



Fostering Family Financial Literacy Via an Interactive Learning Game

An Evaluation Study of *Cha-Ching! Money Adventures*

William Tally, Ph.D.
Jessica Brett
John Parris



Table of Contents

Introduction	3
Sample, Measures, and Materials	3
Sample Cha-Ching! Money Adventures screens	5
Results	7
I. Financial Literacy Learning Outcomes	7
A. Quantitative Analysis	7
Supporting Data	8
B. Qualitative Evidence of Learning.....	9
II. Game Appeal and Game Play Patterns	11
Finding: <i>Cha-Ching! Money Adventures</i> is highly appealing to eight- and nine-year-olds.....	11
Finding: Nearly three-fourths of <i>Cha-Ching!</i> players completed the game.	11
Finding: Most children spent 1–3 hours playing the game.	12
Finding: Most Cha-Ching! Players Repeated at Least One Module.....	12
Finding: Children said overwhelmingly that they like <i>Cha-Ching!</i> and would recommend it to a friend.	13
Kid Quotes	14
III. <i>Cha-Ching!</i> and Parent-Child Interactions	14
Major Finding: <i>Cha-Ching!</i> fostered family conversations about money.	14
Finding: While most children played alone, one-third played with a family member nearby.....	14
Finding: Children said their parents were more interested in <i>Cha-Ching!</i> than in other games.	15
Finding: <i>Cha-Ching!</i> fostered a greater amount of parent-child talk than the control games.....	16
Finding: Family conversations provoked by <i>Cha-Ching!</i> covered a wide range of financial ideas, habits, and behaviors.....	16
Descriptions of Child-Parent Conversations.....	16
IV. Conclusion and Implications	18
Study Limitations.....	18
Broader Implications	19
References	20
Appendix	21

Introduction

In a globalized world, financial decision-making has ever greater importance for individuals, families, and communities. Yet financial literacy is not widespread in developed countries, and even less prevalent in the developing world, where gender and socioeconomic gaps persist as well (Lusardi, 2019).

Since 2012, the Prudence Foundation has been working to address these gaps by creating and distributing financial literacy media and curricula targeting 7- to 10-year-olds in Asia and, more recently, Africa. *Cha-Ching!* is a multipronged learning initiative that reaches children, teachers, and parents in schools and at home through broadcast TV, digital and print curriculum, and web-based videos and interactives. The core of *Cha-Ching!* is an animated cartoon series featuring characters and songs that introduce children to basic concepts like earning, saving, spending, and donating. Built to accompany the cartoon series are a school-based curriculum, a website with activities and materials for parents and children at home, and, now, a new interactive learning game, *Cha-Ching! Money Adventures*.

Cha-Ching! Money Adventures is an interactive learning game designed to introduce 7- to 10-year-olds to the fundamental financial concepts of Earning, Saving, Spending, and Donating, and to foster family dialogue about financial decisions. In each of four problem-based scenarios, children help a *Cha-Ching!* character set a financial goal; make decisions and track earning, spending, and saving over time; and assess and revise their plan accordingly. The game situates financial problem-solving in a narrative quest, and children practice key financial literacy concepts and skills with the help of a wide variety of auditory and visual feedback and scaffolding. The game was created by Two Moos, a Melbourne, Australia-based educational media design studio, with content overseen by Education Development Center (EDC), a nonprofit education and health organization based in Waltham, MA, USA.

In January 2022, EDC researchers conducted an evaluation study of *Cha-Ching! Money Adventures* to determine its appeal and effectiveness for eight- to nine-year-olds playing the learning game at home.

Sample, Measures, and Materials

Sample. The home study was conducted with approximately 300 children, ages eight and nine, in the Philippines, an important market for wider *Cha-Ching!* materials. Participants were recruited by staff from Junior Achievement of the Philippines, which, working with regional school administrators, identified geographically varied groups of fourth-graders whose parents were contacted and asked to participate. These were the inclusion criteria:

- Children were in the fourth grade during the 2021–2022 school year.

- Children had not used the *Cha-Ching!* curriculum in school.
- Children had a stable Internet connection at home, via computer, tablet, or smartphone.
- Children were fluent in English.

The study was a pre-/post comparison group design. Students were randomly assigned to one of two groups: Treatment students played the *Cha-Ching!* financial literacy game at home over two to three weeks. Control students played a selection of science, math and ecology games over the same period.

Measures. Prior to beginning game play, all students completed a 24-item test of Basic Financial Literacy. At the conclusion of game play, typically three to four weeks later, students completed the same 24-item test (with items in a different order) and answered questions about their experience of the games and the context of home play.

The knowledge portion of the pre-/post-test included a total of 24 questions covering the four financial literacy concepts addressed by *Cha-Ching!*—Earning, Saving, Spending, and Donating. The test was based on the *Basic Finance Test* developed by the Council for Economic Education (CEE) as a standardized assessment of personal finance knowledge for grade school children. The questions were slightly modified to better align with the content addressed by the *Cha-Ching!* financial literacy program and game. For example, the *Basic Finance Test* does not include items related to the concept of Donating, so the study team developed items on this topic following the format of the other questions in the *Basic Finance Test*. A draft of the knowledge measure was piloted with a dozen children in the United States and Philippines, and items were adjusted to reduce ambiguity and widen the range of correct and incorrect responses. (See Appendix for measure.)

Study implementation. Working remotely during the Covid pandemic, educators and staff from Junior Achievement of the Philippines administered the pretest to children in their homes, and monitored their completion of it, beginning on January 10, 2022, and ending on February 11, 2022. Immediately following, children were given access to the treatment game or control games and were asked to spend about two hours playing the game or games at home, in their free time, over two weeks. Children played the games on a smartphone, a tablet, or a computer. The post-test was administered to children in the same way (online and at home, monitored by educators or Junior Achievement staff) beginning January 20 and ending March 18, 2022.

