MONEY SAVVY KIDS™
Basic Personal Finance Curriculum

**Evaluative Report**
**Chicago Public Schools**

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**Introduction**

The purposes of this study are to: 1) measure the effectiveness of a program called Money Savvy Kids[®] Basic Personal Finance Curriculum on the attitudes and knowledge of children in Chicago Public Schools.

Money Savvy Kids is curriculum developed by Money Savvy Generation of Lake Bluff, Illinois. 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. During the 2010-2011 school year, over 110 elementary school classrooms received Money Savvy Kids™ materials and curriculum training. Training was provided via the participants' use of self-study materials available via Webcast. They were asked to implement the program in their classrooms and to use a pre-and post test with the students.

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 has been used in each subsequent evaluation study since the first such study at the end of the 2003-2004 school year. This first study was featured in the academic journal *The Social Studies* in Spring 2005 (Schug & Hagedorn, 2005). Several items were reworded for greater simplicity and thus clarity in Fall 2008. This updated survey was used here. The survey was given to students before receiving their Money Savvy Pigs and after they had completed the curriculum. The analyses this academic year were based upon over 6000 pre and post tests, from which we could match 2553 individual pre-tests with individual post-tests. This is one of the largest samples we have analyzed over the years.

This report presents the interpretation of the results of those surveys followed with extensive supporting analysis. In other words, we put the conclusions up front.

**Executive Summary of Results and Conclusions**

Overall, the aggregate data indicate that the Money Savvy Kids program was effective in positively affecting students' attitudes and knowledge about spending, saving and investing money. The paired (matched) samples data for these students indicate statistically significant improvements on all 10 items.

The item for which there was the most change (as indicated by a medium effect size) was item #6. Item #6 suggests that it is best to keep the money you save in your room. After instruction 22.4% fewer students agreed with this and 19.1 % more disagreed with this. The percentage of students who were unsure increased slightly by 3.2%.

The remainder of the statistically significant changes had small effect sizes (Cohen and eta squared), but the measured changes were large enough to indicate statistically they were not likely to have occurred by chance and thus may be attributed to the curriculum and the teachers' use of it. In addition, as many of the positive attitudes towards saving money and making donations, are counter to popular culture, reinforcing them is certainly a value added.

In this evaluator's professional opinion, these data indicate that the Money Savvy Kids curriculum continues to positively impact the financial attitudes and understanding of the children who participated in this study in the Chicago area. In addition, changes to procedures for administering and collecting completed tests, seem to be yielding far more and far better data: matchable tests are always better than independent samples. Overall, these results are consistent with those found in previous studies in Washington State (over several years); in Cleveland, Ohio; in North Dakota; and even in the Chicago area for the 2004-2005 school year. What these studies collectively suggest is that the Money Savvy Kids curriculum is effective with a wide variety of English reading students. It is interesting to note, that in the previous Chicago area study (N=301 students in 22 classrooms) there was no statistically significant improvement on either item 3 or item 5, but there is such an improvement this year on both items.

**Methodology**

The Money Savvy Kids Assessment is a 10 item, Likert scale instrument. A three point response format was used: "agree" (with a value of 3), "unsure" (with a value of 2) and "disagree" (with a value of 1). Dr. Schug had a literacy expert check the questions for roughly a second grade reading level.

The completed pre and post-tests include the participating students' names. This allows for matching individual pre and post-tests. Once matched and recorded, the non-parametric Wilcoxon Signed Ranks test would be performed on the data to determine if student responses changed from pre to post in a statistically significant manner. The Wilcoxon Signed Ranks test is the non-parametric equivalent to the paired or dependent samples t-test. It is used because the paired samples t-test assumes a normal distribution in the data, which these data are not (based upon Kolmogorov-Smirnov and Shapiro-Wilk tests of normality). This is not unusual in data coming from a 3-point Likert scale.

