TECHNOLOGY RESOURCES FOR SOCIAL AND PSYCHOLOGICAL ASSESSMENT IN CHILDHOOD: EXPLORATORY STUDY OF “GPS4SUCCESS” APP FOR USE IN SCHOOL SETTINGS

Raquel Barroso¹, Diana Dias¹,², Diana Soares¹

¹CIPES – Center for Research in Higher Education Policies, Matosinhos (PORTUGAL)
²Universidade Europeia, Lisboa (PORTUGAL)

Abstract

In recent years, psychological research on children has stated significant developments, arising from the childhood scientific reconceptualization. A transversal critical issue to this conceptual evolution is the psychological assessment of children. In fact, psychological assessment of children is a difficult task and is sometimes underestimated by psychologists, teachers and even families. In any investigation, defining the variables/dimensions to be assessed and the best way to evaluate them is recognized as one of the key subjects for a successful research. When the goal is to assess children, by positioning them as participants and social actors, this becomes even more critical and even sensitive. If it is totally uncontested the relevance and beneficial aspects of a psychological assessment when performed in a scientific and ethical framework, the process of doing does not gather broad consensus. All these concerns were taken into consideration when it was conceived a research study with the main goal of contribute to understand the phenomenon of success and failure in the elementary/primary education, from a longitudinal perspective. As a result, the aim is to identify predictable success or failure profiles, creating an early detection system that works as an efficient decision support system enabling school managers to identify the risks and opportunities for an intentional and early intervention. To do that, psychological assessment on children between the ages of 8 and 10 years old had to be planned.

Considering that the evaluation of the target children should take place in the classroom context and should cover both intra, inter and transpersonal aspects, the challenge of achieving results with a sample of 2000 child took on a highly intricate nature. To overcome these challenges, present study aims to present a technological tool (app) to be used to overcome not only the difficulties expected to administer a large number of psychological tests to children, but also to treat their results efficiently without losing their rigor. In this way, all ethical issues were also safeguarded. Thus, GPS4Success is a digital application with a built-in mascot, the GPS, thought out and conceived with features that facilitate the children’s ability to relate to it and with whom they are invited to interact. Throughout data collection, the mascot provides tasks alongside their step by step guides and positive inputs stimulating children’s awareness and engagement, decreasing the risk of demotivation and the monotony resulting from the task. This app enables: collective data collection, autonomous and independent task execution and respect for individual pace. The creation of this resource – GPS - as a built-in mascot stimulates children, raising their attention and simultaneously helps them to perform the tasks requested in a fun and pleasant way, emphasizing the playful aspect of the assignment. The implications of using a technological tool as a data collection strategy for psychological assessment, as well as the advantages and disadvantages of its use, and the possibility of being tailored to and used in the teaching-learning process will be discussed in the light of current educational policy trends.

1 INTRODUCTION

Over the last few decades there has been an evolution in psychological and social research whose participants are children. There has been a growing use of increasingly sophisticated research tools, as well as a growing concern with the ethical dimension of research and its ecological validity. While acknowledging that part of the research continues to function within the scientific paradigms that treat children as research objects, there are new lines of research that have gained increasing prominence and have opened the way for a greater emphasis on children as social and cultural agents. It is starting to be extremely common to request the active participation of children, accepting their perspectives, visions and feelings as genuine and valid evidence. The recognition of multiple ways of collecting data about children and childhood and the acceptance that no single method can produce all the necessary knowledge has also led to investigations including qualitative, paired with quantitative approaches, ethnographic research, paired with structured observation methods, and discourse analysis along with attitudinal scales [1, 2]. Researchers have also increasingly recognized that researches are cultural,
marked by the patterns of interaction that develop between adults and children [3, 4, 5] and that in conducting research with children some extra care is needed. In this way, the researches that seek to structure the child's environment are increasingly frequent, understanding their behavior and allowing their social participation in a way that is consistent with their understanding, interests and ways of communication, especially regarding the issues which most deeply affect their lives. However, in the Code of Human Research Ethics [6], which concerns the indications that should be taken into account for conducting human research, including issues such as informed consent, confidentiality and questioning characteristics, little information exists about the challenges and needs of conducting research with children. Despite this lack of information, documents, such as the United Nations Convention on the rights of the Child (1989) [7] and the code issued by the American Psychological Association, recognize children as social actors in their own lives, clearly stating that they have the right to be heard in the decisions that affect them and emphasizing their rights, prioritizing them over the interests of researchers, and also reinforcing the importance of informing them about the characteristics of the studies in which they participate.