Several challenges made study implementation difficult, leading to significant attrition and data loss. First, Covid-related child absences and school closures delayed the onboarding of many children and sometimes meant that significant clusters of children could not participate. Second, unanticipated software and device compatibility issues prevented some children from completing the pretests and moving on to playing the games, adding to attrition. Third, communication with children and families could only occur through school and Junior Achievement of the Philippines intermediaries, which, during the pandemic, made it difficult to identify and address implementation problems in a timely manner, leading to additional dropouts. Implications are discussed below under “Study Limitations.”

As a result, from an initial 777 children identified as potential subjects and assigned to treatment and control groups, we had a total of 461 students complete the pretest and 306 complete the post-test. Table 1 shows that our total number of matched pre- and post-tests, and therefore our N for the purpose of data analysis, was 293, which included 160 children in the treatment group and 133 children in the control group.

	Pretest	Post-test	Pre- and post-test
Treatment	241	166	160
Control	220	140	133
Total	461	306	293

Table 1: Student participation

Treatment materials. *Cha-Ching! Money Adventures* consists of four game-based learning modules, each focusing on one of four major clusters of financial literacy knowledge and skills: Earning, Saving, Spending, and Donating. The modules use characters, situations, and songs from the *Cha-Ching!* cartoon series to engage learners in financial decision-making and problem-solving. Players must create an earning, saving, spending, or donating plan; try to execute it; and, based on feedback, revise and adjust their plan. Completing a module unlocks the next one, and players progress along a narrative quest—a Band Tour—until they unlock the final Stadium Concert.

Sample *Cha-Ching! Money Adventures* screens

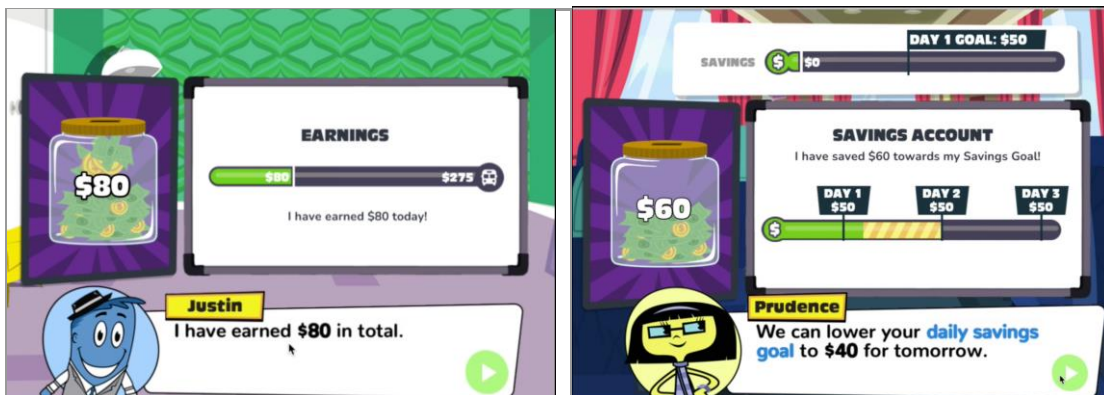


Figure 1: EARN Module: Keeping track of earnings Figure 2: SAVE Module: Calculating a new savings goal

Control materials. Children in the control group played a set of science, math, and geography learning games for upper elementary children available on the National Geographic website. These games used a similar set of engaging game design elements as *Cha-Ching!*—characters, animation, problem scenarios, scaffolding, feedback, and game rewards—to engage children with learning content not related to financial literacy.



Figure 3: Sample control group games: National Geographic Kids

Data analysis. Student scores (number of correct answers) on the 24-item pre-/post-test were examined by module and by their overall score on the test. An initial comparison looked at the scores by the following groups: control, treatment, game players (had played *Cha-Ching!*), completers (had completed all four modules), and high game players (had completed all four modules, repeated at least one module, and played the game for more than 90 minutes). Secondary analyses looked at the direction of score change from pre- to post-test; that is, did their score decrease, stay the same, or improve? Lastly, a regression analysis was completed to test for statistical significance.

Results

This section presents the study's major findings in three categories:

- I. Financial Literacy Learning Outcomes
- II. Game Appeal and Game Play Patterns
- III. Cha-Ching! and Parent-Child Interactions

I. Financial Literacy Learning Outcomes

A. Quantitative Analysis

Quantitative study results indicate that ***Cha-Ching! Money Adventures* is effective in improving children's knowledge of the core financial literacy concepts of Earning, Saving, Spending, and Donating.**

Specifically, analysis of pre-/post learning data for *Cha-Ching!* and control children shows that:

- ***Cha-Ching!* players, as a group, improved on the *Basic Finance Test*, while control students did not.** Although the magnitude of the improvement was modest, it was significant.
- ***Cha-Ching!* players who completed all four modules improved more than those who completed only one or two of the modules, again relative to the control group.**
- **"High" *Cha-Ching!* players—those who completed all four modules, repeated at least one module, and spent more than 90 minutes playing—showed still more learning gains, relative to the control group.** Over half of these children (54%) showed improvement from pre- to post-test, whereas only 41% of control children did so.

Supporting Data

Table 2 presents a regression analysis showing that “game players” (i.e., *Cha-Ching!* players) have higher post-test scores compared to control players, controlling for the pretest. As a group, they improved on an average of one test item from pre- to post-test, while control players declined or showed no improvement. The difference is statistically significant, with a 5% error interval.

