



**Evaluative Report  
Chicago Public Schools Program**

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## Introduction

The purpose of this study is to measure the effectiveness of a program called Money Savvy Kids™ on the attitudes and knowledge of young children in an urban public school system. Money Savvy Kids™ is curriculum developed by Susan Beacham, founder and CEO of “Money Savvy Generation.” The curriculum includes eight lessons:

- The History of Money
- Where Does Money Come From?
- Kids Can Earn Money Too!
- Saving Money and Bank Field Trip
- Spending Money
- Donating Money
- Investing Money
- Family Money Press Conference

An important part of Money Savvy Kids™ curriculum is the Money Savvy Pig™. This is a four slot piggy bank. It provides teachers and parents with a fun and interesting way to introduce children to saving, spending, investing, and donating. Each child participating in the program receives a Money Savvy Pig™. In spring of 2003, 40 elementary teachers in the Chicago Public Schools were trained in using the Money Savvy Kids™ curriculum. They participated in a one-day training workshop organized by Money Savvy Generation. The teachers received the curricular materials (eight lessons) and the Money Savvy Pig™ for each of their students. The teachers were encouraged to implement the program in their classrooms in the following school year. Close to 1,000 second and third graders in the Chicago Public Schools participated in this program.

To investigate the effectiveness of this program, Dr. Mark Schug of the Center for Economics Education at the University of Wisconsin – Milwaukee, developed survey (see Appendix A) measuring student beliefs about savings habits, handling money, the role of business, etc. This survey was given to students before and after using the Money Savvy Kids™ curriculum. This report presents the analysis and interpretation of the results of those surveys.

## Conclusions

Overall, these data indicate that the Money Savvy Kids™ program is effective in positively affecting students’ attitudes and knowledge about spending, saving and investing money. The paired samples data indicates statistically significant improvements on four out of ten items. The only inappropriate change in view was in this group: students tending to believe that they will always earn money when investing in the stock market. The independent samples data indicates statistically significant improvements on seven out of ten items on the assessment. Combining all the data and treating it as independent samples data (which is appropriate as the named pre- and post-tests were no longer paired), gave the same results. None of the significant changes indicated inappropriate understandings.

Quite a few of the completed surveys indicate that the students did not understand how to respond to a Likert scale survey. Many of the surveys were filled out in a manner that suggested creating an artistic pattern, rather responding to items. These surveys were eliminated from the data set. The fact that more of the post-tests were appropriately filled out may indicate increased reading skills from the beginning to the end of the program or that teachers who actually completed both pre- and post-tests explained the procedure more clearly to their students. In light of these factors, this evaluator tends to believe that the data and conclusions drawn from these data *underestimate* the learning gains achieved by this offering of the Money Savvy Kids™ program. Future evaluations of this program will be conducted with more explicit instructions to participating teachers on exactly how to administer the assessments.

### Methodology

The Money Savvy Kids™ Assessment is a 10 item, Likert scale instrument. A three point response format was used: a smiley face for agree (with a value of 3), a straight mouth face for don't know or unsure (with a value of 2) and a frown face for disagree (with a value of 1). Dr. Schug had a literacy expert check the questions for roughly a second grade reading level.

The original expectations of the evaluator were for each completed pre and post-test to include the participating student's name. This would allow for matching individual pre- and post-tests. Once matched and recorded, either a paired-samples t-test or the non-parametric Wilcoxon Signed Ranks test, could be performed on the data to determine if student responses changed from pre to post in a statistically significant manner. (The paired samples t-test is appropriately used if the data did not differ significantly from a normal distribution. Normality is determined using a Kolmogorov-Smirnov test of normality. If the data do differ significantly from the normal distribution, one uses the Wilcoxon Signed Ranks test.)

When the evaluator realized that the majority of the completed surveys would not be labeled by student name, but could still be identified as pre and post-tests, he could no longer use paired samples statistics, but independent samples statistics. If the data were normally distributed, the appropriate test is the independent samples t-test. If the data differed from the normal distribution, the appropriate test is the non-parametric Mann-Whitney U test. More pre-tests were received than post-tests. Only those pre-tests that could be matched by group (school or classroom teacher) with post-tests were used in these analyses.

Any statistically significant changes from the pre- test to the post-test (paired or independent samples) would be identified and interpreted. The effect sizes for these significant changes (an interpretation of "how big" or how meaningful a change is) would also be calculated. Note, that while the one group of tests allowed analysis of average changes from identifiable, individual students and the other group of tests allowed analysis of groups of students, each of these types of statistical tests were appropriate for the data at hand and allow rigorous statistical conclusions to be drawn about the average improvement of the participants.

