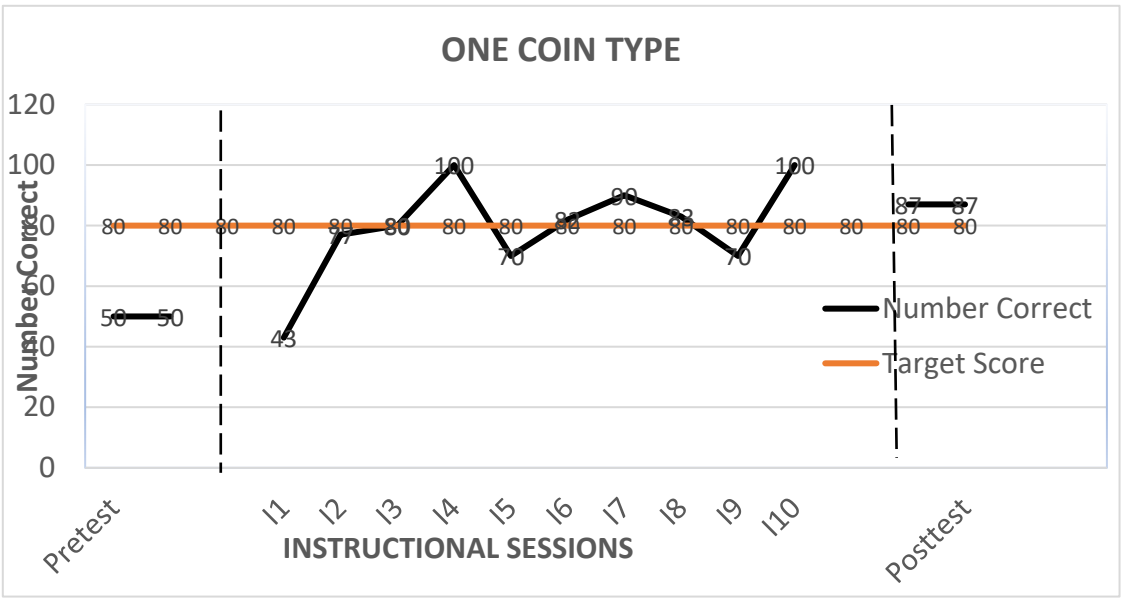
4. Results

The instructional sessions with one coin type were conducted over a ten-week period. There was a pretest, where the student scored 50% and a posttest after ten weeks of instruction, where the student scored 87%. This was an increase of 37 percentage points from the pretest to the posttest. The student scored 43, 77, 80, 100, 70, 82, 90, 83, 70, and 100% for a mean score of 79.5% in checking for understanding during the ten instruction sessions using one coin type (See Table 1) and Figure 1 is a graph of the data (See Figure 1).

Table 1. Instruction with One Coin Type Results.
There was a Pretest, Ten Instructional Sessions, and a Posttest.

Session	Pretest	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	Posttest
Percent Correct	50	43	77	80	100	70	82	90	83	70	100	87
Target Score	80	80	80	80	80	80	80	80	80	80	80	80

Figure 1. Instruction with One Coin Type Results.
There was a Pretest, Ten Instructional Sessions, and a Posttest.

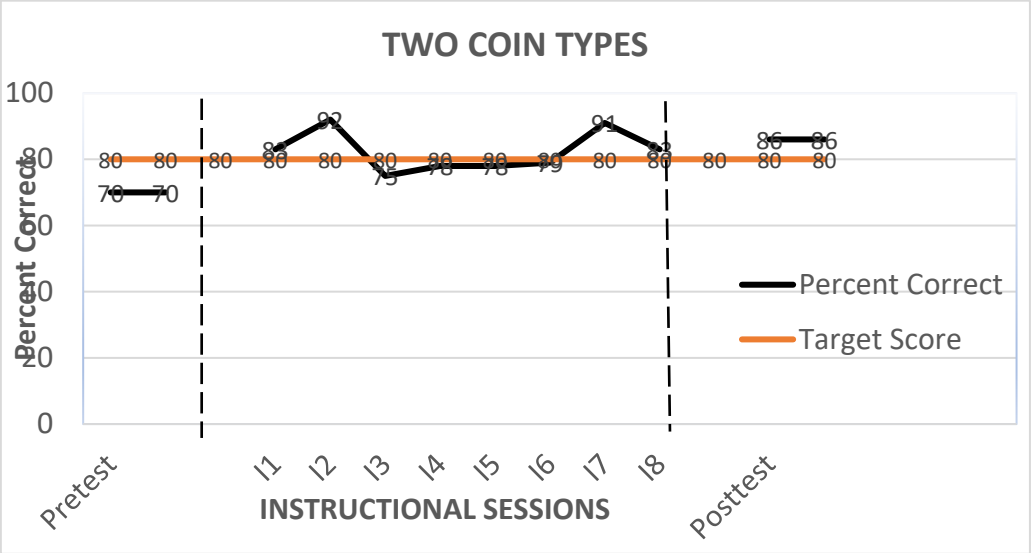


The instructional sessions with two coin types were conducted over an eight-week period. There was a pretest, where the student scored 70% and a posttest after eight weeks of instruction, where the student scored 86%. This was an increase of 16 percentage points from the pretest to the posttest. The student scored 83, 92, 75, 78, 78, 79, 91, and 83% for a mean score of 82.4% in checking for understanding during the eight instruction sessions using two coin types (See Table 2) and Figure 2 is a graph of the data (See Figure 2).

