Child-Persona: What I Think to What They Are

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Abstract Personas are representations of archetypal users aimed at guiding developers during the designing process. Because users—especially children—cannot be easily accessed, Personas have the potential to gather information regarding characteristics of a wide variety of people. Knowing user's abilities and needs is very important for making decisions about the fun conceptual system and the concepts that players should learn. This study presents the steps in the creation of Child Personas (CP) that will be used for designing a political educational game for Brazilian students. The data collection technique used was a questionnaire applied to 674 students aged 9–15 living in different regions in Brazil. To analyze the data collected by survey we ran the Two Step Cluster Analysis that has automatically determined three different clusters. Based on it we have created three child-personas by giving them, name, age, grade, family configuration, school, hobbies, activities, and a narrative to contextualize their lives.

Keywords Child-persona · User-centered design · Quantitative method · Cluster analysis · Game design

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1   Introduction

Nowadays children can do almost everything they need and like supported by new technologies [1]. Nonetheless, many products are still designed without taking into account their needs and abilities. For almost 20 years user centered design methods stress that it is important to invest time and energy in understanding users of technology and in bringing them into the design process. Yet this has been difficult to do with children users.

Within user-centered design (UCD), many methods have been developed to know better their target population. One method that is widely used in this space is the use of personas [2, 3]. Personas are a type of user model or an archetypical representation of real and potential users which illustrates the individual's characteristics [4, 5].

An essential benefit of Personas is that they build empathy for real target users, helping design team to stop talking about the general "user" [6], thus reducing reliance on assumptions and on personal experiences [7].

Despite the fact the Druin and Solomon in 1996 pioneered the concept of having children as part of the design team, it was only recently that researchers began to work more substantively with children [8]. To some extent, this could be explained by the difficulties to access them or to access their feelings given that young children can have more difficulties to verbalize their thoughts [9].

Most of the paper and field reports describe the personas creation using qualitative methods such as ethnographic studies and user observations [10]. However, according to [11], qualitative methods have two important drawbacks: the large number of participants which may result in textual data growth and the high costs. Also important are: subjective assignment decisions, the need for experience in qualitative research training, cognitive limitations of humans, and considerable resource commitments.

This paper aims at showing a quantitative method for child-persona creation to be used on an online political educational game to be published on the *Plenarinho*, the Brazilian's Chamber of Deputies' website for kids (www.plenarinho.leg.br). Our target audience is formed of children aged 10–14 from all over the country. Our goal is to create a game where kids can have a real experience as a representative in ways that are meaningful. It is about helping them to see responsibilities, difficulties and challenges of being a representative in a democratic society.

We chose to design an online game to teach kids politics inspired by a recent research by [11], showing that the decreasing interest of young students in political issues can be fought with educational games. But to make them a powerful educational tool, we must find out what really amuses our users in order to develop a very fun and challenging game that engage them on our subject [12].

To know our users and their interests we developed a questionnaire applied to 702 Brazilian's students aged 9–15. This questionnaire, comprised of 18 questions, derives from a preliminary study carried out in Brasília, Brazil, with 73 students [13], and from where we mapped out the most important aspects to be addressed on

this survey. The five dimensions of the questionnaire were: (i) lifestyle, based on what prescribes [14]; (ii) gamers' preferences, based on [15]; (iii) players' styles, based on [16]; (iv) demographic information; and (v) social concerning, which included one question related to their worries concerning Brazil; one asking about what kind of problem in their school they would solve first (personal interest, shared interests, community interest), and another one about a dilemma (to cut Amazonia's trees and feed people from a starving village or not to tear down the trees and let village people starves). These last three questions were based on our interest in knowing how they feel about subjects we'd like to explore during the political educational game.

We didn't include questions concerning socio-cognitive characteristics, because this knowledge can be found in specific literature, including generalizations based on Piaget's age-dependent stages and in Vygotskian social cognitive perspective.

In this paper we present a quantitative methodology, and the statistical approach to analyze its results in order to create child-personas.

2   Methodology

Our study has used a questionnaire with 19 closed-ended multiple choice-type questions, which addressed the five dimensions previously mentioned.