As a final analysis, the paired samples data was separated and added to the independent samples data. This allowed for an omnibus analysis of the entire group students who properly completed pre and post-tests. Frequency data, Mann-Whitney U, and effect size results are presented.

## Results

### Paired Samples Data

Ninety six students could be identified by name. Not every child responded to every item or completed the post-test, but each of their responses were used in the averages. This caused the sample size to vary from 89 to 96 on various items. The average scores and standard deviations for each item are given in Table 1. Post-test items marked with an asterisk indicate a statistically significant improvement in average student response from pre to post.

**Table 1.** Item response averages and standard deviations for paired samples data.

	<b>Pre</b>	<b>SD</b>	<b>Post</b>	<b>SD</b>
Item 1	2.621	0.671	2.764*	0.477
Item 2	1.833	0.735	1.844	0.792
Item 3	1.936	0.827	1.629*	0.817
Item 4	2.536	0.685	2.700	0.550
Item 5	2.337	0.794	2.406	0.782
Item 6	2.547	0.722	2.089*	0.907
Item 7	2.094	0.682	2.371*	0.681
Item 8	2.396	0.672	2.667*	0.581
Item 9	2.750	0.543	2.800	0.524
Item 10	1.863	0.807	1.900	0.794

**Table 2.** Significantly changed item response averages and effect size of changes.

Item	Z value	Exact 2-tailed significance	Effect size
1. I know a lot about how to handle my money.	-2.082	.035	0.25
3. It is important to have things I want when I want them.	-2.920	.003	-0.37
6. It is best to put the money you save in your room at home.	-4.221	.000	-0.56
7. When I invest in stocks, I will always make money.	-2.573	.011	0.41
8. Business people help others by providing them with goods and services.	-2.985	.003	0.43

**What Tables 1 and 2 tell us about student responses to individual items.** The average response of the students to item 1 changed from 2.621, leaning towards agreeing, to 2.764 , which leans even more towards strongly agreeing. The two-tailed exact significance implies that this improvement in average score could only have occurred by chance, 3.5 out of 100 times. The .25 effect size indicates that this improvement is roughly one quarter of an average standard deviation in size. Cohen considers this a “small effect.”

The average response of the students to item 3 changed from 1.936, on the disagreeing side of uncertain, to 1.629, which is more strongly disagreeing. This indicates an improvement in student understanding, because it is appropriate for students to disagree with this item. The exact two-tailed significance implies that this change in average score could only have occurred by chance, 3 out of 1000 times. The  $-.37$  effect size indicates that this decrease in score is roughly 37% of an average standard deviation in size. Cohen considers this a “small effect.”

The average response of the students to item 6 changed from 2.547, leaning towards agreeing, to 2.089, which is very close to uncertain. This indicates an improvement in student understanding, because even though the average post-test score is uncertain, this average decreased from the pre-test because more students disagreed with this item, which was the learning objective. The exact two-tailed significance implies that this change in average score could only have occurred by chance, 3 out of 1000 times. The  $-.37$  effect size indicates that this decrease in score is roughly 37% of an average standard deviation in size. Cohen considers this a “small effect.”

The average response of the students to item 7 changed from 2.094, very close to uncertain, to 2.371, which leans more towards agreeing. This indicates a misconception for students, because it is more appropriate for students to disagree with this item. The two-tailed exact significance implies that this change in average score could only have occurred by chance, 11 out of 1000 times. The  $.41$  effect size indicates that this improvement is roughly 40% of an average standard deviation in size. Cohen considers this a “small effect.”

The average response of the students to item 8 changed from 2.396, on the uncertain side of agreeing, to 2.667, which leans more towards agreeing. This indicates an improvement in student learning, because it is more appropriate for students to agree with this item. The two-tailed exact significance implies that this change in average score could only have occurred by chance, 3 out of 1000 times. The  $.43$  effect size indicates that this improvement is roughly 40% of an average standard deviation in size. Cohen considers this a “small effect,” although it is approaching a medium effect ( $.50$ ).

### **Independent Samples Data**

Two hundred and nineteen pre-tests and 298 post-tests were collected that were properly completed, but without names. The average item responses and standard deviations on the pre- and post-tests are shown in Table 3. Because the responses to these tests were not normally distributed (Kolmogorov-Smirnov statistics significant at less than one chance in a thousand) a Mann-Whitney U test was used to analyze which items showed significant changes from pre to post.

