Exploring Game Design for the Financial Education of Millenials

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***Abstract*—The vast majority of Germans are reluctant to invest parts of their savings in the capital market, even though this is generally considered best practice for financial and retirement planning. Market research shows that lacking knowledge and motivation are key reasons for this behavior. In this research project, we evaluate game design and game mechanics as a means to educating and motivating particularly the younger generations to follow widely accepted general financial planning advice. Our paper presents an overview of the research we conducted and discusses a prototype we built, playtested, and currently evaluate for field deployment.**

Keywords—financial literacy, gamification, game design, financial education

I. Introduction

Investments in company stocks and funds are generally considered essential elements of a sound financial investment and retirement planning strategy [1]. In the last decade, the zero interest rate policy implemented after the financial crisis of 2008 has made savings accounts and investments into more conservative government bonds unattractive, given that the inflation rate regularly surpasses their rate of return. Still, only a small minority of Germans invest in the capital market:10.06 million share or equity fund owners [2] among 82.79 million inhabitants in 2017 [3]. In terms of demographics, it is particularly younger people who refrain from investing in the capital market. While there are about 3.2 m investors aged 60 or up, there are only about 2.2 m investors aged 14 to 39 [2]. In the long term, the non-investors will experience a lower purchasing power as a result of their reluctance to invest in the capital market. In an interview in 2017 (n=2103), the AXA institute found that 40% of the participants would like to invest in the capital market but thought they had insufficient knowledge [4]. Similarly, a market research with 911 retail customers shows that a lack of knowledge is a key impediment for investing in the capital market, as is a lacof motivation [5].

Games are a medium that has great potential to motivate players and to impart knowledge to them [6]. As Oberdörfer and Latoschik elaborate in their research on gamified knowledge encoding [7], the execution of interacting with individual game mechanics results in a training of procedural and declarative knowledge [8], both of which will help players not only to learn about certain topics, but train and manifest certain behaviours necessary for raising motivation towards real life action. As they elaborate in their model, by translating the required knowledge into a *gamification metaphor* [9], knowledge training can then happen by interacting with the gameful artefact.

While games and gameful experiences have become ubiquitous in recent years with the growing dissemination of smartphones and tablets and increasing focus on user experience design, research on the effect that games have on motivating people to deal with their personal financial planning and increase their knowledge to do so is scarce [10] yet promising [11]. Therefore, the goal of this research is to explore the possibilities of gamification design and (serious) games for increasing the motivation and financial literacy necessary to take care of one's personal financial planning.

II. The Artefacts

To be able to focus our game design efforts, we developed three personas for our target group of non-investors below the age of 39. The basis for these personas consist of 15 in-depth interviews we conducted in September 2018. Besides collecting some general information about the interviewees' demographics and ways of life, we focused on learning about their experiences and preferences in terms of games and play, on their attitude towards and actual experience with finances, and on questions about situations in which they have gathered financial information, both in conversations with other people and via diverse media [questionnaire German: http://tinyurl.com/app-gf-1]. We analysed the interview transcripts for emerging patterns. In general, most participants expressed a feeling of not knowing enough about finances. They also generally found the topic complex and boring and, despite feeling a latent need to get their personal financial planning in order, were not sufficiently motivated to actually do so. Clustering our results, three distinct groups emerged, by and large distinguishable by the stage of life they were in.

First, our interviewees, who were apprentices or university students, usually said that they plan to take care of their personal financial planning later, once they start earning enough money to actually invest in different financial products. They do not find it meaningful to deal with finance topics, because they feel it has nothing to do with their current life. Second, interviewees who had recently graduated and have been working in a full-time job for a while usually said that they use their new income to treat themselves. They want to enjoy living their lives for a while, now that they finally have a substantial income. While acknowledging the relevance of the topic of financial planning, this group still postpones dealing with their own finances. Third, those interviewees that had already taken their first career steps and were well established in their jobs usually said that they had been meaning to get their personal financial planning in order for quite a while now, but somehow had not gotten around to it because of everything else that is going on in their lives. It seems that over the years they have gotten used to not taking action without any perceivable negative short-term consequences. In fact, they likely have made many positive experiences by consuming rather than saving so that they ignore the non-experienceable long-term consequences of their behaviour. Over time, the three personas that emerged from our interviews thus learned to postpone financial

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planning. In order to understand which games influenced our target group, we analyzed popular games in the German market in the last 10 years in terms of sales and downloads. We synthesized our findings into an overview of popular game genres and game mechanics, which later served as inspiration during ideation sessions [see: http://tinyurl.com/app-gf-2].

