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TECHNOLOGICAL TOOLS AS A FACILITATOR FOR PARENTAL/GUARDIAN  
PARTICIPATION IN EARLY CHILDHOOD EDUCATION

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Trabalho de Conclusão de Curso de graduação apresentado ao Departamento de Ciência da Computação da Universidade Federal do Rio de Janeiro como parte dos requisitos para obtenção do grau de Bacharel em Ciência da Computação.

Orientadora: Mônica Ferreira da Silva, DSc

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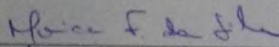
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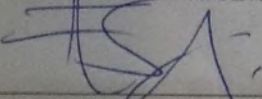
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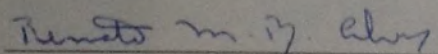
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## **ABSTRACT**

There is a significant need for an intervention to improve student performance in the Brazilian public school system, especially in the State of Rio de Janeiro. A viable option would be enhancing the interactions between home and school. Technology can be used to facilitate the communication between teachers and parents/guardians. Subsequently, further promoting parental/guardian participation in a student's education. This project intends to study technological tools used to promote teacher and parent/guardian communication and conduct a case study in an elementary school within the Rio de Janeiro public school system. The general purpose of this study is to map out existing technologies, to serve as a road map for future technological aids used in public schools and analyze the current situation within a given school.

**Keywords:** Teacher and Parent/Guardian Communication. Technological Tools. Early Childhood Education.

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## **LIST OF ABBREVIATIONS**

ADHD – Attention-deficit/hyperactivity disorder

IBGE – Instituto Brasileiro de Geografia e Estatística

IDEB – Índice de Desenvolvimento da Educação Básica

IEEE – Institute of Electrical and Electronic Engineers

INEP – Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira

ITEA – International Technology Education Association

ITU – International Telecommunication Union

SCS – School Counseling Services

UAT – User Acceptance Testing

UNESCO – The United Nations Educational, Scientific and Cultural Organization

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## 1 INTRODUCTION

### 1.1 MOTIVATION

By law, parents and guardians residing in the State of Rio de Janeiro are guaranteed the right to receive a report card regarding their child's performance in school. However, these progress evaluations are only released on predetermined dates. What if teachers could communicate with parents and guardians between these set periods of time? What if a student's progress could always be measured by their parents or guardians? Epstein's model for parental involvement, used to facilitate partnership programs between educators and parents, states six different types of parent involvement (EPSTEIN, 1995). One of the categories is communication, creating a two-way communication channel between school and home (school-to-home and home-to-school communications) regarding school programs and student progress. The support given to children by their parents impacts their achievement in school, where a child's attitudes towards school and learning can be directly influenced by parental attitudes (DEAN, 2000). Studies show that parental involvement during a child's first year of school can enhance the probability of a student's ability to adapt more efficiently and obtain good grades (MAGDALENA, 2014). Children in elementary school who receive positive reinforcement from their families regarding good work and study habits while at home and whose value of education is prioritized have the tendency to do well; they accomplish even more when parents are informed of their progress and collaborate with their respective teachers (HENDERSON; BERLA, 1994). The student grade levels considered for this study were those that encompass early childhood education, given that in this age group "the impact caused by different levels of parental involvement is much bigger than differences associated with variations in the quality of schools" (DESFORGES; ABOUCHAAR, 2003).

A scholastic census performed in 2016 showed that there was a total of 145,647 schools located in the State of Rio de Janeiro (QEdu, 2018). Of the 39,377,536 students regularly enrolled in school, 12,619,218 fell into the category "early childhood education" (QEdu, 2018). The United Nations Educational, Scientific and Cultural Organization (UNESCO) defines early childhood as "the period from birth to eight years old" (UNESCO, 2018). For the purpose of this study, children in daycare and preschool were excluded from the calculation of those regularly enrolled. Early childhood in the data includes students from grades 1 to 5. Of the students enrolled in 2016, 11,619,054 (92,1%) were approved to go onto

the next grade while 860,299 (6,8%) were held back (or retained) in their current grade for the following school year and 139,866 (1,1%) abandoned school completely (QEdu, 2017). The Brazilian index for educational development (IDEB - Índice de Desenvolvimento da Educação Básica) for 2017 showed that the score achieved for primary education reached the desired goal and increased in comparison to the previous year. However, on a scale from 0 to 10, the score achieved was 5.5. According to the Brazilian Institute of Educational Studies and Research (INEP - Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira), this scale is used to measure the quality of education in Brazil.

## 1.2 PROBLEM STATEMENT AND RESEARCH QUESTIONS

This project intends to study and establish how technological tools can be used to improve communication between educators and parents/guardians, facilitating the participation in early childhood education. Furthermore, a case study was conducted within an elementary school located in the State of Rio de Janeiro.

Research questions:

Q1: What are some current technologies used to accommodate the communication between parents or legal guardians and teachers?

