



**Evaluative Report
Cleveland
Grades 1, 2, 3 and 4**

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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 a high net worth suburb utilizing both the public and private system. The Money Savvy Kids™ curriculum was developed by 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 2004, 40 elementary teachers were trained in using the Money Savvy Kids™ curriculum by participating in a one-day training workshop. The teachers received the curricular materials (eight lessons) and the student consumables (one Money Savvy Pig and activity book per child) for their students. They were asked to implement the program in their classrooms and do use a pre-and post test with the students. Close to 500 first through fourth graders 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 a survey (see Appendix A) measuring student beliefs about savings habits, handling money, the role of business, etc. This survey was given to students before receiving their instruction and after they had completed the curriculum. This report presents the analysis and interpretation of the results of those surveys.

Conclusions

Overall, these data indicate that the Money Savvy Kid™ program is effective in positively affecting students' attitudes and knowledge about spending, saving and investing money. This sample of 794 children, taken as a whole, improved, with statistical significance, on six out of ten items (items 1, 2, 6, 7, 8, and 10). The pre-test responses on items 1, 2, 8, and 10, were, on average, correct, however the number of students choosing them correctly on the post-test improved significantly. This clearly indicates student learning, but also implies reinforcement for the children who chose a correct response on the post-test.

The average response to item 7 (investing in stocks always leads to profit) was essentially “unsure” on the pre-test. By the post-test, however, this notion was correctly changed. Item 6 (it is best to put the money you save in your room at home) was the only item that was, on average, wrong on the pre-test. The significant improvement on this item indicates that a misconception

was overcome for a significant number of children. Learning a brand new idea or reinforcing a previously learned notion is far less difficult to achieve than changing a misconception. With respect to item 6, it is clear that the Money Savvy Kids™ program was effective in changing this misconception.

The remaining four items (3, 4, 5, and 9), while not significantly changed, were, on average, correct on both the pre- and post-test. This indicates that the participants had correct knowledge or appropriate attitudes on these four items. In this circumstance, it is reasonable to assume that the program reinforced these accurate responses.

Differences in responses and how they changed for the different grades are difficult to interpret. Simply put, there are too many variables to attribute changes or lack of changes to age. Nonetheless it should be noted that the first, second, and third grade participants, on average, chose the wrong response on item 6 on both the pre- and post-tests (first graders more so than second, and second graders more so than third). While there was a slight, non-statistically significant, improvement, the data show that for this the first and second graders, the misconception about the appropriateness of keeping one's money in one's room persisted for a significant number of these children. Third graders, however, changed their misconception by a statistically significant margin. Fourth graders, on average, indicated on the pre-test that they knew they should not keep money in their rooms. Nonetheless, a significantly increased number of them chose the correct response on the post-test. These data do tend to suggest the influence of age – one sees younger students holding tightly to the notion to keep money in their rooms (which might actually indicate a positive trait – keeping one's money in one place rather than strewn through the house) and progressively with age, they lose this notion and eventually hold the correct one, on average, both with and without instruction.

Item 7, referring to “always making money in the stock market” was incorrectly held by a slight majority of first graders on the pre-test. The post-test scores indicated that this misconception was changed by the program. Second, third, and fourth graders, on average, indicated that they were unsure about this question on the pre-test. The third and fourth graders chose the correct response, on average, on the post-test. The fact that second graders improved slightly, but not significantly on this item, cannot simply be explained by age.

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 confirm that the questions were roughly at a second grade reading level.

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. In other words, if pre-tests were available from one classroom or school but the post-tests were missing from that class or school, those pre-tests were deleted from the sample.

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, a Wilcoxon Signed Ranks test otherwise.

Because the completed surveys in this study were not be labeled by student name, but could still be identified as pre and post-tests, paired samples statistics were no longer appropriate, but independent samples statistics were. To determine which independent samples test is most appropriate, a test of normality (Kolmogorov-Smirnov test) was used. 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.

Any statistically significant changes from pre- to post 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 pre and post-tests were not matched by individual students, the statistical tests used were appropriate for the data at hand and allowed rigorous statistical conclusions to be drawn about the average improvement of the participants.