**Table 3.** Item response averages and standard deviations for independent samples data.

	Pre	SD	Post	SD
Item 1	2.58	0.667	2.89*	0.436
Item 2	1.65	0.832	1.49*	0.745
Item 3	1.76	0.812	1.54*	0.796
Item 4	2.64	0.626	2.85*	0.437
Item 5	2.28	0.793	2.38	0.826
Item 6	2.58	0.717	2.06*	0.895
Item 7	2.23	0.676	2.08	0.826
Item 8	2.61	0.626	2.75*	0.482
Item 9	2.80	0.510	2.91*	0.379
Item 10	2.07	0.878	1.95	0.863

**Table 4.** Significantly changed item response averages and effect size of changes.

Item	Mann-Whitney U value	Exact 2-tailed significance	Effect size
1. I know a lot about how to handle my money.	25215.0	.000	0.56
2. Saving money is greedy.	29694.5	.043	-0.20
3. It is important to have things I want when I want them.	27386.0	.001	-0.27
4. It is important to save for the things that I want to buy in the future.	26956.5	.000	0.40
6. It is best to put the money you save in your room at home.	22864.5	.000	-0.65
8. Business people help others by providing them with goods and services.	26884.5	.013	0.25
9. It is important for families to keep money in real banks.	27153.5	.002	0.25

**What Tables 3 and 4 tell us about student responses to individual items.** The average response of the students to item 1 changed from 2.58, leaning towards agreeing, to 2.89, which leans even more towards strongly agreeing. The two-tailed exact significance implies that this improvement in average score could only have occurred by chance, less than 1 time in 1000. The .56 effect size indicates that this improvement is over half of an average standard deviation in size. Cohen considers this a “medium effect.”

The average response of the students to item 2 changed from 1.65, on the disagreeing side of uncertain, to 1.49, which is more strongly disagreeing. This indicates an improvement in student understanding, because it is appropriate for students to disagree with this item. The exact two-tailed significance implies that this change in average score could only have occurred by chance, 43 out of 1000 times. The -.20 effect size indicates that this decrease in score is roughly 20% of an average standard deviation in size. Cohen considers this a “small effect.”

The average response of the students to item 3 changed from 1.76, on the disagreeing side of uncertain, to 1.54, which is more strongly disagreeing. This indicates an improvement in student

understanding, because it is appropriate for students to disagree with this item. The exact two-tailed significance implies that this change in average score could only have occurred by chance, 1 out of 1000 times. The  $-.27$  effect size indicates that this decrease in score is roughly 27% of an average standard deviation in size. Cohen considers this a “small effect.”

The average response of the students to item 4 changed from 2.64, leaning towards agreeing, to 2.85, which leans even more towards strongly agreeing. The two-tailed exact significance implies that this improvement in average score could only have occurred by chance, less than 1 time in 1000. The  $.40$  effect size indicates that this improvement is 40% of an average standard deviation in size. Cohen considers this a “small effect.”

The average response of the students to item 6 changed from 2.58, leaning towards agreeing, to 2.06, which is very close to uncertain. This indicates an improvement in student understanding, because even though the average post-test score is uncertain, this average decreased from the pre-test because more students disagreed with this item, which was the learning objective. The exact two-tailed significance implies that this change in average score could only have occurred by chance, less than 1 time in 1000. The  $-.65$  effect size indicates that this decrease in score is 65% of an average standard deviation in size. Cohen considers this a “medium effect.”

The average response of the students to item 8 changed from 2.61, leaning towards agreeing, to 2.75, which leans more strongly towards agreeing. This indicates an improvement in student understanding, because it is more appropriate for students to agree with this item. The two-tailed exact significance implies that this change in average score could only have occurred by chance, 13 out of 1000 times. The  $.25$  effect size indicates that this improvement is one quarter of an average standard deviation in size. Cohen considers this a “small effect.”

The average response of the students to item 9 changed from 2.80, rather strongly agreeing, to 2.91, which is even more strongly agreeing. This indicates an improvement in student learning, because it is more appropriate for students to agree with this item. The two-tailed exact significance implies that this change in average score could only have occurred by chance, 2 out of 1000 times. The  $.25$  effect size indicates that this improvement is one quarter of an average standard deviation in size. Cohen considers this a “small effect.”



### Omnibus Data

The average scores and standard deviations for each item, from the combined datasets are given in Table 5. This combination led to 316 pre-tests and 388 post-tests. The results of the significance tests of changed item scores are presented in Table 6. To make interpreting these results easier, frequencies of responses for significantly changed items are given in Table 7.