Any statistically significant changes from pre to post, will be identified and interpreted. A statistically significant difference in means from pre to post indicates the likelihood that such a difference in mean in the population would occur by chance. For instance, an increase of mean score on Item #3 of .31 (on a scale of 1 to 5) occurs by chance only once in a thousand, as indicated by a p value equal to .001. While this information implies statistical significance (likelihood of occurring by chance), it says nothing about "how big" or "how important" a change of .31 is. To begin to understand these issue, one calculates effect sizes. One of the most well known effect size calculations derives from Cohen. The Cohen Effect Size is essentially the ratio of the change in mean to the standard deviation of the change scores. If the standard deviation of the change scores for Item #3 were around .3, the effect size would be about 1, indicating the change was roughly one whole standard deviation. In the literature, such an effect size is considered "large" (Cohen, 1992; Kirk, 1995). If the standard deviation of the change scores was around 3 (indicate great variability in student responses to Item #3), the effect size would only be .10 – representing a change of about $1/10^{th}$ of a standard deviation. This effect size is considered "small," even though the likelihood that such a change occurred by chance is very unlikely.

The eta squared statistic is considered as an effect size as well (it is most commonly used in analyses of variance but can certainly be used with paired samples analyses), but it is more commonly thought of as a measure of the amount of variance explained in the post-test as based upon the information from the pre-test. In this respect it is similar to the r-squared from correlational or regression studies. In light of this interpretation, a smaller eta squared might be more desirable if our desired outcome was for the students to learn more, and for their post-test scores to go up, reflecting this. Why? If how the students did on the post-test depends heavily on how they did on the pre-test, one could assume that this is due to personal characteristics (e.g. reading ability) that have not changed due to this curriculum. If the eta squared is smaller, whatever changes occurred from pre to post do not depend on factors related to the pre-test but to something that happened between the pre and post-test, namely, the Money Savvy Pig intervention. Eta squared values can be categorized, as suggested by Cohen, similarly to r-squared values: 0.01 small, 0.06 medium, and 0.14 large.

More pre-tests were received than post-tests. This is a common occurrence in year long external curriculum projects: by the end of the academic year teachers may forget to administer post-tests or feel to pressed for time to do so. In addition, students could be absent on either the pre or post-test administration day and in some cases the students might even use a nickname or first name only and thus be hard to match. Nevertheless, we could match 2553 individual pre and post tests from 48 distinct schools and 110 individual teachers. Because paired samples data are more informative than unmatched data from the same source, we did not analyze the unmatched data. In such a large sample, this was deemed unnecessary. In previous studies with other school districts, where both paired and independent samples data were available, the results were very similar.

**Results**

**Mean Item Changes**

Item response means and standard deviations were calculated for the combined group of participating students for whom we had both pre and post tests (N=2553). These are provided in Table 1. When the sample size ("N") is less than 2553 for a particular item, it indicates that a certain number of students left this item blank. The data for every single item differed from normal with a statistical significance less than 1 in 1000 as determined by both the Kolmogorov-Smirnov and Shapiro-Wilks tests. Because of this, the Wilcoxon Signed Ranks test was used to determine if there were any statistically significant changes from pre to post.

**Table 1.** Descriptive statistics for paired samples data from Chicago area students.

|  | N | Pre | SD | Post | SD | Desired change/achieved |
|---|---|---|---|---|---|---|
| Item 1 | 2553 | 2.715 | 0.5350 | 2.789 | 0.4778 | Increase, yes |
| Item 2 | 2544 | 1.368 | 0.6753 | 1.266 | 0.5932 | Decrease, yes |
| Item 3 | 2526 | 1.503 | 0.7644 | 1.454 | 0.7489 | Decrease, yes |
| Item 4 | 2527 | 2.737 | 0.8480 | 2.806 | 0.5027 | Increase, yes |
| Item 5 | 2532 | 1.360 | 0.6911 | 1.265 | 0.5960 | Decrease, yes |
| Item 6 | 2515 | 2.428 | 0.8031 | 2.013 | 0.8921 | Decrease, yes |
| Item 7 | 2522 | 2.118 | 0.7085 | 1.952 | 0.8137 | Decrease, yes |
| Item 8 | 2526 | 2.664 | 0.5960 | 2.796 | 0.4926 | Increase, yes |
| Item 9 | 2538 | 2.735 | 0.5871 | 2.796 | 0.5189 | Increase, yes |
| Item 10 | 2534 | 1.878 | 0.8419 | 1.694 | 0.8267 | Decrease, yes |