Source	SS	df	MS			
Model	1950.14306	2	975.07153	Number of obs	=	288
Residual	3285.35694	285	11.5275682	F(2, 285)	=	84.59
Total	5235.5	287	18.2421603	Prob > F	=	0.0000
Post-test				R-squared	=	0.3725
	Coef.	Std. Err.	t	Adj R-squared =	=	0.3681
				P> t		[95% Conf. Interval]
pretest	.6352542	.051833	12.26	0.000	.5332302	.7372782
game players	1.035036	.414958	2.49	0.013	.2182645	1.851807
_cons	5.083167	.836737	6.07	0.000	3.436198	6.730135

Table 2: Regression analysis: *Cha-Ching!* vs. *non-Cha-Ching!* game players

Table 3 shows the direction that scores changed from pre- to post-test for four groups. Of all control students, 41% improved on the post-test, while a higher number of all *Cha-Ching!* players, 46%, improved. When we look at the subset of *Cha-Ching!* “completers” (those who completed all four modules), we find that over half, or 52%, improved from pre- to post-test. Finally, we see that among children who were “high” *Cha-Ching!* players (playing all four modules, repeating at least one, and playing for more than 90 minutes), a still higher proportion, 54%, improved from pre- to post-test.

	Raw number			Percent		
	Decrease	No change	Increase	Decrease	No change	Increase
Control (ITT) (n=133)	63	16	54	47	12	41
Treatment (ITT) (n=160)	59	31	70	37	19	44
Treatment (game players) (n=117)	43	20	54	37	17	46
Treatment (completed four modules) (n=79)	24	14	41	30	18	52
Treatment (high players (n=52)	14	10	28	27	19	54

Table 3: Directional change in scores (pre- to post-test)

Taken together, these findings indicate that for eight- to nine-year-olds, playing *Cha-Ching! Money Adventures* leads to modest but statistically significant improvements in basic financial literacy, as measured by the *Basic Finance Test*.

Furthermore, completing all four modules leads to a greater improvement, and completing all modules, repeating one or more modules, and playing for more than 90 minutes leads to still more improvement.

These findings should be viewed in the context of the study conditions. For a discussion of these conditions, please see “Study Limitations” in the “Conclusion and Implications” section below.

B. Qualitative Evidence of Learning

The post-test asked children the open-ended question, “What, if anything, did you learn in playing the games?” Their responses support and add detail to the findings from the standardized measure. Based on a thematic analysis of children’s responses, four patterns of learning are evident in their statements.

1. Players internalized the four key financial ed concepts: Earning, Saving, Spending, and Donating.

Nearly all players (92%) mentioned at least one of the four key financial literacy concepts in describing what they learned; almost half (46%) mentioned at least two; 15% mentioned all four concepts. Examples of children’s statements included the following:

- *I learned about saving money, how to earn by working hard, and to spend money wisely and donate to people in need.*
- *I learned a lot about how to be a smart-money kid. I should earn, save, spend, and donate!*
- *I learned to earn, save, spend, and donate wisely. (18 children said this)*

2. Players took away important messages about financial responsibility.

In addition to specific ideas about earning, saving, spending, and donating, several comments suggest that Cha-Ching! made children aware that they, and not just their parents or elders, can and should be financially responsible. Examples of children’s statements included the following:

- *I realized that children like me should be responsible for the decisions that we make when it comes to spending and saving money.*
- *I have learned that it is fun to save and earn while helping others. I will help my family when I get a job someday.*
- *I’ve learned to value money and how to manage money effectively, and also learned how to appreciate the money, and give it to others.*
- *Playing this game, I learned to save money and also think about happiness for myself and others too.*
- *Yes, I learned about being financially smart. It’s something even kids should know.*

3. Players absorbed key content under each of the four main concepts.

Examples of children's statements included the following:

Earning

- *I learned that if you want to earn money, you have to use your skills.*
- *I learned that I need to choose work that I am happy with and have skills for.*
- *You can earn money little by little.*
- *I learned that it feels good to have something I earned from hard work.*
- *I learned that my well-being is important in earning. If you really don't like a job, it might not be right for you.*

Saving

- *I learned how to be wise, practical, and be smart in saving money.*
- *I learned that saving money is also saving a future.*
- *I learned how to budget and save money. I also learned to only choose things that I need.*
- *This game is teaching me to save money.*
- *I can save money little by little...but don't forget my happiness or my well-being.*

Spending

- *I learned how to spend money wisely on things I really need, not just what I want.*
- *Spending money on things for your friends makes you feel good.*
- *I learned how to spend money safely and wisely.*
- *I learned that in spending and earning money, you should think about your friends and happiness.*
- *I learned how to use money on the proper things, that are most important.*
- *The most important thing I learned in Cha-Ching! is that spending money to buy the things you like doesn't mean that you will be happy forever.*

Donating

- *I learned to donate things that I no longer use.*
- *I learned it is good to donate, and my favorite character is Charity.*
- *I learned to help other people.*
- *If you donate money to help people, you feel good.*
- *I learned that it feels good to help others, not only by donating money but also by sharing my time, effort, and talent.*

II. Game Appeal and Game Play Patterns

Finding: *Cha-Ching! Money Adventures* is highly appealing to eight- and nine-year-olds.

Cha-Ching! Money Adventures was very appealing to children, and they were highly motivated to play the game. This was evident in the following:

- The rates at which they completed the game (72.2% played all four modules)
- The amount of free time they spent playing it at home (averaging one to two hours)
- The frequency of repeat play
- Their ratings and comments on the game after playing it

Finding: Nearly three-fourths of *Cha-Ching!* players completed the game.

Figure 4 shows that nearly three-quarters of children who started *Cha-Ching! Money Adventures* (72.2%) completed all four game modules. A remarkably small number (5.7%) stopped playing before completing Module 1, and roughly a quarter played one to three modules. Because children were playing on their own at home, and not for school credit or as a homework assignment, this is a strong indication of the game’s appeal and “stickiness” for children in this age group.