**Table 5.** Item response averages and standard deviations for combined data.

	Pre	SD	Post	SD
Item 1	2.592	0.667	2.863	0.449
Item 2	1.703	0.807	1.572	0.770
Item 3	1.812	0.819	1.561	0.801
Item 4	2.607	0.646	2.817	0.469
Item 5	2.299	0.792	2.387	0.815
Item 6	2.571	0.717	2.068	0.936
Item 7	2.185	0.680	2.151	0.803
Item 8	2.538	0.647	2.730	0.507
Item 9	2.785	0.520	2.881	0.419
Item 10	2.003	0.860	1.939	0.847

**Table 6.** Significantly changed item response averages and effect size of changes.

Item	Mann-Whitney U value	Exact 2-tailed significance	Effect size
1. I know a lot about how to handle my money.	49227.5	.000	0.49
2. Saving money is greedy.	55751.5	.026	-0.17
3. It is important to have things I want when I want them.	49733.5	.000	-0.31
4. It is important to save for the things that I want to buy in the future.	51105.5	.000	0.38
6. It is best to put the money you save in your room at home.	43351.5	.000	-0.61
8. Business people help others by providing them with goods and services.	49085.5	.000	0.33
9. It is important for families to keep money in real banks.	52536.0	.001	0.20






**Table 7.** Changes in Percentages of Student Responses from Combined Data.

<b>Item</b>	<b>Response</b>	<b>Percent of Students Pre-Test</b>	<b>Percent of Students Post-Test</b>	<b>Comments</b>
1	1 disagree 2 unsure 3 agree missing/ incorrect	10% 20% 68% 2%	3% 10% 81% 6%	13% more students agreeing that they can handle money; 10% less unsure; 7% less disagreeing. Medium effect size.
2	1 disagree 2 unsure 3 agree missing/ incorrect	51% 26% 21% 2%	56% 24% 13% 7%	5% more students disagreeing that saving is greedy; 2 % less unsure; 8% less agreeing. Small, but significant effect.
3	1 disagree 2 unsure 3 agree missing/ incorrect	44% 28% 25% 3%	60% 16% 17% 7%	16% more students disagreeing with immediate gratification; 12 % less unsure; 8% less agreeing. Small, but significant effect.
4	1 disagree 2 unsure 3 agree missing/ incorrect	8% 21% 68% 3%	3% 12% 79% 6%	11% more students agreeing with importance of saving; 9% less unsure; 5% less disagreeing. Small, but significant effect.
6	1 disagree 2 unsure 3 agree missing/ incorrect	13% 15% 70% 2%	38% 11% 44% 7%	25% more disagreeing that you should keep money in room; 4% less unsure; 36% less agree. Medium effect.
8	1 disagree 2 unsure 3 agree missing/ incorrect	8% 27% 58% 7%	3% 20% 71% 6%	5% less disagree that business people help others; 7% less unsure; 13% more agree with this. Small, but significant effect.
9	1 disagree 2 unsure 3 agree missing/ incorrect	5% 10% 78% 7%	3% 5% 85% 7%	17% more agreeing that keeping money in banks is important; 5% less unsure; 2% less disagree with this. Small, but significant effect.

## Appendix A: Money Savvy Kids™ Assessment

**Directions:** Teachers, please read each of the following 10 sentences together in class. Explain the following directions to the children: If you *agree* with the statement, use your pencil to circle the *face with the smile*. If you *don't know* or are *unsure* about the statement, circle the *face with the straight mouth*. If you *disagree* with the statement, circle the *face the frown*. Please circle only one face for each question.

- |     |   |   |   |   |
|-----|---|---|---|---|
| 1.  | I believe I know a lot about how to handle my money.  |    |    |    |
| 2.  | I believe that people act selfishly when they save money.   |    |    |    |
| 3.  | I believe it is important to have the things I want when I want them.                                   |    |    |    |
| 4.  | I believe it is important to save money for the things that I want to buy in the future.                |    |    |    |
| 5.  | The thing I enjoy most about earning money is getting to spend it right away.                           |   |   |   |
| 6.  | It is best to save your money in a secret place in your bedroom.  |  |  |  |
| 7.  | I believe that some places to put my savings - - like putting money in banks - - are safer than others. |  |  |  |
| 8.  | I believe business people help others by providing them with goods and services to buy.                 |  |  |  |
| 9.  | It is important for families to keep money in real banks.   |  |  |  |
| 10. | I believe saving money helps me but not help anyone else.   |  |  |  |