Participants were convenience sampled at schools from teachers already know by Plenarinho's team. Although this kind of sample can be criticized because its application is not random or typically representative, we tried to ensure that students from all Brazilian's regions, covering schools from different social economic classes and different sociocultural background were reached.

Eight teachers were invited to participate based on the criteria that they had been selected to take part on a face-to-face course about civic education at the Chamber of Deputies. Teachers were instructed to apply the questionnaires and to explain students its context. The questionnaires were sent to their schools and returned to us by mail.

In total we received 702 questionnaires, 55 were eliminated due to the fact that respondents were older then the target users. Final sample was composed of 674 questionnaires answered by 48.2 % boys, 41.7 % girls; 49.3 % studying in private schools, 49.1 % in public schools from the following Brazilian's regions: Center (51.6 %), North East (24.1 %), South East (19.8 %), South (2.5 %), North (2.2 %). The average age of students was 12.9 years with a standard deviation of 1.36.

The answers given by students were first registered into an Excel file, where we converted string variables into numerical variables. After, they were imported into SPSS program where we began to treat data by running frequency tables for each variable, splitting the sample by gender and type of school (public and private schools). The analysis by type of school allowed us to verify if there were discrepancies among students from different social economic classes. Based on the

frequency tables we could identify 43 variables that differentiated participants which were used to perform the cluster analysis.

To analyze the data collected by the above-mentioned survey we ran the Two Step Cluster Analysis tool of IBM SPSS Statistics, version 22 [17]. Cluster Analysis is a technique aimed at identifying clusters of users by addressing variables that differentiate users, and based on that, at setting up homogenous groups of users [11]. This method can handle categorical data and automatically determine the best number of clusters. The results of cluster analysis can contribute to find representative groups of users [10] by distinguishing prevailing interests and needs of each one of them which suggests us the personas' attributes. To make them more realistic, personas must be presented in a narrative which describes them in a way that articulates all those information.

3   Results and Discussion

Table 1 presents results of questions, which have had homogeneous results after running frequency table. They are presented here because they were not taken into account during cluster analysis since we were interested in questions that gave rise to discrepant answers.

Looking at this frequency table, what caught our attention was the fact that most students would let the village starves but would not allow tearing down Amazonian's trees. We wondered if this is a result of media "saving the environment" discourse. Later we will see another answer that can be dictated by media influence over kids.

Results concerning family configuration, presented in Table 2, reveals that most of them lives with mother, father and sisters and/or brothers. We did not include this

Table 1 List of questions and the corresponding most frequent answer

Question	Most frequent answer	%
1. Concerns about school	Common problems	59
2. Complying new rules	Giving rewards	57
3. Where to play with friends	Outdoors	57.3
4. Dilemma	Not tearing down the trees to feed starving village	75.1

Table 2 Results for family configuration

Family configuration	%
Father, mother, brothers/sisters	50.7
Father, mother	12.3
Mother	10.1
Mother, brothers, sisters	9.3

variable in cluster analysis, but we took it into account when creating personas narrative.

After selecting 42 variables we ran the two-steps cluster analysis. As presented in Table 3, this analysis has automatically determined 3 different clusters that were used as reference to form the persona narratives.

We should highlight some results showed in Table 3, especially those related to game preference and goals when playing game.

Cluster 1, with 94.6 % of boys, showed interest in playing first person shooter games. This is consistent with studies [18, 19], which suggests that boys are most attuned to violent games. If we use Bartle's well-known model for grouping player personalities, they could be classified as killers: type of player who like to impose drama over other players in virtual worlds.