Q2: How is communication handled between teachers and parents/guardians in a public-school setting and how are the current methods perceived?

The general purpose of this project is to map out existing technologies to serve as a road map for future technological aids used in schools within the Rio de Janeiro public school system. Additionally, by inquiring about the current status of communication between teachers and parents/guardians, we can further understand how to improve any deficiencies.

## **2 RELEVANCE**

### **2.1 TECHNOLOGICAL LITERACY**

#### **2.1.1 Overview**

Technological literacy pertains to the knowledge of and capacity to correctly use any given technology (HAYDEN, 1989). According to the International Technology Education Association (ITEA), a person who is technologically literate understands the essence of technology, what it is and how it works (ITEEA, 2018). Currently, there are no comprehensive global statistical indicators being used to measure technological literacy for today's reality. The Global Framework for Digital Skills was presented at the 2018 World Summit on the Information Society in Geneva (ANTONINIS; MONTOYA, 2018). This framework was designed to allow countries to analyze digital literacy within their own borders, possibly supporting the development of curricula and assessments (WSIS FORUM, 2018).

#### **2.1.2 Technological Literacy in Brazil**

According to the Human Development Reports for Brazil conducted by the United Nations Development Programme, the percentage of the total population that can be categorized as internet users is 60.9% (2017). Additionally, according to the International Telecommunication Union (ITU), in 2017, there were a total of 236,488,548 mobile telephone subscriptions in Brazil (ITU, 2017). The Brazilian Geographic and Statistical Institute (IBGE) estimated the Brazilian population in 2017 to be around 207.7 million people (IBGE, 2017). The number of mobile telephone subscriptions surpassed that of the population. Both internet access and mobile phones are necessary precursors for the implementation of technology to facilitate the communication between teachers and parents/guardians.

## 2.2 CURRENT INITIATIVES IN BRAZIL

There have been a variety of bills passed within Brazil to promote electronic report cards. In 2018, laws were passed in Goiânia (a city in the State of Goiás) (GOIÂNIA, 2018), in Rio Branco (municipality in the State of Acre) (CESAR, 2018), and in São Luís (a city in the State of Maranhão) (SÃO LUÍS, 2018). In all, these laws seek to electronically make available grades, reports and attendance for parents and guardians of students within the public school system.

## 2.3 CURRENT INITIATIVES IN RIO DE JANEIRO

Online report cards, known as *Boletim Online*, have been available in the state of Rio de Janeiro since November of 2009 (TABAK, 2010). Parents and students can assess grades and truancy for each academic quarter by accessing a website (RIO DE JANEIRO, 2018). The system works as a digital representation of the conventional report card, that is printed by the school and sent out to parents and guardians. As such, the system only serves as a visual aid for student performance and not a direct communication facilitator between teachers and parents/guardians.

## 2.4 RELATED STUDIES

There have been several studies conducted to analyze parental involvement in childhood education. Researchers in Ghana sought out to “examine the extent to which the involvement of parents” affects the academic performance of students (MANTE; AWEREH; KUMEA, 2015). Two separate master’s theses also examine this phenomenon, Luchuck (1998) and Burke (2004). Both theses were approved in 1998 and 2004, respectively. Additionally, studies that analyze student performance also exist. A study conducted in 2006 examined multiple aspects of student readiness in an educational environment (HAIR et al., 2006). However, no study analyzed the use of technological tools as a facilitator for educator and parent/guardian communication in a Brazilian context. This phenomenon is still relatively unresearched.



### 3 LITERATURE REVIEW

#### 3.1 SYSTEMATIC LITERATURE REVIEW PROTOCOL

##### 3.1.1 Research Strategy

Digital libraries established by journals predominantly contain articles published by the journal maintaining it, while indexed databases index articles from various digital libraries (FALBO, 2017). Combining digital libraries and indexed databases is a valid method to conduct a systematic literature review (DYBÅ; DINGSØYR; HANSSSEN, 2007). The research databases chosen for this study were: Web of Science, Scopus and IEEE. Both Web of Science and Scopus are indexed databases, while IEEE is a digital library.

##### 3.1.2 Search Strings

The search strings used for each research database are shown in Table 1.

**Table 1:** Search Strings for “Tools currently used to facilitate the communication/interaction between teachers and parents/guardians in early childhood education”

RESEARCH DATABASE	SEARCH STRING
Web of Science	TS = ((teacher OR school) AND (parent OR guardian) AND (communication OR interaction) AND (tool OR app OR site OR system) AND (childhood OR elementary))
Scopus	(teacher OR school) AND (parent OR guardian) AND (communication OR interaction) AND (tool OR app OR site OR system) AND (childhood OR elementary)
IEEE	(teacher OR school) AND (parent OR guardian) AND (communication OR interaction) AND (tool OR app OR site OR system) AND (childhood OR elementary)

