POCKET:
A PERSONAL FINANCE GAME

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ABSTRACT

The gamification is a motivational methodology that includes mechanical and dynamic games, not used in recreational activities. Applied to personal finance, shows the importance of balance between income and expense, providing tools for the rational process of making financial decisions. The game is designed to teach this methodology, to strengthen the knowledge, applied to students of the Universidad Nacional de Colombia and professionals of administrative and non-administrative areas. It is identified with the gamification the individual faces financial decisions as a fun way, increasing the knowledge, and at the end of the game all the participants had a similar level.

INTRODUCTION

Financial education is defined like "the process by which the investors and financial consumers develop skills and confidence to acquire major conscience of the risks, financial opportunities, to take informed decisions, to know where to come to ask for help and to take any effective action to improve its financial well-being" (Blanco Hernández, 2015). There is highlighted the importance of the training and the knowledge of information for the correct handling of the family budgets (Carmona, 2013), indicating that the knowledge in the financial handling can bring with it benefits in the personal finance, on the contrary its absence favors the capture of bad decisions, bad organization, departures higher to the income.

With the use of motivational strategies like the gamification, defined as the use of elements of game in contexts that are not a game (Deterding, Sicart, Nacke, O'Hara, & Dixon, 2011) is proposed in a playful way to simulate situations of the everyday life in which it is possible to take decisions use against to the use of the resources, show of the objective decisions, the use of the budget, strategy and the consequences to future.

PERSONAL FINANCE

The personal finance is defined as the study of personal and familiar resources that are considered to be important for the achievement of the financial success, it includes expense, saving, protection and investment of these financial resources (Garman & Forgue, 2011).

Also (Maya, 2014), includes the planning concept and this way it defines the planning of the personal finance PPF as "set of concepts, hardware and skills needed to solve problems and to take financial decisions".

The financial goals are related to the concept of the personal wealth, which can be subjective, since it depends on the individual who does the evaluation (Figueroa, 2009). The above mentioned evaluation depends on the perception of the consumers and the balances of the bank accounts and how the finance changes over the course of time (Berman, Tran, Lynch, & Zauberman, 2014). This way the PPF will be different for every individual who projects the budget, as to which the goals will be personal and in accordance with the interests, the individual will have to concentrate its efforts in maximizing the relation revenue - expense and looking for alternatives that allow to satisfy the financial goals.

It is believed that a preference exists in the property asset investment. In the study of (Bover, 2005) 79.7 % of the assets of the households in Spain, is distributed in property assets. The decision to invest in another real estate property is bigger than the decision to acquire financial assets, this is due to the fact that the revenue is significantly top, in accordance with the Table 1.

Of equal way, for the Colombian case, the preference to the Real Estate as alternative of saving happens in major measurement opposite to other financial alternatives. This due to the biggest access to the mortgage credit and to the additional purchasing power for the remittances. Nevertheless, the housing acquisition isn't always being the best alternative, there are financial, demographic and tributary factors that have influence in the awaited results, we'll be positive or negative (Clavijo, Janna, & Muñoz, 2004).

So that a balance exists between the expense and the revenue, not only it is necessary to carry out the planning and the budget, but also to control the expense and to continue the plan (Vahidov & He, 2010). It is as well as there has tackled the problem of the administration of the personal finance.

Although there is clear the problems with the balance of the countable equation, it is mentioned that another difficulty exists in the handling of the personal finance. The ignorance of the

financial plantation and few cultures of saving, in accordance with the survey of financial load and education of his holdings March - July, 2010 (DANE, 2010).

The bad financial decisions comprise the reduction in the saving, in pension and capital formation, among others (N. García, 2012). The financial education increases the well-being of the individuals and contributes to the general well-being of the economy, since it smooths the functioning of the financial markets. This, because, on having grouped the guessed right decisions of all the persons.

GAME DESIGN: POCKET

Pocket is a game designed for the education of a

methodology for the rational process of decision making financiers in daily situations and to reinforce the knowledge of the persons who have previous formation. The player will have to realize a classification of the income and expenses that appear before the game. In accordance with the taken decisions, there will appear different types of income and expenses.