Table 3 Main variables and the prevalent categories of each cluster

Variables	Cluster 1	Cluster 2	Cluster 3
Gender	Boy (96.4 %)	Girl (72.4 %)	Girl (69.1 %)
School type	Private (60.9 %)	Private (81.2 %)	Public (93.9 %)
Grade	8 (42.2 %)	8 (30.4 %)	7 (37 %)
Goals when playing	To be on the top of the ranking (31.8 %)	To find out what no one else knows (42 %)	To find out what no one else knows (39.4 %) To kill the enemy (25 %)
Favorite type of TV program	Movies (47.4 %)	Series (42 %)	Soap operas (56.4 %)
Favorite type of online game	First person shooter (43.2 %)	Adventure (29.8 %) Simulation (24.3 %)	Adventure (45.5 %)
Favorite type of movie	Action (30.7 %)	Action (29.8 %)	Terror (30.9 %)
Favorite type of game	Physical skills street games (89.6 %)	Physical skills street games (42.8 %) Intellectual games (27.1 %)	Playing physical skills street games (68.5 %)
Time online/day	More than 3 h (42.7 %)	More than 3 h (45.3 %)	Less than 1 h (32.1 %)
Favorite game device	Computer/PC (43.2 %)	Cell phone (40.3 %)	Cell phone (49.7 %)
Routine out of school	Plays on computer at home (38.5 %)	Plays on computer at home (40.3 %)	Helps cleaning her house (51.5 %) Watches TV (36.1 %)
Concerns about Brazil	Health (37.5 %)	Health (49.9 %)	Health (54.5 %) Safety (27.5 %)

We can also identify some similarities among clusters. Clusters 2 and 3, both composed mainly by girls, are interested, when playing online games, in finding out what no one else knows about it, and both prefer playing online Adventure games. This has some synergies with works by [18, 20] where Adventure games appear as the most preferred by girls. To some extent, genre game preference can also be explained by their goal when playing—knowing what no one else knows. If we use Bartle's model, we can classify them as achievers: people who love to get high scores. If they know what no one else knows they will score better, and want to prove their achievements with high level character and other things that show their success in the game [21]. Because Cluster 2 scored lowest in terms of genre preference, we decided to consider a second genre (Simulation: 24.5 %), which is in consonance with [18] findings. Preference for using cell phone among girls also confirms literature findings [18].

Concerning Clusters 1 and 2, composed by boys (96.4 %) and girls (72.4 %) respectively, we can see coincidences among type of favorite movie (Action), time spent online (more than 3 h), and what they do when not in school (playing with computer). Here we found a divergent result from an international literature review where, in general, boys tend to spend more time than girls online [18, 22]. These differences could be explained by gender similarities in Cluster 1 (96.4 % boys) by socioeconomics background similarities in Clusters 2 (81.2 % private school).

Worries with health issues are common to all tree Clusters. Maybe this can be explained by the fact that Brazilian kids are exposed to news programs, which treat this subject very often and always in a dramatic way, since it deals with life and death issues. Cluster 3 shows concerns about safety. This is a serious problem in Brazil predominantly in poorer zones.

They also prefer playing physical street games when they are not playing online games. This can be explained because from ages 7 to 15, kids need to develop their physical abilities, testing their skills. Cluster 2 shows interest in playing board games as well what coincides with [22] findings.

After analyzing these results, each of the personas needed to be "brought to life." For each of the personas, we wrote a narrative emphasizing their game preferences and interests. As said before, we were particularly interested in describing what motivates them to keep engaged to a game. This is very important when we aim to design a real fun educational game.

Persona 1

Miguel is 13 years old and lives in Brasília, Brazil's capital. Miguel is in the 8th grade at a private school, which is very close to his house. He walks to school and almost every day he is in a hurry. He doesn't like to wake up early in the morning and stays in bed as much as he can before getting ready to leave. He is the eldest son and lives with his mother, a teacher, and his father, a doctor. He has a sister, aged 11, and they are very close. They like playing the same online games: first person shooter and football. He likes playing games where he is free to roam around and interact with a realistic world, doing things, which he can't do in real life. There he can explore bad and good behaviors without real consequences, because when

playing games he can always fix the problems he makes. When playing football online, what he likes best is the feeling of being someone else, very famous, and talented. He thinks it is very empowering to help his team win a game. Besides, there is the competition and Miguel loves to be the first on the ranking. Miguel wants to be an architect in the future and he dreams about studying abroad. When Miguel is not online on his laptop or studying, he likes playing real football with his friends. If he stays at home, he prefers watching TV, especially action movies with lots of car racing and fighting. Concerning social issues, Miguel is worried about health in Brazil. He thinks politicians are always lying and never keeping up with their promises of looking after people.