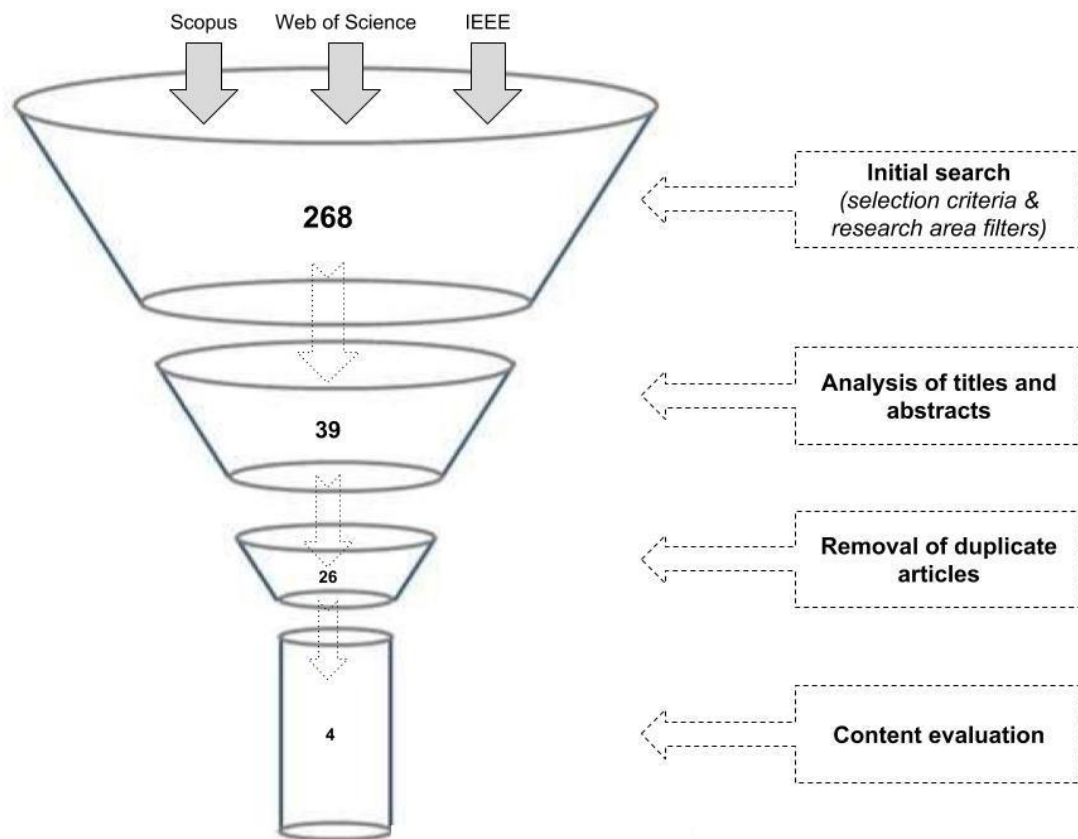
##### 3.1.3 Study Selection Criteria

There was a total of 4 study selection criteria for the inclusion and exclusion of articles. The first criteria chosen to narrow down studies was language. Only articles written

in English were considered for this study. The second inclusion/exclusion criteria was the type of research. As a result, research articles (from journals and magazines) and conference papers were exclusively considered. The year of publication was also considered as a factor. Research published and presented between 2004 and 2017 were included in the study. Additionally, articles pertaining to the medical field were excluded, except for those pertaining to psychology and psychiatry. Both psychology and psychiatry fields were included in the study because they may pertain to human behavior.

### **3.1.4 Systematic Literature Review Results**

The initial search, application of the search string, generated a total of 268 results amongst the 3 chosen research databases (Web of Science, Scopus, IEEE). The selection criteria (language, type of research and year of publication) and research area filters (exclusion of articles regarding the various medical fields of study, except psychology and psychiatry) were applied to this search. The results generated from this inquiry included duplicates between the different databases. Three forms of analysis were used on the initial results in order to narrow down the number of articles that could possibly be considered for the literature review. The first analysis was the examination of titles and abstracts, evaluating whether the subject matter of a given article was pertinent to the present study. This inquiry helped reduce the collection of articles down to 39. The second analysis included removing duplicate articles amongst the previous analysis' results; which in turn, decreased the total number to 26. The third and final form of analysis applied was content evaluation. Upon reading each article, a decision was made of whether it was relevant and enhanced the discussion. Articles were chosen based on a study's focus on the use of technology and communication. From the results remaining after the first two analyses, 4 articles were chosen using the third analysis; which are further elaborated upon in the following section. The final four articles were selected for their availability (no need to pay a subscription) and whether the study centered around the use of technology on the communication between parents and schools within an early childhood spectrum. The results from each stage of analysis are illustrated in Figure 1.