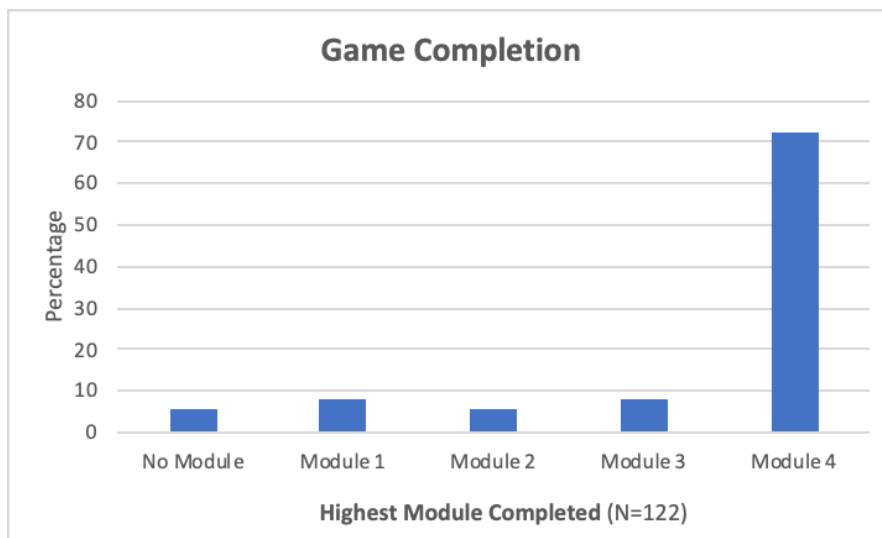


Figure 4: Level of game completion (N=122)

Finding: Most children spent 1–3 hours playing the game.

Based on back-end game logs, *Cha-Ching! Money Adventures* players spent an average of 1 hour and 50 minutes playing the game over two weeks at home. Figure 5 below shows the distribution of time children spent playing the game. These numbers compare favorably with comparison children’s reports of how long they spent on the control games from National Geographic Kids. Overall, the substantial playing time—over a third of players spent more than two hours playing—underscores the appeal and “stickiness” of *Cha-Ching! Money Adventures* for children in the target age range.¹

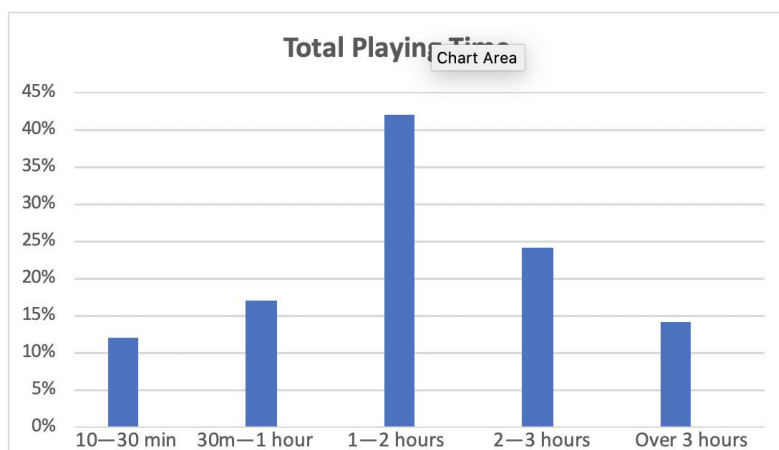


Figure 5: Duration of game play (N=115)

Finding: Most Cha-Ching! Players Repeated at Least One Module.

Cha-Ching! Money Adventures has a scoring and reward system that encourages children to replay modules until they achieve a high enough score to ‘unlock’ an animated pay-off sequence at the end of the game. This appeared to motivate repeat play and deeper engagement with the game. Well over half of children (60%) chose to replay at least one module, and more than half of these (32% in total) re-played modules four or more times.

Figure 6 below shows the percentage of players who repeated each module. More children (55%) repeated Module 2, on Saving, than any other, followed by Module 1, on Earning. Slightly less than a third (29%) repeated Modules 3 and 4, on Spending and Donating, respectively. The degree of repetition corresponds to the difficulty level of the modules, suggesting that children were replaying in an effort to improve their scores, a sign of effective engagement and motivation.

¹ Figures at the upper end may be somewhat inflated; it is possible, for example, that some children left their computer or smartphone in the middle of a module and returned to finish it later, resulting in a higher playing time than is accurate.

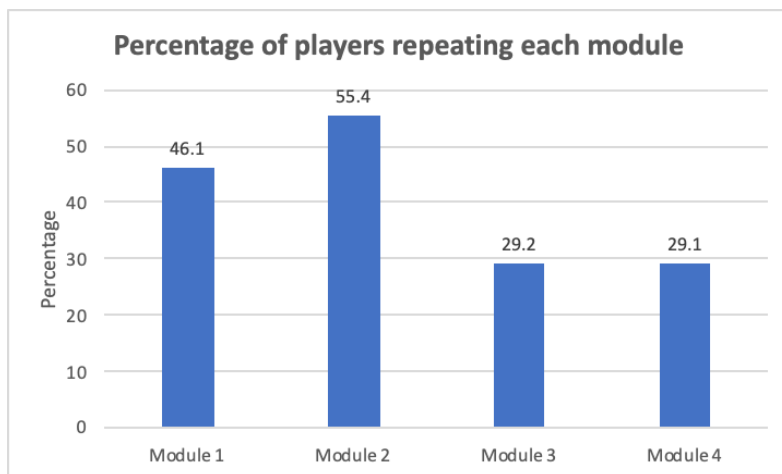


Figure 6: Percentage of players repeating each module

Finding: Children said overwhelmingly that they like *Cha-Ching!* and would recommend it to a friend.

Nine in ten children who played *Cha-Ching!* (89%) said they liked the game, and nearly three-quarters (73%) said they liked the game “a lot.” Figure 7 below shows that children rated the *Cha-Ching!* games as more appealing than the control games from National Geographic Kids. In addition, fully 97% of *Cha-Ching!* players said they would recommend the game to a friend.