In truth, in carrying out the research, researchers can play a relevant role in accepting the challenge of creating space for children to be listened to, and the use of participatory techniques can facilitate such a task. If “understanding children and childhood ... requires listening attentively to their agendas and participating with them in the research process” [8], then research needs to include less directive research goals, allowing children to structure their own participation. In addition, these methods can be adapted so that they are suitable for working with a wide variety of children and also be used in a wide variety of locations.

Until recently, researchers, when looking at aspects of childhood, preferred questioning adults, such as parents and/or teachers, about children's lives rather than questioning the children. Nonetheless, children have voices, express opinions, observe and judge, and have a crucial influence on how families and schools function. In addition, there is often a large gap between the perspectives of parents and children or of teachers and students and the children's own perceptions [9]. Of course, there are also topics about which the adults who know the child can more easily provide information about the child than the child itself (e.g. health issues). However, for questions about the children's own perception the best source of information is themselves. It is noted, however, that in many areas of research it is desirable to collect information from multiple sources, since any information can be biased [9, 10].

Evaluating children inevitably poses some particular practical and methodological challenges and the current state of knowledge about the best methods seems to be incipient and fragmented [11].

There is an increased concern with data quality and some scepticism about whether an adult interviewer can obtain reliable and valid records of children, especially in areas where information can be sensitive and subject to adult disapproval. However, the evidence shows that children are extremely reliable [12]. Some strategies include avoiding ambiguous phrases or allowing answers such as "I do not know" to avoid guessing and increase the reliability of answers.

In order to increase the data quality, researchers also have to ensure that the issues will measure the desired construct and that the children interpret the questions as intended. Research in this area is scarce, but it suggests that the clarity of the questions influences data quality, especially in younger children [13].

The definition of the best method, the best language and the variability of literacy and stages of cognitive development among children are some of the most usual challenges of the research carried out with this population. Research has, however, shown that even pre-school children are able to make social judgments or even identify false intentions and beliefs [14]. In truth, research methods involving children should consider the wide range of cognitive and social development that exists among them and depends on the age, gender, but also the socio-cultural context and the ethnicity of the child. Interview techniques or questionnaire completion are, for example, clearly unfit for pre-schoolers. Up to the age of 8-10, children also have difficulty distinguishing what is said and what is meant, so hypothetical questions become equally problematic [15]. These issues imply that less structured and conventional methods are the most appropriate for younger children. However, in school age, from age 7 onwards, children can participate in researches using individual or group semi-structured interviews. At this age, however, new questions arise. As children acquire the competence to process and respond to standard questions, they also begin to control and choose the information they want to share, with previous research showing that there is an association between the children's age and the information that they reveal to adults [16]. The use of visual stimuli, instead of the unique and exclusive use of questions, can
be useful, since they make the subject more specific. Memory aids can also be used to help achieve goals, as children easily forget about answer options, even though the set of answers is limited.

In addition to adapting their own collection of instruments or interviews, it is also often necessary for researchers to change the way data collection itself takes place. Children tend to need more guidance compared to adults, tend to ask for more help, especially when they feel insecure. In such circumstances, it is preferable for researchers to say what they want in other words, giving children the highest possible confidence.

Another issue that arises in data collection with children is the context in which they occur. The social worlds of children have many different contexts, but home and school are two of the most important. Context is especially important for data collection, since the child’s behavioural expression often depends on it [17]. Data collection in a school context is extremely frequent, tending to depend on the autonomous completion of questionnaires, which may find difficulties in literacy and motivation. Data collection at home can be influenced by the presence of other family members. Even if the child moves away to conduct the assessment, complete privacy is often unbiased or elusive. Thus, the place where the collections are carried out can influence the answers obtained, while there is no evidence demonstrating that one place should prioritize over the other.

Finally, the collecting modality arises as a challenge. Should the collections be carried out face-to-face, by autonomous filling or over the phone? The various methodologies can increase or reduce the likelihood of different answer trends, such as social disability or contamination of answers.

Face-to-face collection has the advantage or disadvantage of the dependency of the relationship between the children and the researcher. On the other hand, autonomous collections facilitate the expression of more sensitive issues, since they do not imply verbal expression or the answer to another person. New collection techniques, using the Computer Assisted Personal Interview (CAPI) methods, have also emerged [18, 19]. These techniques add reinforcements that can be used to obtain good results with children. They also grant the opportunity to incorporate videos and visual and audio stimuli that reduce the need of the dependency on verbal questions and answers, which can facilitate their expression. The use of a computer tool can also increase motivation in the task.