**Figure 1** – Systematic literature review results for each stage of analysis

## 3.2 TOOLS USED TO FACILITATE COMMUNICATION AND INTERACTION

### 3.2.1 Indonesian SCS Information System

A major component of the integration between teachers and parents/guardians is school counselors. According to the Council for Accreditation of Counseling & Related Educational Programs, “counseling is a professional relationship that empowers diverse individuals, families, and groups to accomplish mental health, wellness, education, and career goals” (CACREP, 2018). They can serve as a human bridge for the interactions between teachers and parents/guardians. A study conducted at a school in Surabaya (Indonesia) provided a technological tool to facilitate the communication for School Counseling Services (SCS) and evaluated the proposed system by surveying its target audience (teacher, counselors and parents). An SCS information system was designed with the intent of creating a network of adults, providing them with complete access to a thorough composite of a

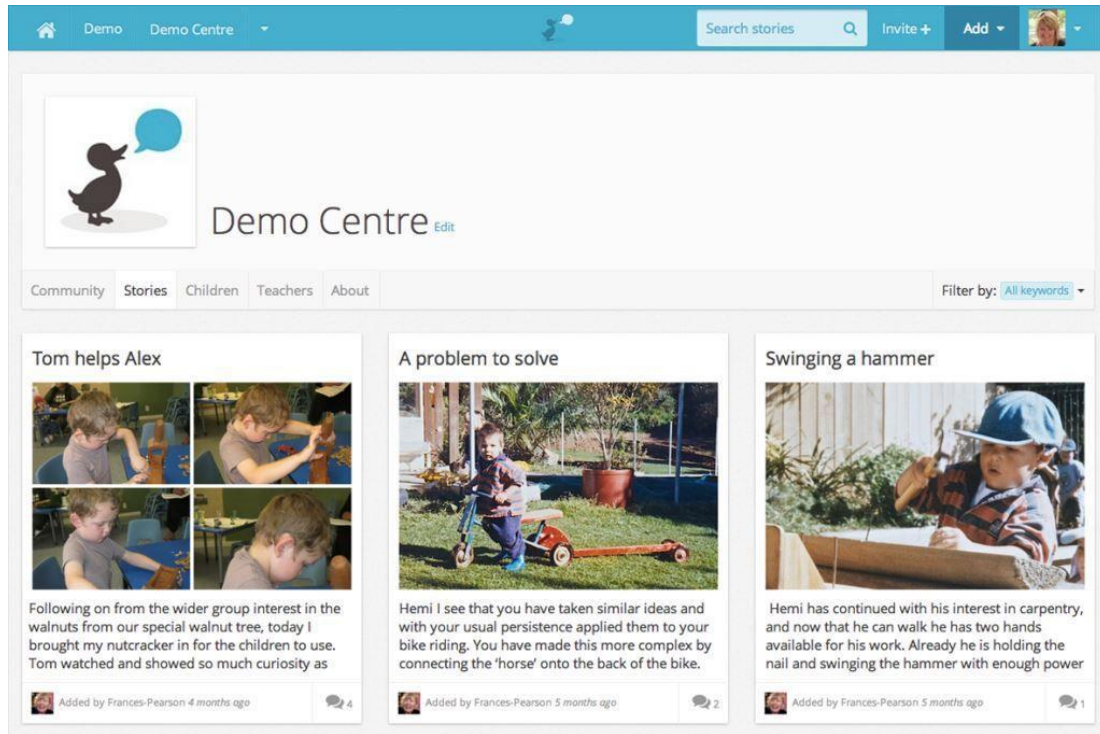
student's information. It was made available via two versions: mobile (for parents and accessible anywhere) and web (school officials) (LIMANTO et al., 2017). Upon completing the analysis and system design phases, tests were conducted to measure the features' efficacy and performance. Three testing methods were used to analyze the system: unit testing (conducted individually for each feature/process), integration testing (verified the accuracy of each feature) and User Acceptance Testing — UAT (LIMANTO et al., 2017). The UAT testing method was executed by administering questionnaires to teachers, counselors and parents. Surveys were distributed to all teachers and counselors, and simple random sampling was used to select parents for participation in the questionnaire process. The surveys were administered to evaluate the system's efficacy and identify potential improvements. Two surveys were distributed, the first inquired about general functionalities and problems encountered by school personnel (teachers and counselors), and the second investigated the same aspects as the first survey but from a parental point of view. In all, most parents, teachers and counselors agreed that the system (or any system of the same caliber) would be beneficial to the communication between school (teachers) and home (parents/guardians), which in turn, would benefit the students' overall development. After analyzing all test results, the researchers intended to further implement the system in a wider range of school grade levels and evaluate functionality a year after its implementation. The collaboration and coordination between school and family is necessary to address and manage learning barriers, thus ensuring that student knowledge is achieved in a constructive manner (GALASSI; AKOS, 2004). The system created proposed to foster this partnership. Figure 2 shows a screenshot of a student's counseling history available through the system.