With regards to the knowledge that people should have about finances and financial planning, we looked at literature about financial literacy [12], [13] as well as at the recommendations of non-fiction books and influential popular articles, both online and offline [1], [14]. As a result, we decided to look into different topics that are deemed necessary to take educated decisions about financial matters: attainment and usage of income, management of liquidity, proceeds from and repayments of bonds, treatment and risk-evaluation of assets, usage of possibilities of money transmissions, assurance of financial risk and the payment of taxes, dues and charges. In terms of how bankers try to explain abstract financial concepts, we collected visual, narrative and rhetorical metaphors that are frequently used when giving financial advice (e.g., instead of speaking of diversification, a banker might suggest not to put all eggs in one basket). Such memorable, illustrative phrases gave us a rich fundament for metaphor-based game mechanics [15].

The results of our extensive research about the target group, popular games, relevant financial topics, and commonly used metaphors to explain financial concepts were used as prompts to devise different core gameplay mechanics. Several ideation workshops and a game jam were held using the researched angles as ideation prompts (e. g. "devise a core gameplay that works with the metaphor of *all eggs in the basket* targeting Persona 1 as a player"). The research results guided the creative process in terms of who the game is designed for, what meta-content the game transports, and how it is translated into gameplay. To gain a deeper understanding of the whole possibility space, we developed six diverse game ideas with different financial concepts, different settings, and different game mechanics into playable prototypes of which, for illustrative purposes, we will present in the last chapter of this publication the gameplay of "InvestNuts" (working title).

The game is designed as a quick to play casual game. It is set in a cartoon forest a squirrel avatar. The goal of the game is to accumulate a certain number of nuts within ten rounds. Each round starts in a summer landscape with the squirrel being able to plant nuts. The promise of planted nuts growing into trees and yielding more nuts in following years conveys the key concept of investing (instead of consuming). To understand that there are different investment opportunities with different risk-return profiles, the squirrel can plant different nuts: one kind with a stable but low yield, one with a medium but somewhat fluctuating yield, and one with a potentially high but strongly fluctuating yield. These three kinds of investments also differ in terms of their immunity to a crisis, which is implemented as a frost-mechanic, that sometimes hits during the winter (the end of the round). Frost leads to partial crop failure for the medium yield nuts and a total crop failure for the high yield nuts. Moreover, each round the squirrel needs to keep at least ten nuts to survive the winter (a liquidity reserve). But since it is somewhat cold and wet in the squirrel's drey, a small amount of the nut reserve will turn bad during the winter (illustrating the lower purchasing power due to inflation).

Altogether, players learn that investing excess resources is an important means of achieving long-term financial stability. Via trial and error, players can experience that a strategy of diversification enhances their chances to achieve the game's goal. Thus, players learn that the risk/return ratio of financial investments is an important criterium to bear in mind when making decisions – and they need to figure out a good mix of products with different risk/return ratios given their own goals.

III. Results & Outlook

Our initial playtests for the game InvestNuts (that were conducted with over 50 different participants via gameplay sessions with a follow-up questionnaire) have yet to be systematically evaluated. However, our first evaluations showed very promising results. Participants stated that the game is fun and addictive. For many, it is a motivating way to engage with the topic of investing, but not all of them can transfer what they learned as a squirrel to their real life. For the game to fully work on its own, the transfer has to be included in the game. Overall, our research efforts resulted in over 80 game design ideas, showing that a transfer of financial knowledge to suitable game mechanics is possible. We are working on an experimental design that will result in quantifiable results in terms of learning effect and motivation.

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