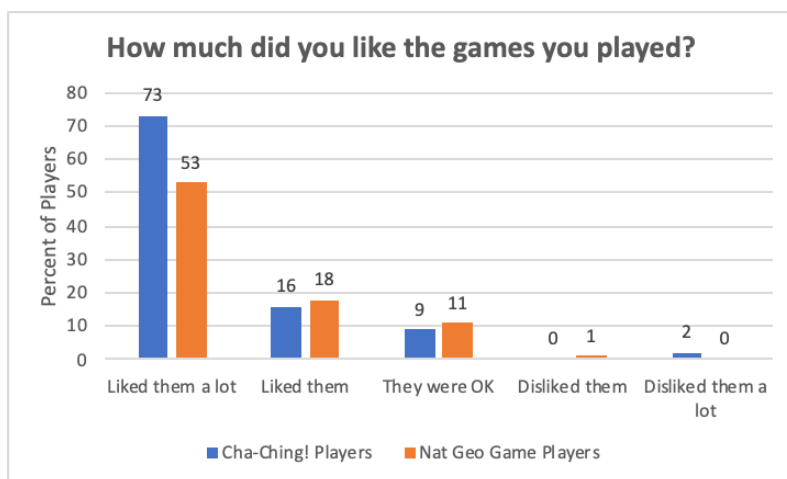


Figure 7: Appeal of *Cha-Ching!* and control games (N=113)

In open-ended responses, children gave three main reasons for liking and recommending *Cha-Ching! Money Adventures* to friends:

- The game was a lot of fun.
- They learned how to be smart with money.
- They felt more competent, and proud of themselves.

Kid Quotes

Why did you like *Cha-Ching!*? / Why would you recommend it to friends?

- *It made me inspired. The games were fun and exciting, and you learn while playing them.*
- *I'm proud of myself after I play it.*
- *I learned to be smart in using money.*
- *You learn how to spend and donate wisely, and you also enjoy the game a lot!*
- *I want my friends to learn what I have learned in Cha-Ching!.*
- *I learned to be smart in using money.*
- *It helps you save money, and also have an idea about your options in life.*
- *I learned how to save and prioritize, and they will too.*
- *It was so fun to play, and you have the knowledge to save, earn, spend, and donate.*
- *It's really fun to do.*
- *It was so fun and exciting playing it.*

III. *Cha-Ching!* and Parent-Child Interactions

Major Finding: *Cha-Ching!* fostered family conversations about money.

Family conversations about money are an important contributor to financial literacy among children and youth (see, e.g., Hanson & Olson, 2018). Accordingly, one goal of *Cha-Ching! Money Adventures* is to foster such conversations between children and caregivers. Although a parental text notification feature specifically designed to promote this was not operative during the study, evidence suggests that even without this feature, *Cha-Ching!* learning games fostered exactly the kind of parent-child talk they were intended to.

Finding: While most children played alone, one-third played with a family member nearby.

Figure 8 indicates that a fifth of children (22%) had a parent nearby. Slightly fewer parents (18%) were nearby while children played the control games.

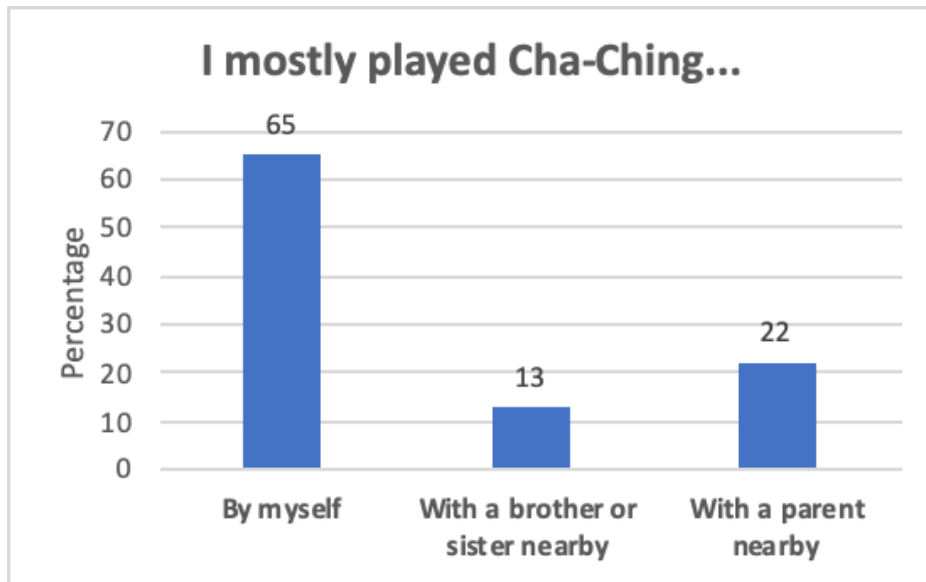


Figure 8: Children's status while playing

Finding: Children said their parents were more interested in *Cha-Ching!* than in other games.

Two-thirds of *Cha-Ching!* players said their parents were interested in their game playing "a lot," compared to 43% of control game players. See Figure 9.