NIS	Name	Class	Counseling Date	Diagnosis/Problems	Solution/Recommendation	Action
0045750361	ABI KHALIF REFIANSYA	VI B	05 October 2014	Students behave rude and bad	display solutions	
0022150557	HAIKAL SJARIF	VI B	07 January 2015	Stubborn, like talking with her friend during class. Already been warned but not heeded. Advice would be great	-	
0038693967	Bintang Pria Prasetya	VI B	31 March 2015	Few questions regarding student's problem	display solutions	
0038694012	Kanza Syuhada	VI A	13 April 2015	Students are less able to focus / concentrate when following the lesson	display solutions	

**Figure 2** – School Counseling Services (SCS) System – student counseling history

### 3.2.2 New Zealand E-Portfolio Study

An e-portfolio is an electronic tool that allows a person to store and collect evidence of learning, “owned and managed by the student, and meant to be selectively shared according to audience and purpose” (JENSON; TREUER, 2014). According to Mohammed et al. (2015), “e-portfolios have many advantages over printed portfolios, they are easily accessible, with the ability to store multiple media, they are easy to update, and references the work of learners”. A researcher in New Zealand conducted a study to analyze a school’s transition from physical portfolios to electronic portfolios (e-portfolios). The study intended to evaluate parent and teacher perspectives regarding collaborative relationships through e-portfolios. Educa and Storypark were the two providers chosen for the study, both of which “provide a range of ways to communicate with families, such as learning story templates, conversations, video and audio, and can be accessed in multiple ways, such as desktops, laptops, tablets and smartphones, with an app available for tablets and smartphones” (BEAUMONT-BATES, 2017). Additionally, tools to help better understand how to utilize the programs are made available to the user through the systems. A screenshot of Storypark illustrating a demo stories page can be found on Figure 3. The study aimed to investigate how and whether an e-portfolio can assist teachers in supporting and promoting collaborative relationships with their colleagues, students and their families, in addition to, supporting families in cultivating collaborative relationships with their child’s teachers (BEAUMONT-BATES, 2017). A series of interviews and questionnaires were conducted to examine the alliance between teachers, students and their parents/guardians, and how e-portfolios improve their communication. One finding derived from the study showed that both teachers and parents agreed that e-portfolios promoted collaborative partnerships and increased effective communication between both parties. As a result, there was an increase in parental involvement since the implementation of the digital system. Research findings also showed that with adequate participation from all members involved, communication improved significantly. Additionally, teachers who participated in the study stated that e-portfolios helped enhance the collaborative relationship between the school and home environments. With the information gathered through the dialogue provided by the system, teachers were able to better prepare lesson plans based on an enhanced understanding of a child’s personal needs and home life.