**Table 2.** Wilcoxon Z (indicator of significant change) and Cohen effect size of changes.

| Item | Z value | 2-tailed significance | Cohen Effect size | Described Effect Size |
|---|---|---|---|---|
| 1. I know a lot about how to handle my money. | -5.871 | 0.000 | 0.15 | Small |
| 2. Saving money is greedy. | -6.055 | 0.000 | -0.16 | Small |
| 3. It is important to have the things I want when I want them. | -2.477 | 0.013 | -0.06 | Small |
| 4. It is important to save for the things that I want to buy in the future. | -5.422 | 0.000 | 0.10 | Small |
| 5. I want to spend the money I earn right away. | -6.445 | 0.000 | -0.15 | Small |
| 6. It is best to put the money you save in | -17.748 | 0.000 | -0.49 | Medium |

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|---|---|---|---|---|
| your room at home. | | | | |
| 7. When I invest in stocks, I will always make money and never lose money. | -8.323 | 0.000 | -0.22 | Small |
| 8. Business people help others by providing them with goods and services. | -8.820 | 0.000 | 0.24 | Small |
| 9. It is important for families to keep money in real banks. | -4.369 | 0.015 | 0.11 | Small |
| 10. When I donate money it helps others but doesn't help me. | -9.191 | 0.000 | -0.22 | Small |

**Table 3.** Eta squared

| Item | Eta squared | Interpretation |
|---|---|---|
| 1. I know a lot about how to handle my money. | 0.01 | Small |
| 2. Saving money is greedy. | 0.02 | Small |
| 3. It is important to have the things I want when I want them. | 0.00 | Small |
| 4. It is important to save for the things that I want to buy in the future. | 0.01 | Small |
| 5. I want to spend the money I earn right away. | 0.02 | Small |
| 6. It is best to put the money you save in your room at home. | 0.13 | Medium, but very close to large |
| 7. When I invest in stocks, I will always make money and never lose money. | 0.03 | Small |
| 8. Business people help others by providing them with goods and services. | 0.03 | Small |
| 9. It is important for families to keep money in real banks. | 0.01 | Small |
| 10. When I donate money it helps others but doesn't help me. | 0.03 | Small |

**What Tables 1, 2 and 3 tell us about student responses to individual items.**

In general these two tables show that there were statistically significant improvements in student understanding on all ten of the items on the assessment. The individual item changes are described below in terms of averages based on the rating scale: 3 indicating agreement, 2 uncertainty, and 1 disagreement. Following these written descriptions is a table showing how student responses changed from pre to post in terms of percentages of students responding to each response category before and after instruction.

The average response of the students to Item #1 changed from 2.715, leaning towards agreement to 2.789, more strongly agreeing. This indicates an improvement in student self-confidence regarding the proper handling of money. The two-tailed significance implies that this improvement in average score could only have occurred by chance less than 1 in 1000 times. The .15 effect size indicates that this improvement is 15% of an average standard deviation in size. Cohen considers this a "small effect." The eta-squared is also small.