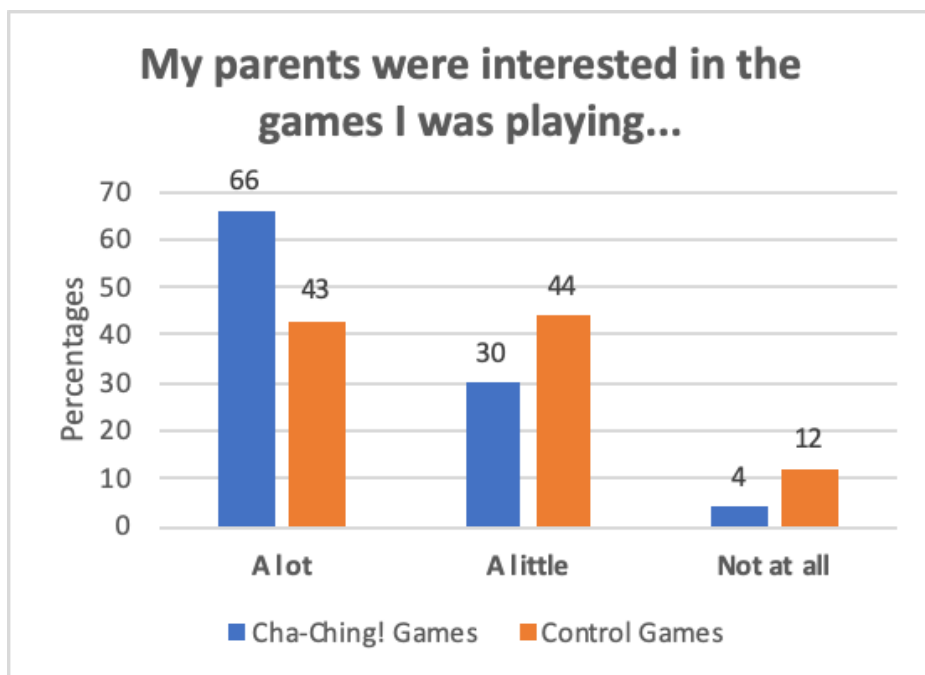


Figure 9: Parent interest in game play, reported by children

Finding: *Cha-Ching!* fostered a greater amount of parent-child talk than the control games.

Figure 10 below shows that almost twice as many *Cha-Ching!* players than control game players said they talked with their parents about the game “a lot” (59% versus 33%).

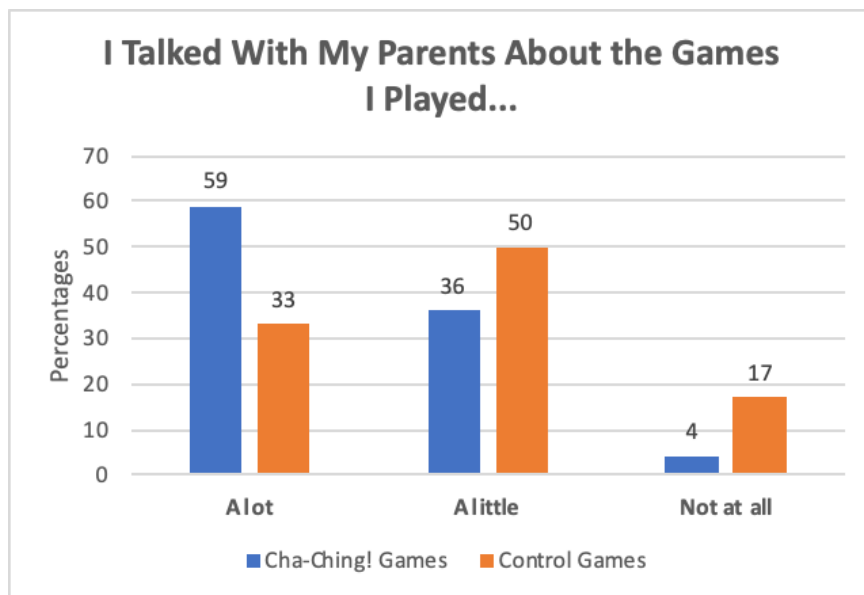


Figure 10: Frequency of family talk in *Cha-Ching!* and control cohorts

Finding: Family conversations provoked by *Cha-Ching!* covered a wide range of financial ideas, habits, and behaviors.

Cha-Ching! players responded to an open-ended prompt—“Please tell us what you and your parents talked about”—by describing conversations they had with parents about the following:

- Money in general, and the importance of being “money smart”
- Specific ways they might earn, save, spend, and donate
- Behavior changes they were undertaking
- The game itself as a way to learn about money

Descriptions of Child-Parent Conversations

Conversations about money in general

- I talked to my parents about decisions with money.
- Me, my Mommy, and my Dad talked about how important it is to learn about money. Money is an important tool, but safety, health, and happiness are sometimes more important.
- We said we should use money wisely, and I should practice to earn, save, spend, and donate.

- *Mama and I are talking about how to save money. She also teaches me the wants and needs when saving.*
- *I told them that budgeting money is good for us.*
- *How to earn money and save money wisely. Be wise and be practical when it comes to money.*

Conversations about earning, saving, spending, and donating

- *We talked about how you need to work hard to earn money.*
- *We said you can earn money by doing things you like to do, like playing guitar and piano.*
- *Me and my parents talked about saving. She said don't spend that much money, so if you need something or in case of an emergency, at least you have money in your bank account.*
- *I talked about saving money and not buying too much things that I don't need.*
- *After playing Cha-Ching!, I told my mom that we shouldn't waste money on useless things, we should save to buy necessities and also help others in need. And I promised my parents that I would not ask for money to buy useless things.*
- *We talked about how you can learn to spend on things you really need, and save money.*
- *I talked to my parents that I will use money wisely and buy things that are important to me. I learned about how to save.*
- *We said I should not give all my money on donation, I should save some of it.*

Conversations about behavior change

- *I made a savings challenge with my cousins and friends*
- *I'm going to save money and buy things that benefit me.*
- *We talked about how can I save my snack money. I am putting it in the jar with my sister.*
- *I am excited to share this experience to my cousin and friends.*
- *I gave advice to my mother to save money and don't buy many clothes.*

Conversations about the *Cha-Ching!* game, and game play

- *I told my Mom that it was very fun and exciting game. I really liked all the activities and I learned a lot. I am excited to share this experience to my cousin and friends.*
- *I asked for help in how I can get more money on the adventures and complete [the game] with three stars.*
- *Some other [modules] are hard a bit, so I asked one parent to guide me.*
- *I talked about what I learned to do with my money/dollar savings.*
- *I told them it was so much fun to play.*
- *My parents are always by my side to help me with Cha-Ching!.*

- *I told them Cha-Ching! is the best way to learn how to save money.*
- *I told my parents that I learned a lot about spending money wisely, saving money, donating, and making good decisions. That I love the Cha-Ching! games and the graphics of it.*
- *I talked about how I really love the game, and that our well-being is also important.*

IV. Conclusion and Implications

EDC's evaluation of *Cha-Ching! Money Adventures* examined the appeal and learning impact of the game for approximately 300 fourth-graders and their families playing at home, in the Philippines. By comparing the responses of *Cha-Ching!* players to players of non-financial literacy games on a range of measures, the study found the following:

***Cha-Ching! Money Adventures* is highly engaging for eight and nine-year-old players at home.** Rates of game completion, playing time, and repeat play were remarkably high for this learning game, even though children were playing it voluntarily on their own time at home.