To give clarity to the assumptions of the game present the Table 2 and Table 3 in which the correct classification is detailed for the income and expenses, respectively.

well as when there exists the option to "Buy" "not to buy" o "not to accept" any product, are chosen inside drop-down list. To realize these classifications, the game delivers to the participant the descriptions of every revenue or expense, avoiding subjectivities.

After finishing the decision making process, the player

TABLE 1
RENT VS ASSETS, (BOVER, 2005)

Revenue Centile	Main Housing	Other real estate properties	Financial assets	Business for work for proper account
Less than 40	72,6%	15,7%	8,6%	3,1%
Between 40 y 60	65,3%	19,6%	9,2%	6,0%
Between 60 y 80	59,1%	22,4%	10,9%	7,5%
Between 80 y 90	55,8%	22,0%	12,7%	9,6%
Between 90 y 100	43,2%	25,2%	19,8%	11,9%

TABLE 2
CORRECT CLASSIFICATION OF INCOME

Income	Classification
Periodic Salary	Fixed
Lottery	Variable
CDT Yields / Investment fund	Variable
Bond granted by the company	Variable
Bond for targets fulfillment	Variable

TABLE 3
CORRECT CLASSIFICATION OF EXPENSES

Expenses	Classification
Market	Variable
Transport	Variable
Quota of handling savings account	Fixed
Mobile telephony	Fixed
Quota of mortgage credit	Fixed
Taxes of the housing	Fixed
Administration	Fixed
Leasehold	Fixed
Vehicle Buy	Superfluous
Maintenance	Variable
Gasoline	Variable
Parking	Variable
Medical	Fixed
Quota of handling credit card	Fixed
Credit Card	Variable
Medical expenses	Variable
Birthday Gift	Superfluous
Shopping XYZ	Superfluous

sends the answers. Once there are received those of all the players, the answers sheet unburdens itself and interface is annexed like the input of the second, which corresponds to a file in Excel formed to generate the cash flows of all the participants of the game. It is necessary to stand out, that although the player has not hit the classification of income and departures, the cash flows generate with the correct places, that is to say, at this point do not bear in mind the classifications that the player realized, these are born in mind to realize the punctuation that the interface calculates automatically, with the help of Table 4 .

Although the winner of the game is who takes the best decisions that are reflected in the biggest cash flow, also there is analyzed the player who realized the classifications of a correct way, this because one of the targets of the game also is to teach

The Interface shows in detail income, expenses, the clear cash flow and the graph that allows to compare the result of each of the players, selecting in the drop-down list the code assigned to the player. The Figure 1, illustrates an example.

winner is selected, verifying what the maximum value of cash flows was in the last period and the loser, with the minor. The above mentioned results will be those who are going to be analyzed in the socialization or feedback.

In this feedback there are indicated to the player which actions it left of realizing that they might generate major participation and profit. The reasons are explained to the players by which gave themselves these results, bearing in mind that some decisions are important and perhaps definitive, depending on the combination that it is realized. The Figure 2 present to the lineaments of Pocket and its elements.

The players have the possibility of analyzing what the mistakes were in the performance of the game and to raise corrective actions. With these conclusions it is checked that strategies and decisions can move into the real life. Also, taking like a flow as basic with negative periods, the resources, lack is demonstrated to support the obligations. On having selected, a

TABLE 4
POCKET TABLE OF POINTS

Concept	Points
To locate correctly the fixed income (for each one)	3
To locate correctly the variable income (for each one)	4
To locate correctly the overheads (for each one)	3
To locate correctly the variable expenses (for each one)	4
To locate correctly the superfluous expenses (for each one)	4
Insurances buy	3
Saving / investment	6

FIGURE 1
CLEAR CASH FLOW

	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period n
Initial Balance	$ 0	$ 7.844	$ 46.884	$ 60.781	$ 64.823	$ 61.538	$ 84.193
Total Income	$ 30.000	$ 61.096	$ 41.232	$ 31.372	$ 31.517	$ 49.667	$20.905.259
Total Expense	$ 22.156	$ 22.056	$ 27.334	$ 27.330	$ 34.802	$ 27.012	$2.035.467
Cash Flow	$ 7.844	$ 46.884	$ 60.781	$ 64.823	$ 61.538	$ 84. 193	$ 18.953.986

FIGURE 2
POCKET LINEAMENTS

Basic concepts	• Income for receiving • Departures (expenses for paying)
Events classification	• Income: fixed and variable • Expenses: Fixed, variable and superfluous • Accept credit card • Realize buys
Decisions	• Every decision leads to a different way • Different events appear • Generate a cash flow
Duration	• 6 periods of time • Period n projected with the decisions of the past • It bears in mind the probabilities of occurrence of certain events

player on the drop-down list generates the cash flow, in accordance with the decisions that this one took.