All analyses (normality, frequency data, Mann-Whitney U, and effect size) were conducted on the entire sample (all grades combined) and by individual grade. The results are presented in the following section.

Results

Complete, Mixed-grade Data

423 pre-tests and 371 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 1. 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 1. Item response averages and standard deviations for independent samples data.

	Mean Pre	SD	Mean Post	SD
Item 1	2.69	.521	2.88*	.329
Item 2	1.34	.632	1.18*	.490
Item 3	1.25	.556	1.21	.514
Item 4	2.78	.524	2.83	.427
Item 5	2.42	.741	2.44	.721
Item 6	2.20	.859	1.74*	.801
Item 7	1.99	.604	1.53*	.687
Item 8	2.76	.508	2.83*	.434
Item 9	2.81	.492	2.84	.436
Item 10	1.97	.820	1.76*	.787

*Indicates statistically significant improvement from pre to post. See Table 2.

Table 2. 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.	64876.0	.000	0.43
2. Saving money is greedy.	69321.0	.000	-0.28
6. It is best to put the money you save in your room at home.	54881.5	.000	-0.55
7. When I invest in stocks, I will always make money.	47024.5	.000	-0.71
8. Business people help others by providing them with goods and services.	73486.5	.030	0.15
10. When I save money it helps me but not others	67578.5	.000	-0.26

What Tables 1 and 2 tell us about student responses to individual items. The average response of the students to item 1 changed from 2.69, leaning towards agreeing, to 2.88, 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 .43 effect size indicates that this improvement is 43% of an average standard deviation in size. Cohen considers this a “small effect.”

The average response of the students to item 2 changed from 1.34, on the disagreeing side of uncertain, to 1.18, which is less strongly disagreeing. This indicates a slight negative change in student understanding, because it is appropriate for students to disagree with this item. 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 -.28 effect size indicates that this decrease in score is roughly 28% of an average standard deviation in size. Cohen considers this a “small effect.”

The average response of the students to item 6 changed from 2.20, just on the agreeing side of uncertain, to 1.74, which is beyond uncertain to just 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 $-.55$ effect size indicates that this decrease in score is roughly 55% of an average standard deviation in size. Cohen considers this a “medium effect.”

The average response of the students to item 7 changed from 1.99, uncertain, to 1.53, which leans more towards disagreeing. This indicates an improvement in student understanding, because it is appropriate for students to disagree with this item. 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 $.71$ effect size indicates that this improvement is 71% of an average standard deviation in size. Cohen considers this a “medium effect.”

The average response of the students to item 8 changed from 2.76, leaning towards agreeing, to 2.83, which is more strongly agreeing. This indicates an improvement in student understanding, because it is appropriate for students to agree with this item. The exact two-tailed significance implies that this change in average score could only have occurred by chance, less than 30 times in 100. The $.15$ effect size indicates that this decrease in score is 15% of an average standard deviation in size. Cohen considers this a “small effect.”

The average response of the students to item 10 changed from 1.97, very close to uncertain, to 1.76, which leans more towards disagreeing. This indicates an improvement in student understanding, 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, less than 1 out of 1000 times. The $.26$ effect size indicates that this improvement is roughly one quarter of an average standard deviation in size. Cohen considers this a “small effect.”

Table 3 looks at the significantly changed items from the perspective how many of the students (by percentage) agreed, were unsure, or disagreed on the pre-test and then on the post-test.

Table 3. Changes in Percentages of Student Responses from Combined Data.