Table 2. Instruction with Two Coin Types Results.
There was a Pretest, Eight Instructional Sessions, and a Posttest.

Session	Pretest	I1	I2	I3	I4	I5	I6	I7	I8	Posttest
Percent Correct	70	83	92	75	78	78	79	91	83	86
Target Score	80	80	80	80	80	80	80	80	80	80

Figure 2. Instruction with Two Coin Types Results.
There was a Pretest, Eight Instructional Sessions, and a Posttest.

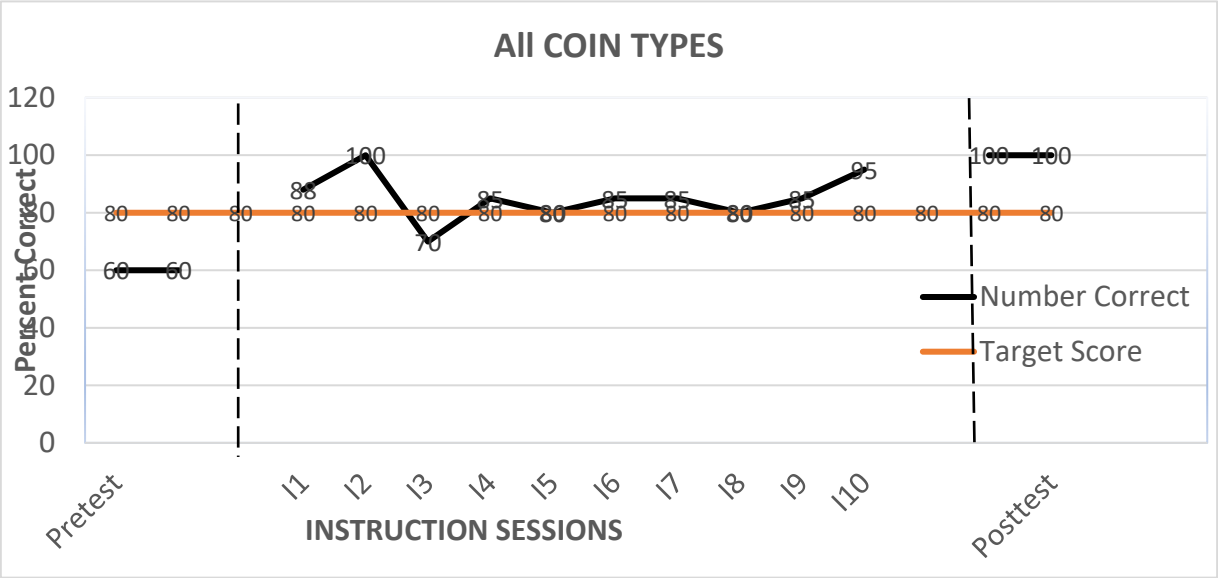


The instructional sessions with all coin types were conducted over a ten-week period. There was a pretest, where the student scored 60% and a posttest after ten weeks of instruction, where the student scored 100%. This was an increase of 40 percentage points from the pretest to the posttest. The student scored 88, 100, 70, 85, 80, 85, 85, 80, 85, and 95% for a mean score of 85.3% in checking for understanding during the ten instruction sessions using all coin types (See Table 3) and Figure 3 is a graph of the data (See Figure 3).

Table 3. Instruction with All Coin Types Results.
There was a Pretest, Ten Instructional Sessions, and a Posttest.

Session	Pretest	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	Posttest
Percent Correct	60	88	100	70	85	80	85	85	80	85	95	100
Target Score	80	80	80	80	80	80	80	80	80	80	80	80

Figure 3. Instruction with All Coin Types Results.
There was a Pretest, Ten Instructional Sessions, and a Posttest.