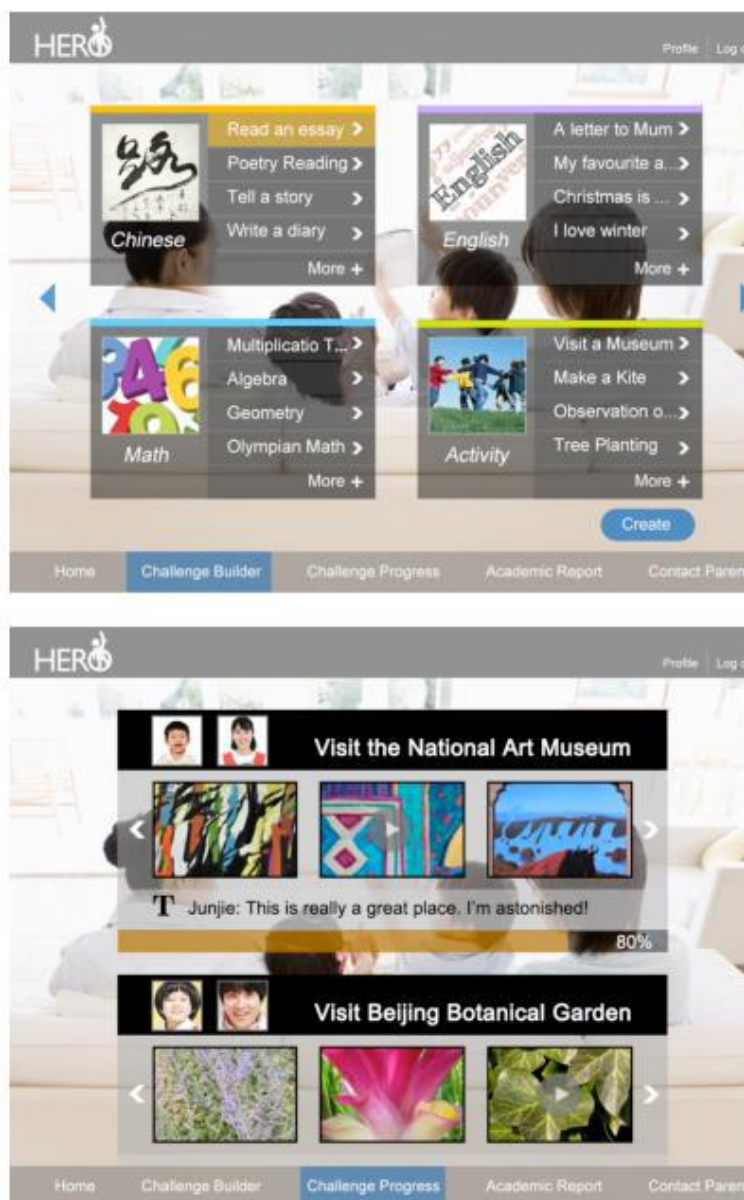


**Figure 3** – Storypark demo stories

### 3.2.3 Chinese Hero Tool

A group of Chinese researchers developed Hero, considered “a suite of learning tools that combine teacher-created extracurricular challenges with in-class motivational tools to help parents become more involved in their child’s education, while also engaging students in their own learning” (ZHAO et al., 2014, p.637). Given that several technologies aspiring to strengthen parental involvement have been developed in countries within Western society, the study focused on non-western characteristics of educational tools, specifically in the Chinese context. Hero comprises of three different modules, “a website for teachers, a mobile application for parents, and an interactive adventure map that can be used in the classroom by each student” (ZHAO et al., 2014, p.638). A screenshot showing the teacher’s website user interface can be found in Figure 4. The three modules interact with one another, imposing direct and indirect communication between the participating individuals. Its design specifications were based on the results from a field study including elementary school students, parents and teachers. The field study, conducted in a school located in Beijing (China), included interviews with all parties involved and usability testing. The main design goals in creating Hero were: “increase parent-child communication by reducing redundant

tutoring sessions, improve parents' pedagogy skills to increase their ability to teach their children and involve teachers' guidance in parenting to leverage the trust parents have in them" (ZHAO et al., 2014). Advice and guidance could be given to the parents by the teachers through the website, of which include challenge-based guidance inspired by different educational problems. According to participant feedback, the system was easily understood and used. The study showed that all participating parents agreed they could acquire pedagogical guidance from teachers through the system. Additionally, all participating teachers stated that through the system they were able to better understand a student's academic environment outside of school. In all, the system helped facilitate the alliance between teachers and parents/guardians.



**Figure 4** – Hero, teacher's website user interface: Challenge Builder page and Challenge Progress page



### 3.2.4 Taiwanese Electronic Classroom Newsletter

A study conducted by researchers in Taiwan created a system for an electronic classroom newsletter for students (KUO; LIU; HUANG, 2004). A screenshot of this newsletter can be found on Figure 5. The population chosen, students in the fourth grade of an elementary school, would input their work into the platform created specifically for the classroom and parents would receive a classroom newsletter via email. The focus of this study was to design and construct a system that enabled the composition of newsletters, and to enhance parental understanding of a child's daily routine and achievements in school. The researchers hypothesized that communication between teachers and parents/guardians could improve through a student collaboration by way of an electronic classroom newsletter, including information updating parents/guardians about their children's daily routines and tasks. With user feedback, the study was able to show that parents were able to be more aware of their children's accomplishments, better through visual depictions as opposed to the oral sharing previously experienced. According to studies, "it takes the cooperation of both parents and teachers to guide a youngster out of academic or behavioral problems; good parent-teacher communication is therefore indispensable when it comes to helping a child break through learning barriers" (KUO; LIU; HUANG, 2004).