Item	Response	Percent of Students Pre-Test	Percent of Students Post-Test	Comments
1	3 agree 2 unsure 1 disagree missing/ incorrect	71.6% 25.3% 2.8% .2%	88.7% 11.1% .3% 0%	17.1% more students agree that they can handle money; 14.2% are less unsure; 2.5% fewer disagree. Small but significant effect.
2	3 agree 2 unsure 1 disagree missing/ incorrect	8.7% 16.1% 74.9% .2%	4.6% 8.9% 86.5% 0%	4.1% less students agreeing that saving is greedy; 7.2 % less unsure; 11.6% more disagree. Small, but significant effect.
6	3 agree 2 unsure 1 disagree missing/ incorrect	48.7% 22.2% 28.6% .5%	22.1% 28.8% 48.2% .8%	26.6% fewer agreeing that you should keep money in room; 6.6% more unsure; 19.6% fewer agree. Medium effect.
7	3 agree	17.3%	11.1%	6.2% fewer agree that

	2 unsure 1 disagree missing/ incorrect	61.7% 18.0% 3.1%	30.7% 58.0% .3%	investing in stocks always leads to profit; 31% less unsure; 40% more disagree with this. Medium effect.
8	3 agree 2 unsure 1 disagree missing/ incorrect	79.7% 16.3% 3.8% .2%	85.4% 11.9% 2.4% .3%	5.7% more agree that business people help others; 4.5% less are unsure; 1.4% fewer disagree. Small, but significant effect.
10	3 agree 2 unsure 1 disagree missing/ incorrect	32.2% 32.9% 35.0%	21.8% 32.6% 45.6%	10.3% less agree that saving money only helps oneself; .3% less unsure; 10.6% more disagree with this. Small, but significant effect.

Data by Grades

Descriptive statistics (means and standard deviations), results of Mann-Whitney U tests, and effect sizes for statistically significant changes are presented in tabular form for each grade. Where no significant changes were found, the Mann-Whitney results and effect size calculations are omitted.

Grade 1

Table 4. Item response means and standard deviations for Grade 1 ($N_{pre}=29$, $N_{post}=28$).

	Mean Pre	SD	Mean Post	SD
Item 1	2.71	.535	2.82	.390
Item 2	1.79	.917	1.57	.790
Item 3	1.31	.660	1.11	.416
Item 4	2.54	.693	2.61	.567
Item 5	2.43	.790	2.46	.744
Item 6	2.61	.685	2.54	.693
Item 7	2.25	.447	1.57*	.742
Item 8	2.62	.494	2.82	.390
Item 9	2.59	.628	2.50	.638
Item 10	2.07	.842	1.89	.737

*Indicates statistically significant improvement from pre to post. See Table 5.

Table 5. Significantly changed item response averages and effect size of changes (First Grade).

Item	Mann-Whitney U value	Exact 2-tailed significance	Effect size
7. When I invest in stocks, I will always make money.	104.0	.001	-0.71

Table 6. Changes in Percentages of Student Responses from First Grade.

Item	Response	Percent of Students Pre-Test	Percent of Students Post-Test	Comments
7	3 agree 2 unsure 1 disagree missing/ incorrect	17.3% 61.7% 18.0% 3.1%	11.1% 30.7% 58.0% .3%	6.2% fewer agree that investing in stocks always leads to profit; 31% less unsure; 40% more disagree with this. Medium effect.

Grade 2**Table 7.** Item response averages and standard deviations for Grade 2 ($N_{pre}=26$, $N_{post}=23$).

	Mean Pre	SD	Mean Post	SD
Item 1	2.77	.514	2.91	.288
Item 2	1.46	.761	1.13	.344
Item 3	1.31	.679	1.39	.783
Item 4	2.85	.368	2.74	.619
Item 5	2.46	.761	2.65	.573
Item 6	2.23	.951	2.22	.850
Item 7	2.00	.490	1.78	.736
Item 8	2.92	.272	2.87	.458
Item 9	2.62	.752	2.87	.458
Item 10	2.00	.938	2.09	.949

No significant changes, hence no additional tables.

Grade 3**Table 8.** Item response averages and standard deviations for Grade 3 ($N_{pre}=336$, $N_{post}=289$).

	Mean Pre	SD	Mean Post	SD
Item 1	2.68	.526	2.89*	.325
Item 2	1.30	.581	1.16*	.469
Item 3	1.24	.552	1.20	.500
Item 4	2.80	.516	2.86	.392
Item 5	2.40	.747	2.41	.742
Item 6	2.15	.866	1.63*	.760
Item 7	2.00	.611	1.53*	.693
Item 8	2.76	.522	2.82	.442
Item 9	2.84	.453	2.86	.414
Item 10	1.97	.812	1.72*	.779

*Indicates statistically significant improvement from pre to post. See Table 9.