As in all other challenges in conducting research with children, there is also no single and definitive answer to what the best methodology to be used in this case is. Consequently, the methodology, tools and way of questioning in research with children should always take into account the research issues, as well as the idiosyncrasies of the target audience, trying to adjust and adapt research to the sample in the best possible way, in order to consider them as true participants and social agents and allow the collection of the most reliable and valid data possible.

All these concerns were taken into consideration when the research project was designed with the main goal of better understand of the phenomena of success and failure in the primary education, from a longitudinal perspective. This study intends to know how students’ academic performances are influenced, both by their personal (individual) and family characteristics and by the way they interact with the school context. This project aimed not only at identifying the factors that best explain school failure, but also to propose an approach based on Data Mining techniques, in order to facilitate the identification of students at risk. The creation of an efficient decision-making support system that allows teachers and school administrators to identify risks and opportunities to an early and intentional intervention is also output of this research project. In order to achieve this goal, firstly, it is important to identify and understand the factors that explain this failure; secondly, identifying the students who need help in a timely manner and, finally, define the proposal of the learning strategy that best respond to the situation of each student. In order to carry out this research, a representative sample of the students attending the 3rd year of schooling was selected (n = 2000). It was conducted a psycho-pedagogical assessment of these students (aged between 8 and 10 years old). Their parents, teachers and school coordinators also participated in this research.

Considering all the previously mentioned challenges of conducting researches with children, this study aims to present a technological tool (app), GPS4Success, which was used to overcome not only the difficulties expected when administering a large number of psycho-pedagogical instruments to children, but also to obtain the most valid and reliable results possible, aiming that data collection is performed in a pleasant way and with high levels of motivation and satisfaction.
2 METHODOLOGY AND RESULTS

GPS4Success is a digital application that can be installed on a smartphone and/or tablet. All the participating children, along with all their other classmates, perform the data collection on a keyboard tablet, to facilitate the writing. Throughout the data collection, at least one researcher is always present to provide the guidelines and support that the children request.

This application includes the built-in mascot, the GPS, thought out and conceived with features that facilitate the children's ability to relate to it and with whom they are invited to interact. The GPS is a mascot (fig. 1) that has two ears, an antenna, two hands, a head with six eyes, a mouth and two legs. All of these aspects have some intention and purpose, namely: (a) the two legs are intended to transmit that, to achieve school success, it is necessary to walk and go a long way; (b) the hands mean that success implies that one should "get to work" and work hard, not giving up on the tasks proposed; (c) the six eyes mean that it is necessary to be attentive to the various details for the effective performance of the task; (d) the head is disproportionate when compared to all the rest of the body, since it has the greatest influence in success, although it cannot function without the remaining elements; (e) the ears are the second largest element, because it intends to transmit that, to achieve success, it is essential to develop the ability of attentive listening, as this influences the learning ability; (f) finally, it also has an antenna that intends to transmit that we have to relate and connect to each other, as biopsychosocial beings that we are, to achieve our goals.

![Figure 1. GPS, Built-in Mascot](image)

Throughout the data collection, the mascot interacts with the children, changing some of its positions, namely regarding its hands, as we can see in fig. 2.

![Figure 2. Different positions assumed by GPS.](image)

Early in the data collection, GPS presents itself to the children and states that it is a scientist who will find out if the children have the skills needed to be junior scientists. The application incorporates the data collection instruments that need to be applied to children and the GPS provides tasks, alongside their step by step guides, and positive inputs that stimulate the children's awareness and engagement.

The application is divided into six stages. In every stage the GPS appears before the task expected to be performed by the child providing the children with the instructions to perform the task. After the task performance, and at the end of each step, the child receives a stamp (see Fig. 3).
Whenever the child receives a stamp, it receives positive inputs provided by GPS, as can be seen in Table 1.

Table 1. Description of positive inputs that the children receive at the end of each step.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Positive Inputs</th>
</tr>
</thead>
</table>
| End of Stage 1 | You have already finished this stage. I know you a little better already. Do you have what it takes to be a junior scientist? You will find out ... *(The child receives the first stamp)*  
You’re just a few moments away from being a true junior scientist and helping me to discover fantastic things. What would you like to discover? Start thinking about it ...  
But be careful, don’t forget to stay focused and tell the truth until the end, only then you will get it... |
| End of Stage 2 | Good…  
Looks like you’ve solved all the puzzles!  
What will happen next? *(The child receives the second stamp)*  
Look, you got another stamp … you’re getting close!  
I’m really proud of you, you’re getting through all the challenges. But be careful, don’t get distracted...  
Let’s go to the next stage? |
| End of Stage 3 | Did you survive?  
This stage was big, but it is over now and you were amazing!  
I think you made it ... look at what you got… *(The child receives the third stamp)*  
It looks like you’re almost there, but be careful … don’t get distracted.  
I know that it is a difficult process, but show me that you can do it… |
| End of Stage 4 | This was difficult, but you didn’t give up.  
Were you able to complete this challenge? *(The child receives the fourth stamp)*  
Another stamp and look … there’s only one left for you to be a junior scientist.  
Let’s work to get the last stamp ... |
| End of Stage 5 | *(The child receives the last stamp)*  
Congratulations!  
Now you’re a real junior scientist! |