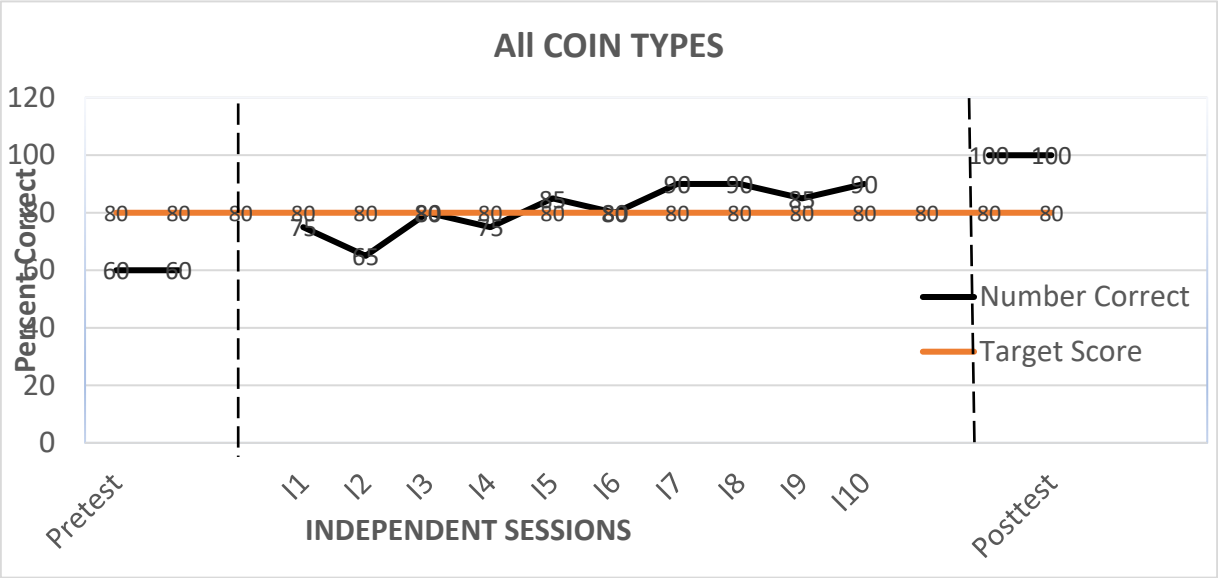


The independent work sessions with all coin types were conducted over a ten-week period. There was a pretest, where the student scored 60% and a posttest after ten weeks of instruction, where the student scored 100%. This was an increase of 40 percentage points from the pretest to the posttest. The student scored 75, 65, 80, 75, 85, 80, 90, 90, 85 and 90% for a mean score of 81.5% in checking for understanding during the ten instruction sessions using all coins (See Table 4) and Figure 4 is a graph of the data (See Figure 4).

Table 4. Independent Work with All Coin Types Results.
There was a Pretest, Ten Independent Sessions, and a Posttest.

Session	Pretest	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	Posttest
Percent Correct	60	75	65	80	75	85	80	90	90	85	90	100
Target Score	80	80	80	80	80	80	80	80	80	80	80	80

Figure 4. Independent Work with All Coin Types Results.
There was a Pretest, Ten Independent Sessions, and a Posttest.



The student scored 50, 70, 60 and 60 on the four pretests, one for each of the different session types (M=60%, N=4). The posttest scores were 87, 86, 100, and 100 on the four posttests, one for each of the different session types (M=93.3%, N=4). There was a significant difference between the pretest and posttest scores [$t(6) = 5.89$, $p < .001$], with the posttest scores being higher (See Table 5). The student made significant gains in learning how to count with one type of coins, two types of coins, all coin types and on independent counting of all coin types.

Table 5. Pretest, Posttest and Mean Scores.
There was a Pretest, Posttest, Instructional and Independent Sessions

Sessions	Pretest	Posttest
One Coin Type (Instruction)	50	87
Two Coin Types (Instruction)	70	86
All Coin Types (Instruction)	60	100
All Coin Types (Independent)	60	100
Means (N=4)	60	93.3
[t(6)=5.89, p<0.001]		
SD	8.16	7.80

5. Conclusions

According to the Individuals with Disabilities Education Act of 2004, "specific learning disability means a disorder in 1 or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations" [22]. The student in this study was diagnosed with mild disabilities. She was performing at the middle school grade levels in reading, writing and mathematics. The student was also enrolled in speech services at the public school which she attended.

The current study consisted of 10 instructions sessions with one coin type, 8 instruction sessions with two-coin types, 10 instruction sessions with all coin types and 10 independent sessions with all coin types for a total of 38 sessions. There was also a pretest and posttest for each of the 4 different sessions for an additional 8 sessions. With one session per week, the duration of the study was 46 weeks over a two-year period. Some students, especially special needs students, may need more time and practice to learn how to count money and give correct change.

The student in the study has difficulty expressing herself verbally and in writing. Repetition was used in verbal instructions. She has difficulty with memory and attention so much repetition was used in short-time framed sessions. Adjustments were made so that the student could master the counting change concepts. Explicit and systematic instruction was used along with modeling. The adjustments that were made in the instruction led to positive outcomes for the student. It was interesting that, during the study, several parents of students, who were not special needs students, commented to the researcher that their child did not know how to count money.

The use of debit cards, credit cards and cash apps on phones may be a reason that young students may not be motivated to learn to count money. The student in this study began working at a local café during the study and saw the benefits of learning how to count correct change. The student had a job coach that assisted the student in the work program for special needs students in which the student was enrolled. The job coach reported that the student had worked at the cash register at the café and had done a great job.

The researcher will continue to work with this student on other math concepts. The student is especially proud to know how to count money and give correct change, since she is able to use these skills at her job. The student attends school from 7:30am until 1pm, then works at a café from 2-6pm. After work sessions are not possible because of fatigue. The researcher will attempt to gather data on weekends, when possible, to determine the long-term effects of the study.

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