Table 9. Significantly changed item response averages and effect size of changes (Third Grade)

Item	Mann-Whitney U value	Exact 2-tailed significance	Effect size
1. I know a lot about how to handle my money.	39781.0	.000	0.43
2. Saving money is greedy.	42846.0	.000	-0.28
6. It is best to put the money you save in your room at home.	32387.0	.000	-0.55
7. When I invest in stocks, I will always make money.	29965.5	.000	-0.71
10. When I save money it helps me but not others	40351.5	.000	-0.26

Table 10. Changes in Percentages of Student Responses from Third Grade.

Item	Response	Percent of Students Pre-Test	Percent of Students Post-Test	Comments
1	3 agree 2 unsure 1 disagree missing/ incorrect	71.6% 25.3% 2.8% .2%	88.7% 11.1% .3% 0%	17.1% more students agree that they can handle money; 14.2% are less unsure; 2.5% fewer disagree. Small but significant effect.
2	3 agree 2 unsure 1 disagree missing/ incorrect	8.7% 16.1% 74.9% .2%	4.6% 8.9% 86.5% 0%	4.1% less students agreeing that saving is greedy; 7.2 % less unsure; 11.6% more disagree. Small, but significant effect.
6	3 agree 2 unsure 1 disagree missing/ incorrect	48.7% 22.2% 28.6% .5%	22.1% 28.8% 48.2% .8%	26.6% fewer agreeing that you should keep money in room; 6.6% more unsure; 19.6% fewer agree. Medium effect.
7	3 agree 2 unsure 1 disagree missing/ incorrect	17.3% 61.7% 18.0% 3.1%	11.1% 30.7% 58.0% .3%	6.2% fewer agree that investing in stocks always leads to profit; 31% less unsure; 40% more disagree with this. Medium effect.
10	3 agree 2 unsure 1 disagree missing/ incorrect	32.2% 32.9% 35.0%	21.8% 32.6% 45.6%	10.3% less agree that saving money only helps oneself; .3% less unsure; 10.6% more disagree with this. Small, but significant effect.

Grade 4

Table 11. Item response averages and standard deviations for Grade 4 ($N_{pre}=32$, $N_{post}=31$).

	Mean Pre	SD	Mean Post	SD
Item 1	2.66	.483	2.87	.341
Item 2	1.19	.592	1.03	.180
Item 3	1.16	.369	1.29	.461
Item 4	2.75	.508	2.84	.374
Item 5	2.56	.619	2.61	.558
Item 6	2.38	.751	1.65*	.709
Item 7	1.75	.622	1.26*	.445
Item 8	2.75	.508	2.90	.396
Item 9	2.88	.421	2.94	.250
Item 10	1.91	.818	1.84	.735

*Indicates statistically significant improvement from pre to post. See Table 12.

Table 12. Significantly changed item response averages and effect size of changes (4th Grade).




Item	Mann-Whitney U value	Exact 2-tailed significance	Effect size
6. It is best to put the money you save in your room at home.	251.5	.000	
7. When I invest in stocks, I will always make money.	286.5	.001	

Table 13. Changes in Percentages of Student Responses from Fourth Grade.

Item	Response	Percent of Students Pre-Test	Percent of Students Post-Test	Comments
6	3 agree	48.7%	22.1%	26.6% fewer agreeing that you should keep money in room; 6.6% more unsure; 19.6% fewer agree. Medium effect.
	2 unsure	22.2%	28.8%	
	1 disagree	28.6%	48.2%	
	missing/ incorrect	.5%	.8%	
7	3 agree	17.3%	11.1%	6.2% fewer agree that investing in stocks always leads to profit; 31% less unsure; 40% more disagree with this. Medium effect.
	2 unsure	61.7%	30.7%	
	1 disagree	18.0%	58.0%	
	missing/ incorrect	3.1%	.3%	

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. |  |  |  |