***Cha-Ching! Money Adventures* measurably, if modestly, improves children's financial literacy.** Players improved on a measure of financial literacy to a statistically significant degree, while control students did not.

***Cha-Ching!* helps foster family conversations about money.** The game helped foster the kinds of parent-child conversations about earning, saving, spending, and donating that play an important role in the development of children's financial literacy.

Study Limitations

Findings reported here should be viewed against the backdrop of several constraints that made study implementation difficult and contributed to significant attrition and data loss. First, Covid-related child absences and school closures during the study period delayed the onboarding of many children and sometimes meant that significant clusters of children could not participate. Second, unanticipated software and device compatibility issues prevented some children from completing the pretests and moving on to playing the games, adding to attrition. Third, communication with children and families could only occur through school and Junior Achievement of the Philippines intermediaries, which, during the pandemic, made it difficult to identify and address implementation problems in a timely manner, leading to additional dropouts. As a result, our final data set included approximately 300 children—far fewer than the intended 777 children.

Accordingly, while reported differences between treatment and control groups are likely due to game effects, they may also be attributable to other factors. First, we do not know whether the children who were able to participate fully in the study are different, in consequential ways, from the children who were not able to do so. Attrition analyses suggest that those who began but did not complete the study (i.e., those with a pretest only) were *not* significantly different in their financial literacy from those who completed it; however, we do

not know if the group of children who were not able to enroll at all differed from the group that did.

Second, even though schools' roles were limited—they helped administer the online pre- and post-tests and did not know which condition children were in—it is possible that teacher or school effects may have been operating. For example, a principal or a teacher may have had a conscious or unconscious preference for financial literacy or science, math, and ecology games and may have communicated this to children inadvertently, with unknown effects.

Third, back-end game play data was not available for the control games, so researchers had to rely on control children's self-reported estimates of game play time, game completion, etc. If their actual game play differed markedly from their estimates, this could conceivably have influenced their appeal and financial literacy scores, though it seems unlikely.

Fourth, and finally, the challenges of implementation during the Covid pandemic very likely reduced the overall impact of the intervention, in which case the modest positive learning effect reported may significantly underestimate the true learning impact of the game. For this reason, replication of the study under more stable conditions, in the Philippines or another developing country, is recommended.

Broader Implications

Study results suggest two avenues for continued research and program development aimed at improving financial literacy in the developing world, and beyond.

First, delivering learning experiences via mobile devices is a promising way to engage children and families in informal learning activities that can enhance their educational and social capital. Access to mobile devices with Internet connectivity is becoming widespread in developing countries. In this study, fully 44% of Filipino children in largely working- and middle-class households played *Cha-Ching!* on a smartphone, followed by laptop (23%), tablet (18%), and desktop computer (15%). Thus, the current study adds to a growing body of research on the use of mobile devices, text messaging, and web chats as effective ways to engage family learners who may be otherwise hard to reach with learning materials (Germeroth et al., 2018; York & Loeb, 2014).

Second, using media to foster family talk about money and finances is a promising direction for the field of financial education. Two-thirds of *Cha-Ching!* players said their parents showed interest in the financial learning game they were playing, and 60% reported that it led to family talk about money and specific ways to earn, save, spend, and donate. Because family conversations about money are an important factor contributing to financial literacy among children and youth (Hanson & Olson, 2018), this is an encouraging finding. In this regard, a feature of *Cha-Ching!* that went unexplored in the current study should be the focus of future research: a parental notification feature that pushes email or text messages to parents when children complete the game modules, summarizing what was learned and offering family conversation starters to extend learning. It would be worthwhile to examine whether these kinds of notifications, and perhaps additional digital tools and supports (child and family budget makers, piggy banks, planners, etc.) help families extend and sustain financial learning and conversation.

References

- Germeroth, C., Kelleman, B., Bopp, L., Joyce, J., Underwood, K., & Serdiouk, M. (2018). *Bright by Text evaluation report*. Marzano Research. <https://vdocuments.net/bright-by-text-evaluation-report-evaluation-rep-bright-by-text-evaluation-report.html>
- Hanson, T. A., & Olson, P. M. (2018). Financial literacy and family communication patterns. *Journal of Behavioral and Experimental Finance*, 19, 64–71.
<https://doi.org/10.1016/j.jbef.2018.05.001>
- Lusardi, A. (2019). Financial literacy and the need for financial education: Evidence and implications. *Swiss Journal of Economics Statistics*, 155, Article 1.
<https://doi.org/10.1186/s41937-019-0027-5>
- Walstad, W. B., & Rebeck, K. (2016). *Basic finance test: Examiner's manual*. Council for Economic Education. <https://www.councilforeconed.org/wp-content/uploads/2016/10/BFT-manual-final-040416.pdf>
- York, B. N., & Loeb, S. (2018). *One step at a time: The effects of an early literacy text messaging program for parents of preschoolers* (Working Paper No. 20659). National Bureau of Economic Research. <https://doi.org/10.3386/w20659>

Appendix

Financial Literacy Assessment Used in the Cha-Ching! Evaluation

Adapted from the Basic Finance Test, created for the Council for Economic Education (Walstad & Rebeck, 2016).