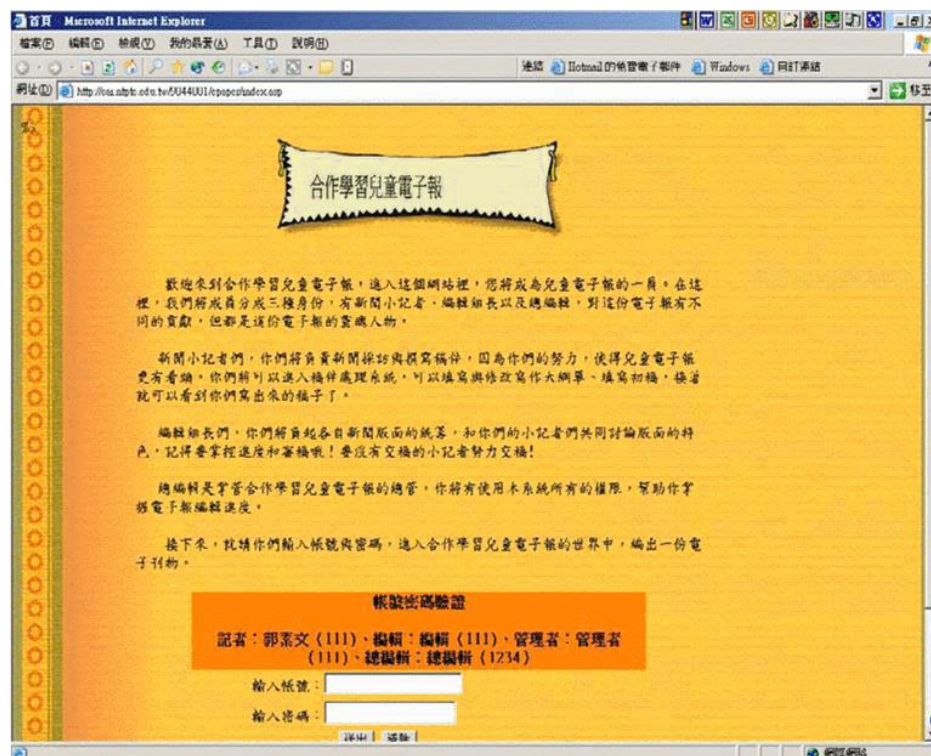


Figure 5 – Newsletter homepage



## **4 METHODOLOGY AND DATA**

### **4.1 TYPE OF RESEARCH**

For this project, an embedded single-case study design was used (YIN, 2002). This design pertains to one single case study that involves more than one unit of analysis (subunits). In this context, one single school would be chosen and within this environment, multiple groups of people would be studied. I spent the month of November selecting a location to conduct the study and preparing the questions to be administered during the interviews. The questionnaire questions and statements were revised by two separate non-participants, serving as an autonomous verification and validation panel. All questions were finalized before any of the interviews were conducted. I met with a faculty member from the school's administration in early December to obtain permission to conduct a case study with teachers and parents from the school. I retained the necessary permission from one of the people responsible for the school.

### **4.2 DATA**

#### **4.2.1 Sample and Selection Criteria**

The case study was conducted in a single public school within the state of Rio de Janeiro, of which currently sustains 300 enrolled students. The name and address of this school will stay anonymous for the purposes of this study. Anonymity was also guaranteed to all participating parents, teachers and school officials. All participants signed a consent form, which can be found in Appendix A. Data collection occurred throughout a period of three days. An initial meeting with a school representative occurred on December 5<sup>th</sup>, 2018. The first visit served as an introduction of the study and to inquire about the possibility of using the school as a study sample. A second meeting took place a week later, on December 13<sup>th</sup>, 2018 to drop off questionnaires for the school administration, an early childhood education teacher and a paraprofessional that worked in the school's library and had daily direct contact with the children. The questionnaires were distributed on that day and picked up on a later date to allow for each participant the time and privacy needed to answer each question. Parent and guardian interviews occurred during the final parent-teacher conference day of the school

year, which took place on December 15<sup>th</sup>, 2018 (two weeks after classes ended for the school year).

To ensure uniformity and consistency between each data collection session and avoiding potential biases, only one person administered the questionnaires. The participants had the options of having each question read out loud to them and filled out by the person administering the questionnaire or respond individually. This was done to ensure that individuals who may not feel comfortable with their literacy capabilities feel at ease, avoiding the ostracism of potentially illiterate participants. The amount of time for each interview varied from person to person. My goal was for each participant to understand what was asked of them, in order to receive the most accurate and honest responses possible. Each person received as much time as was needed to complete the questionnaire.

For this study, 3 members of the school's faculty (one school administrator, one teacher and one paraprofessional) and 9 parents/guardians participated. All participants volunteered and agreed to participate in the study. I only had access to the parents and guardians present on the day of the parent-teacher conference. As such, a considerable portion of the parent population was not interviewed.

#### **4.2.2 Variables**

The questionnaires were intended to deconstruct the current state of communication between teachers and parents/guardians. The questions asked were from an individual about an organization, in this case the organization being technology used as a facilitator for parent/guardian and teacher communication. Each participant served as a single unit of analysis. Questionnaires administered to teachers and parents/guardians were divided into two parts. The first section consisted of a series of seven affirmations with the participant responding in accordance with a varied degree of agreeance, choosing from options represented by the Likert Scale. The second section contained short answer questions to further explore the current communication reality. Through each series of answers, I was able to further understand how communication is accomplished and the overall perception of how it is executed. The teacher questionnaire can be found in Appendix C and the parent questionnaire in Appendix D. The school administration questionnaire only consisted of short answer questions, of which can be found in Appendix B. Stata 12 was used to analyze portions of the questionnaires and generate graphs, the do-file can be found in Appendix E.