The average response of the students to Item #2 changed from 1.368, leaning towards disagreeing, to 1.266, which is leans further towards disagreeing. This indicates an improvement

in student understanding, because it is appropriate for students to disagree with the notion that saving money is selfish. The two-tailed significance implies that this improvement in average score could only have occurred by chance less than 1 in 1000 times. The -.16 effect size indicates that this improvement is roughly 16% an average standard deviation in size. Cohen considers this a "small effect." The minus sign indicates that the average score decreased from pre to post (which is appropriate for this item). The eta-squared is also small.

The average response of the students to Item #3 changed from 1.503, leaning towards unsure, to 1.454, which is more strongly disagreeing. This indicates an improvement in student understanding, because it is appropriate for students to disagree with the notion that saving money is selfish. The two-tailed significance implies that this improvement in average score could only have occurred by chance less than 13 in 1000 times. The -.06 effect size indicates that this improvement is 6% of an average standard deviation in size. Cohen considers this a "very small effect." The minus sign indicates that the average score decreased from pre to post (which is appropriate for this item). The eta-squared is also small.

The average response of the students to Item #4 changed from 2.737, leaning towards agreement to 2.806, more strongly agreeing. This indicates an improvement in students' perceptions that you should save for the future. The two-tailed significance implies that this improvement in average score could only have occurred by chance less than 1 in 1000 times. The .10 effect size indicates that this improvement is one tenth of an average standard deviation in size. Cohen considers this a "small effect." The eta-squared is also small.

The average response of the students to Item #5 changed from 1.360, leaning towards disagreeing, to 1.265, which is more strongly disagreeing. This indicates an improvement in student understanding, because it is appropriate for students to disagree with the notion you should spend your money immediately. The two-tailed significance implies that this improvement in average score could only have occurred by chance less than 1 in 1000 times. The -.15 effect size indicates that this improvement is about one seventh of an average standard deviation in size. This is a small effect size. The minus sign indicates that the average score decreased from pre to post (which is appropriate for this item). The eta-squared is also small.

The average response of the students to Item #6 changed from 2.428, on the agreeing side of unsure, to 2.013, which, on average, indicates uncertainty. This actually indicates an improvement in student understanding, because the average dropping indicates more students disagreeing with this item which is appropriate for this item (saving money in your room is the best method of saving). The exact two-tailed significance implies that this change in average score could only have occurred by chance less than 1 out of 1000 times. The -0.49 effect size indicates that this decrease in score is almost half of an average standard deviation in size. Cohen considers this a "medium effect." The eta-squared is very nearly large.

The average response of the students to Item #7 changed from 2.118, on the agreeing side of uncertain, to 1.952, which is now on the disagreeing side of uncertain. This indicates an improvement in student learning because it is more appropriate for students to disagree with the idea that investing in the stock market always pays off. The two-tailed significance implies that this change in average score could only have occurred by chance less than 1 out of 1000 times. The -.22 effect size indicates that this improvement is almost one quarter of an average standard deviation in size. Cohen considers this a "small effect." The eta-squared is also small.

The average response of the students to Item #8 changed from 2.664, leaning towards agreement to 2.796, more strongly agreeing. This indicates an improvement in students' perceptions that business people help others and how they do so. The two-tailed significance implies that this improvement in average score could only have occurred by chance less than 1 in 1000 times. The .24 effect size indicates that this improvement is just less than one quarter of an average standard deviation in size. Cohen considers this a "small effect." The eta-squared is also small.

The average response of the students to Item #9 changed from 2.735, leaning towards agreeing, to 2.796, leaning even more towards agreeing. This indicates an improvement in student understanding because more students agree that it is important for families to keep money in real banks. The two-tailed significance implies that this change in average score could only have

occurred by chance 15 in 1000 times. The .11 effect size indicates that this improvement is roughly 11% of an average standard deviation in size. The eta-squared is also small.
The average response of the students to Item # 10 changed from 1.878, learning towards uncertain, to 1.694, which also leans towards uncertain, but not as much (in the direction of disagreeing). This indicates an improvement in student understanding because more students should disagree that donating money only helps the recipient. The two-tailed significance implies that this change in average score could only have occurred by chance 1 out of 1000 times. The -.22 effect size indicates that this improvement is 22% of an average standard deviation in size. Cohen considers this a "small effect." The eta-squared is also small.