As soon as they receive the first stamp, as it is shown in Fig. 3, the children realize that, to complete the task, they must fill the booklet. To do it, they have to earn 5 stamps.
After winning the 5 stamps, the children will have finished the data collection, and GPS reinforces it by saying that they have become a junior scientist.

Thus, children develop the task at their own pace, in an involved way, that is viewed by them as a game.

It should also be noted that anonymity and confidentiality of data collection are also ensured throughout the use of the application. Each child has a code that is inserted in the application at any given time by the researcher, encoding the child’s name throughout the process. At the end of the data collection, the information obtained is uploaded to a database, only identified by the code initially entered by the researcher.

3 CONCLUSIONS

It is still common for research to exclude children as participants for several reasons: (1) there is a tendency to perceive adults as having greater knowledge, experience and power; (2) collecting data with children is considered too problematic to be worthwhile; (3) conducting research with children poses many practical, methodological, and ethical questions that researchers may want to avoid; and finally (4) it is believed that children lack communicative and social skills which are essential for successful data collection. Despite these added challenges of conducting research with this population, research has shown that children can and should be included in researches that relate to issues to their own lives. In order to overcome this difficulty in the best possible way, a technological tool (app) for collecting data with children, GPS4Success, was developed in the context of a longitudinal research that involved psycho-pedagogical evaluation of 2,000 students.

This data collection methodology wishes to maintain the advantages of face-to-face data collection, including the establishment of a relationship between the interviewer and the child, while allowing children to express themselves freely and without feeling that they were giving sensitive information which could be condemned by an adult. All these aspects were regarded as prone to reduce social desirability. Likewise, the goal was to maintain the advantages of interviewing and holding open questions that allowed the fluidity of thought and free expression, also wishing that the time factor would not be a constraint for the free expression and resolution of the task. On the other hand, it was intended to combine the use of more standardized instruments, without causing discouragement in the performance of the task, with the use of less conventional instruments, such as the use of visual stimuli. Consequently, a digital tool was developed, which in itself is already an appealing thing to children, including a mascot, with which children can identify and which allows the inclusion and adaptation of all the psycho-pedagogical assessment measures that were considered essential to understand the phenomenon of school (in)success in primary education.

In truth, the use of a digital application allowed the data collection to be performed collectively, with the various participants of a class answering to the application simultaneously, which significantly reduced the time of data collection compared to an individual collection option. It also made it possible for children to have the support of the researcher whenever necessary, and to permanently have the mascot providing all the necessary instructions to perform the task. The interest that the mascot raised in the participants also allowed each one to perform the task respecting their time and pace, without showing much interest in knowing in which stage their colleagues were, but rather remaining focused and motivating themselves to perform the task as best as possible.

The use of this application with the mascot stimulated the interest of the children, fostered their motivation and the desire to perform the task correctly (with the aim of completing the booklet and becoming junior scientists), allowing us to simultaneously carry out a complex and long data collection, of around 2h30, emphasizing the playful aspect of the assignment.

Despite the constant presence of visual stimuli and reinforcement, it is considered that the great disadvantage of the application is the absence of auditory stimuli, namely the existence of a voice that reads all the questions to the children, as well as provides them with reinforcements. The inclusion of this audio tool would allow us to solve the literacy problems associated with data collection. During the research, whenever there were difficulties in reading and/or writing, a researcher or teacher individually read all the stimuli to the child, who answered them. However, this situation is not ideal for research, since it can increase the contamination of data, the social desirability and its costs, since it implies the presence of more researchers in the classroom. It also becomes less challenging for the child and prevents the free and fluid expression that we consider to be an added value in the use of the application. Consequently, it is considered that the integration of this tool is necessary for the continuity of the use of this application in other projects and researches, as well as in the teaching-learning process.
In fact, since this application and its mascot have been so well received by children between the ages of 8 and 10, it would be interesting to consider its use in other contexts, in which one wants children to perform tasks autonomously and independently, considering the task appealing and motivating.

ACKNOWLEDGEMENTS
We thank EDULOG for the financial support of this research project
https://www.edulog.pt/investigacao_projeto/5

REFERENCES