RATIFICATION OF THE GAME

As soon as the designed game was applied, one proceeds to validate the results of the evaluation of the game, if they fulfill the targets instructional and if this methodology has the awaited effects.

In whole there were 63 players divided between students of ungraduated, postgraduate, professionals of administrative and not administrative careers. The ungraduated students took part in groups of 5 persons and those of postgraduate in groups of 4, the others realized this game of an individual way. In the Table 6 there presents the classification and the whole of the players.

For the analysis of the effect on learning, there takes the initial period of the game in which the participant scarcely begins the decision making process and is compared with the results of the evaluation realized after the feedback, in which the learned concepts happen.

There is realized the test of normality of the Shapiro-Wilk to determine if the average is a parameter typical of the population (Sen & Srivastava, 1990).

Ho: The information is distributed normally
Ha: The information is not distributed normally

With the help of the statistical bundle Minitab the value is calculated p and the test statistic, this bundle uses the Ryan-Joiner test and indicates that it is similar to the Shapiro-Wilk. To accept the void hypothesis, the test needs that the statistician is near to 1 and the value p major turn α.

As is observed in the Figure 3, for the qualifications of the initial period, the test statistician is 1 and the value is p > 0,100. With 95 % of confidence, the void hypothesis is not pushed back, that is to say, the information is distributed normally.

As is observed in the Figure 4 for the qualifications in the final test, the test statistician is 0,995 and the value is p> 0,100. With 95 % of confidence, the void hypothesis is not pushed back, that is to say, the information is distributed normally.

It is chosen to use the test t semi detached because only one set of individuals is hard and realized there are two remarks of each of them, after applied a treatment, in case of this investigation, the treatment is the game and the feedback.

There is realized the analysis of contrast of averages to determine if the averages of the qualifications of the initial period and of the final test, or as per statistics differ, by which the following hypothesis test is realized, in accordance with (Devore, 2008):

Ho: $\mu d = \mu o$, where μd is the average of the difference of the populations and μo is the hypothetical average of the differences.
Ha: $\mu d \neq \mu o$

To realize the averages contrast, it is needed that the number of information of both populations is equal. Therefore, for the meetings of game that were realized in a group way, the result of the team is assigned to every player. It is the case of the students of ungraduated and postgraduate. In the whole of the population of the qualifications of the initial period and of the final test it is 63.

Comparing the averages of the qualifications one concludes that the game and the feedback had an effect on learning of the

TABLE 6
CLASSIFICATION PLAYERS

Classification	Total
Ungraduated students	35
Postgraduate students	16
Administrative Professional career	6
Administrative non Professional career	6

FIGURE 3
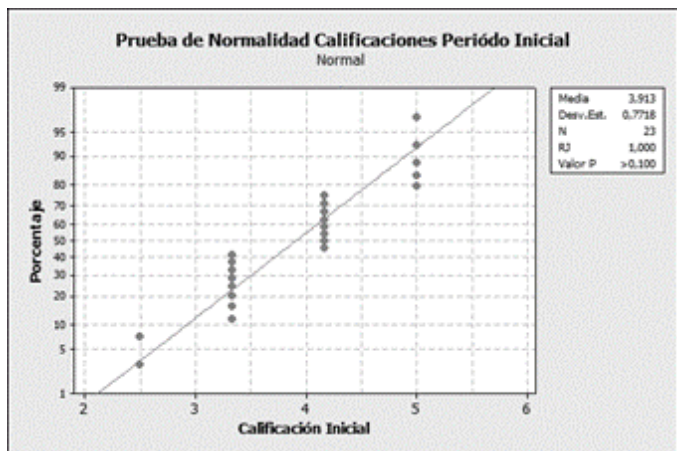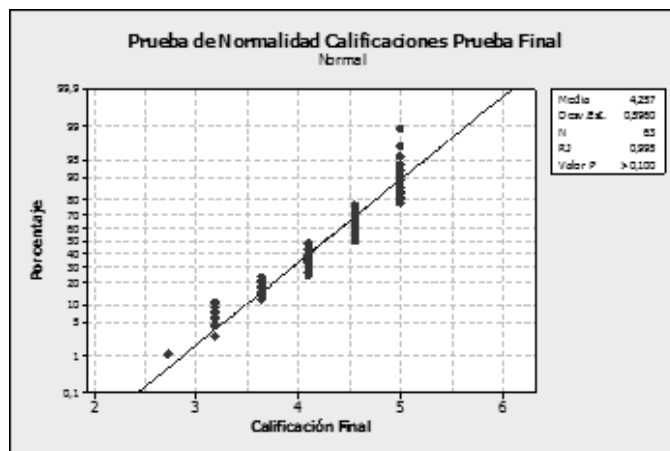## TEST OF NORMALITY QUALIFICATIONS INITIAL PERIOD