These interpretations are also presented in terms of the changes in percentages of students picking each possible choice before and after being taught in Table 4.

**Table 4.** Percentages of chosen responses to selected items on matched pre and post-measures.

| Item | Response Category` | % students pre-test | % students post-test | Comments |
|---|---|---|---|---|
| 1 | 1 disagree<br>2 unsure<br>3 agree | 4.1<br>20.3<br>75.6 | 3.1<br>14.9<br>82.0 | Fairly large percentages believing they know how to handle money before and after participation. 5.4 % fewer unsure after. 6.4% more students agreeing that they can properly handle money after participation. |
| 2 | 1 disagree<br>2 unsure<br>3 agree | 74.4<br>14.5<br>11.2 | 81.2<br>10.9<br>7.8 | 6.8% more students disagreeing that saving is greedy. 3.6 % fewer unsure. 3.4 % fewer students agreeing that saving is greedy after participation. |
| 3 | 1 disagree<br>2 unsure<br>3 agree | 66.4<br>17.0<br>16.6 | 70.2<br>14.2<br>15.6 | More than half disagreeing with immediate gratification to begin with. 3.8 % more students disagreeing with immediate gratification, after instruction. 2.8 % fewer unsure. 1.0 % fewer agreeing with immediate gratification. |
| 4 | 1 disagree<br>2 unsure<br>3 agree | 6.5<br>14.4<br>79.1 | 4.8<br>9.7<br>85.5 | 1.7 % fewer students disagreeing after instruction that saving for future is important. 4.7% fewer unsure about this and 6.4 % more agreeing. |
| 5 | 1 disagree | 76.3 | 81.5 | 5.2 % more students disagreeing, 1 % fewer unsure, |

| | | | | |
|---|---|---|---|---|
| | 2 unsure | 11.4 | 10.4 | and 4.3 less agreeing with the statement that they want to spend their money right away. |
| | 3 agree | 12.3 | 8.0 | |
| 6 | 1 disagree | 20.0 | 39.1 | 19.1 % more students disagreeing that you should keep money in your room at home. 3.2 % more unsure. 22.4 % fewer agreeing with this after participation. |
| | 2 unsure | 17.2 | 20.4 | |
| | 3 agree | 62.8 | 40.4 | |
| 7 | 1 disagree | 19.8 | 35.6 | 15.8 % more disagreeing that you always make money on stocks. 14.9% fewer unsure. 0.8 % fewer agreeing with this. Most of those disagreeing with this after instruction came from the unsure category. |
| | 2 unsure | 48.6 | 33.7 | |
| | 3 agree | 31.6 | 30.8 | |
| 8 | 1 disagree | 6.6 | 4.0 | 2.6 % fewer disagreeing that business people help others with goods & services, although very few disagree with this before or after. 7.9 % fewer unsure. 10.6 % more students agree with this after participation. |
| | 2 unsure | 20.3 | 12.4 | |
| | 3 agree | 73.0 | 83.6 | |
| 9 | 1 disagree | 7.5 | 5.4 | 2.1 % less disagree that it is important for families to keep money in real banks, although a small percentage do so. 1.9 % less unsure and 4.1 % more agreeing. While there is a small change in the correction direction, almost 81% knew the correct response before participation. |
| | 2 unsure | 11.6 | 9.7 | |
| | 3 agree | 80.9 | 85.0 | |
| 10 | 1 disagree | 42.3 | 54.1 | 11.8 % more disagreeing that saving only helps the saving individual. 5.3 % fewer unsure. 6.6 % fewer agreeing. |
| | 2 unsure | 27.7 | 22.4 | |
| | 3 agree | 30.1 | 23.5 | |

## References

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