Persona 2
Julia is 11 years old and lives in Fortaleza, Brazil. She is in the 8th grade at a private school far from her house. After her parents got divorced, her mother, her and their dog, moved to live near the beach. Julia misses her father a lot because he doesn't visit her very often. Julia has to take a school bus everyday and this upsets her. She has to leave her house 1 h before class starts and always arrives very late at home when she comes back. The only good thing is that she can play on her cell phone on her way to school and back. Julia loves playing adventure and simulation game, especially those that can be played with other players. Now she is somewhat addicted to a game where she can craft things, build houses, and fight with enemies. This gives her a very good feeling of ownership and belonging. Besides, she must be very creative to survive. And when she doesn't know something, she can find a lot of information on how to play this game on Internet. She also likes the idea of learning how to get better and better in playing it. In the morning, before going to school, she does her homework as fast as she can to have more free time to play. Sometimes, after playing it, she watches TV. She loves American series and action movies. When her friends visit her, they play Seven Sins, a game where you have to run away from your friend ball attack. Concerning politics, she is worried about health issues. Once, she heard her mother saying that the government has used all its money to build stadiums for the World Cup and now there is nothing left to be invested in health care. She would like to talk about this with her mother, but she says that this is an adult subject.

Persona 3
Yasmin is 12 years old and lives in a rural neighborhood close to Belo Horizonte, Brazil. She studies in a public school in a mixed class of grades 6 and 7. She is a good student but hates math. Every day she has to go earlier to school to have tutoring classes because she failed her last test. Yasmin is the younger sister of three brothers and lives with her parents and grandmother. Before going to school, she studies, and helps her mother clean the house. When she comes back, she loves watching TV until it is time to go to bed. She loves Brazilian's soap operas. She used to play on her mothers laptop, but now she uses her new cell phone with Internet connection. Her mother has even allowed her to create a social network profile! She is very happy, because she no longer needs to go to her aunts' to access the Internet, although she cannot stay for longer than 1 h a day. Mother's rules! She

plays adventure games. She likes mostly those where you can choose your avatar and improve it while playing. Now she is playing almost everyday a game where she has to run away from a policeman, with lots of physical obstacles and places hard to access. When she accomplishes her game missions, she earns coins, which she can use to buy things, including making her avatar even nicer. She plays it with her cell phone and she can control her avatar movement by moving the phone. She must be very careful not to die! During the weekend she goes to church and she likes playing football. But she has to play with boys because her girl friends don't like it at all. She does not like politics. It seems to her that politicians only fight, that they are always saying bed things about each other and don't do anything good to us. She is worried with health issues, but in her opinion one of the main problems in Brazil is security: you can be robbed at anytime and no one helps you.

4 Conclusions

As a design tool, personas aim at connecting designers and users. Through the detailed narrative, we expect these three personas will help them to overcome the natural tendency of making product design decisions based on an idea of general user or on our own needs and preferences. This commitment to user-centered design methods is even more important when we aim designing a real fun and engaging educational game.

However, persona development methods are widely varied and the design team must decide which one would be appropriate to their project. We opted to use quantitative data for cluster assignment because we were interested in reaching a varied and large number of students.

Two Step clustering method provided three clusters, which is in accordance with design teams recommendation. Although quantitative techniques rely on statistical software for analysis, we have to interpret the information in order to determine their meaning in the context of our game. We did so based on this survey's results but also referring to prior study, when we could be face-to-face with our user.

Because we faced some problems in receiving all the questionnaires sent to teachers, we decided to confirm our results comparing it with similar studies or surveys. We found divergences but also similarities among them. As with most studies related to developing medium, some works are time-bound to the period when data were collected.

The process of mapping user's information and using them to create personas is still largely subjective. The method outlined in this paper provides one way of doing it, but it has its limitations. We believe that its real value will be confirmed during the game design process when it will be validated by using these three personas with real children.

It would be very important if other researches could perform quantitative methods on creating child-personas. This would help us enrich a methodology that can reach a larger set of users.

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