FIGURE 4
TEST OF NORMALITY QUALIFICATIONS FINAL PERIOD

participants, since the qualification mediated in the final test it was 4.3, superior to the qualification average of 3.9 in the initial period of the game

Of the same figure, with regard to the standard deviation, one concludes that the results of the qualifications in the final test, after applied the game, are closer to the average, to a comparison of the standard deviation of the results in the initial period, which was more dispersed. This indicates that the game helped to level the knowledge of the participants, since the qualifications were more nearby between themselves in the final evaluation.

CLOSING ARGUMENT

As it is observed in the Table 5 in average, the participants obtained positive cash flows, quite thanks to the initial balances of the flows of periods 1, 2 and 3 where the income overcame the expenses, which indicates that for these periods the decisions related to the expense were balanced. Nevertheless, from the period 4 the income and expenses were not balanced and the savings of the initial periods were the persons in charge of endorsing the expenses up to the period 5 and 6 repeats the balance again in the period.

After the cash flows of every player group the individual results, that is to say, in the professional categories of administrative, professional careers of not administrative careers, students of ungraduated and students of postgraduate, the following results are obtained.

The results reflect that the professional participants of administrative careers are usually more analytical and risky, this was the result of the feedbacks realized at the end of the exercise. These participants show that they accepted to realize all the possible buys because they were provided with sufficient income, while the professional participants in not administrative careers mentioned that its strategies were centring on increasing

its income and reducing its expenses, that is to say, to chase the target that silver-plates them in the explanation of the game.

In the meetings of the students of ungraduated and postgraduate, both of engineering, the results demonstrate that the ungraduated students obtain major income and reduce its expenses in the long term, that is to say, in the period n, although the result in the short term favors the postgraduate students. The period n bears in mind the present decisions and the probabilities of occurrence of the events to simulate several periods to future.

The professionals' combinations of administrative and not administrative careers were present in the meetings of the groups 1, 3 and 5, the groups 2 and 4 correspond to ungraduated and postgraduate, both of engineering. In these organized heterogeneously groups, that is to say, in the groups of game 1, 3 and 5, the winners are the professionals for not administrative careers. With regard to the winners of each of the meetings of game, in the global result, it is highlighted that the biggest cash flow in the last period corresponds to the group 5 of the students of ungraduated with a whole of $ 18.953.986. The previous thing is observed in the Table 12.

Next there have analyzed the results of the survey of evaluation realized to the players after the meetings of game, where it is investigated on the fulfillment of the instructional targets, the evaluation of the elements of the game and the lessons learned.

Concludes that 83 % of the participants indicates to have learned on income, 86 % on expenses, 70 % of cash flow and 67 % on saving. Also, 79 % of the participants have knowledge previous to the concepts applied to the game. Checking the individual answers, it is demonstrated that 92 % of the professionals of not administrative careers assures not to have a previous knowledge, some of them are doctors, philosophers, dentists and artists. What allows to reinforce the result of the cash flows for this participants' category.