Questions Related to *Cha-Ching!* Concepts

- Earn: 6 questions (3,4,5,6,7,& 25)
- Save: 6 questions (14, 15, 16, 17, 18, & 26)
- Spend: 6 questions (8,9,10,11,12, & 13)
- Donate: 6 questions (19, 20, 21, 22, 24, & 27)

EARN

Q3. Abby is looking for a job. She is good at math, but not as good at writing or making things with her hands. Which job might be best for her?

- Children's author
- Store cashier
- Pastry Chef
- Computer artist
- Save money by buying items on sale, even if she might not need them

Q4. Josh works as a dog walker. Ella volunteers at a pet shelter. Natalie cuts hair at a salon. Larry attends computer classes. Which two people are earning money?

- Ella and Josh
- Ella and Larry
- Natalie and Josh
- Natalie and Larry

Q5. Dylan works at a skateboard shop and is paid 500 PHP for each skateboard he sells. What is this 500 PHP called?

- Allowance
- Bonus
- Benefits
- Earnings

Q6. Piper's family rents their cabin to vacationers each summer. What is the main reason?

- The vacationers like to spend time on the lake
- Piper's family can use the money for something they want
- Piper's family does not like to swim in the lake
- Piper's family wants to do something nice for others

Q7. Cindy's Cake Company got 20,000 PHP selling cakes this week and spent 12,500 PHP for their supplies. How much money did Cindy's Cake Company earn this week?

- 7,500 PHP
- 12,500 PHP
- 20,000 PHP
- 32,500 PHP

Q25. When choosing a job or career it is best to think about:

- Whether the job is indoors or outdoors
- Whether your friends like the job
- Whether you have the skills for the job
- Whether the job is easy to do

SAVE

Q14. Connor earns 10,000 PHP a month from working from a job after school. He spends 7,500 PHP a month and puts 2,500 PHP in his bank account. When Connor deposits the 2,500 PHP in his account he is...

- Loaning
- Investing
- Saving
- Financing

Q15. Sophie decides to save the money she got for her birthday. What does she give up by doing this?

- Saving money
- Buying things she wants right now
- Earning interest
- Buying things she wants next year

Q16. A major purpose of banks is to serve as places to

- Earn income
- Pay taxes on time
- Save money safely
- Spend money carefully

Q17. Ariana's goal is to save 500 PHP each month to buy a new bike. The new bike is

- A financial investment
- A deposit into her savings
- A reason for her to save
- A way to get to her job

Q18. Gina wants to save 2,000 PHP to buy her Dad a book for his birthday. Each week she earns 1,000 PHP and spends 750 PHP of it. How many weeks will she need to save to buy the book?

- 6 weeks
- 8 weeks
- 10 weeks
- 12 weeks

Q26. Rosa is saving for new school clothes. Which would help her save more money in her money jar?

- Offer to help her neighbors with chores
- Look for clothes that are on sale
- Spend less money on gum and candy
- Ask her mother to pay for the clothes

SPEND

Q8 Sheila wanted to buy her mother a birthday present, so she bought her a bracelet. Which of these did she do?

- Paid for an activity
- Purchased a service
- Paid for a resource
- Purchased a good

Q9. What should people do when they want many things but do not have enough money to buy them all?

- Borrow money from a friend to buy them
- Decide which ones are most important to buy
- Pay for the least expensive things first
- Pay for the most expensive things first

Q10. Lucy used some of her savings to buy a soccer ball. She made this choice in order to

- Increase her income
- Increase her savings
- Increase her popularity
- Increase her happiness

Q11. Ivan wants to buy new sunglasses. His three choices all cost the same. Which would be a wise decision?

- Ivan buys the sunglasses that his friends are wearing
- Ivan buys the sunglasses that his favorite movie star wears
- Ivan buys the sunglasses that have the best style and sun protection
- Ivan buys the sunglasses that are in an advertisement with happy-looking people

Q12. Mariah is going shopping for school items. Her mother reminds her to stay within her 10,000 PHP budget. Which will help Mariah follow her mother's advice?

- Go shopping with friends who can help her decide what to get
- Only buy items she knows from advertisements
- Make a list of the things she really needs
- Save money by buying items on sale, even if she might not need them

Q13. Alexandra created a budget so she would not waste money. What are the two main things she should keep track of in her budget?

- Her needs and wants
- The costs and benefits of things
- What people owe her and have paid her
- Her earnings and expenses

DONATE

Q19. Ben earns 5,000 PHP a week from his job delivering newspapers. Every week, he donates 500 PHP to the local food bank. What is the most likely reason?

- He only needs 4,500 PHP for his expenses
- His parents told him to donate the money
- It makes him feel good to help others
- It is a school requirement

Q20. The playground where Jane and her friends play has a lot of trash and weeds growing. What should they do?

- Play at the playground, and try to forget the trash and weeds
- Organize a group to help clean up the playground
- Find a job so they can pay to fix the playground
- Tell their parents, since adults have money to fix things

Q22. Bella is good at playing guitar, and there are many needs in her town. What would be way for her to help?

- Help prepare meals at the soup kitchen
- Enter a talent competition that has a big prize
- Volunteer to walk dogs at the animal shelter
- Hold a concert at the senior center

Q24. Lexi has clothes in her closet that don't fit her anymore. What should she do with them?

- Put them in a box, in case she'll need them later
- Give them to a local charity
- Give them to her friends and hope they fit
- Throw them away since they don't fit anymore

Q27. To make this world a better place, we can...

- Earn by doing things we love to do
- Save for long-term goals
- Spend on things that make ourselves happy
- Donate money, time, or items to those in need



Cover Photograph by Chris Leones

300 Fifth Avenue, Suite 2010
Waltham, MA 02451

Boston | Chicago | New York | Washington, D.C.

Web: edc.org
E-mail: contact@edc.org
Phone: 617-969-7100