One concludes that 94 % of the participants makes sure that

TABLE 5
AVERAGE CASH FLOW

Cash Flow	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period n
Initial Balance	$ 0	$ 12.148	$ 55.447	$ 68.636	$ 63.724	$ 60.163	$ 90.295
Entire income	$ 30.000	$ 61.051	$ 41.151	$ 31.255	$ 31.361	$ 58.061	$ 17.271.389
Entire expenses	$ 17.852	$ 17.752	$ 27.963	$ 36.166	$ 34.922	$ 27.929	$ 3.025.328
Entire cash flow	**$ 12.148**	**$ 55.447**	**$ 68.636**	**$ 63.724**	**$ 60.163**	**$ 90.295**	**$ 14.336.357**

TABLE 6
RESULTS OF THE UNGRADUATED STUDENTS

Cash Flow	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period n
Initial Balance	$ 0	$ 11.052	$ 53.268	$ 70.751	$ 78.358	$ 79.130	$ 110.011
Entire income	$ 30.000	$ 61.064	$ 41.180	$ 31.300	$ 31.424	$ 54.256	$ 18.930.305
Entire expenses	$ 18.948	$ 18.848	$ 23.697	$ 23.693	$ 30.651	$ 23.375	$ 2.278.454
Entire cash flow	**$ 11.052**	**$ 53.268**	**$ 70.751**	**$ 78.358**	**$ 79.130**	**$ 110.011**	**$ 16.761.862**

TABLE 7
RESULTS OF THE POSTGRADUATE STUDENTS

Cash Flow	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period n
Initial Balance	$ 0	$ 13.649	$ 58.439	$ 79.328	$ 82.824	$ 86.907	$ 124.672
Entire income	$ 30.000	$ 61.041	$ 41.142	$ 31.246	$ 31.354	$ 57.697	$ 17.199.090
Entire expenses	$ 16.351	$ 16.251	$ 20.254	$ 27.750	$ 27.272	$ 19.932	$ 2.752.056
Entire cash flow	**$ 13.649**	**$ 58.439**	**$ 79.328**	**$ 82.824**	**$ 86.907**	**$ 124.672**	**$ 14.571.706**

the knowledge of the administration of the personal finance it improved after applied the game. The perception of the participants is coherent with the statistical analysis with which learning ended

The results of the game reinforce the theory of (Bover, 2005) in which a preference appears in the decision to invest in real estate property than in financial assets, with 95.7 % opposite to 73.91 %. It is observed as well as 73 % of the persons that they decided to invest in real estate property also decided to save in financial assets how it appears in the Table 9

It is highlighted that none of the participants chose the option not to save, which allows to make sure that the participants of the game belong to the small percentage of the population with saving culture, in accordance with the survey of financial load and education of hearths March - July, 2010 (I DAMAGED, 2010).

The Gamification is a tool that has been used to deliver the participants in an entertaining way, strategies applicable to its financial decisions in the real ambience, which application demonstrates a difference between the knowledge given from the classroom of classes and the education "for fun". The above mentioned difference consists of the top results when the Gamification is used as a way of reinforcing the knowledge of the participants, what is translated into a major learning of the concepts.

With the use of methodologies as the Gamification there are taught strategies applicable to the real life for the making of financial decisions, so that the income and departures stay balanced.

The results of the participants improve in the final stage, after applied the game and realized the feedback. This is due to the fact that the concepts were presented in a playful way that generates remembrance, also, doubts clear up and the progress strategies are consolidated into the group.

Although it is demonstrated in the results of the game that the persons without previous formation in finance present a better administration of resources, it does not mean that the financial education is unnecessary. Because hardware and resources are obtained to favor the saving, income increase, expense control, by means of financial products.

TABLE 8
RESULTS OF THE POSTGRADUATE STUDENTS

Ranking	Group	Winner	Classification	Player	Result
9	1	Si	Non administrative	Plata	$ 17.947.834
6	2	Si	Postgraduate	Posgrado 3	$ 18.464.809
13	3	Si	Non administrative	Meliza	$ 17.179.885
1	4	Si	ungraduated	Pregrado 5	$ 18.953.986
7	5	Si	Administrative	Juan Miguel	$ 18.464.809

TABLE 9
DISTRIBUTION OF THE OPTIONS OF SAVING

Options	Total
Financial Asset	73%
Other saving sources	27%

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