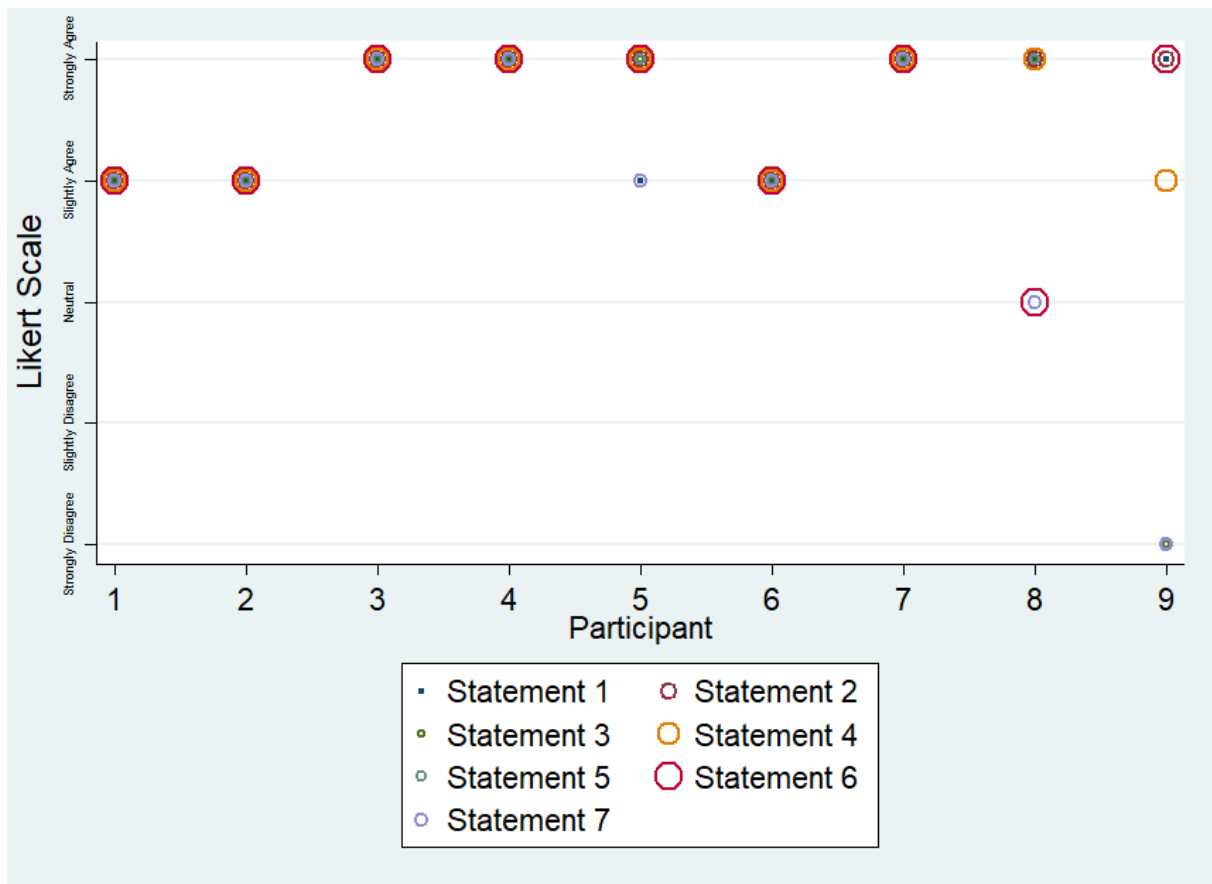
## 5 RESULTS AND DISCUSSION

### 5.1 FACULTY

The faculty sample consisted of a school administration representative, an early childhood education teacher and a paraprofessional that worked in the school's library and had daily direct contact with the children. Their answers helped determine that the way communication is currently handled is by way of: general conferences, private meetings, phone calls, a Facebook page where announcements and photos of activities and projects are posted (through the Facebook page, questions are answered on the message board – i.e. the comment's section and direct messaging), and a Whatsapp group for parents. The recommendations given for improving communication were: send home letters with more advanced notice, a daily dialogue about incidents and more individual meetings for each grade level (there are currently 4 general conferences per school year). The school does not use any form online report card. According to the faculty interviewed, the best initiatives taken by the school were: special events and parties, *Projeto Familia Presente* (which promotes meetings, excursions and seminars) and the Facebook page. Some obstacles for the communication between school and home include: outdated telephone numbers, the fact that many parents and guardians do not appear or participate in the teacher-parent conferences, a parent's work schedule (in most cases), and the lack of personal interest from the parent or guardian. The teacher and paraprofessional commented that they communicated with parents and guardians daily.

### 5.2 PARENTS/GUARDIANS

Nine parents and guardians participated in the study, all of which were recruited during the final parent-teacher conference day of the school year. The first half of the questionnaire consisted of 7 statements, of which the participant had to select one of the agree or disagree options. These results are shown in Figure 6. The x-axis of the graph represents each individual parent/guardian and the y-axis the Likert Scale values. Every statement is depicted by a hollow circle, drawn in a unique color and size. In this manner, we can see how each person agreed with the statements by looking at the vertical line of circles directly above their given identification number.



**Figure 6** – Different levels of agreeance for each statement according to each participant

It is important to notice that some participants selected the same level of agreeance for the various statements, as shown in a single multi-colored circle above the participant identification number (for example: Participant 1). Whether the participant actually felt the same for every statement or did not understand what was being asked of them cannot be determined.

In general, parents and guardians agreed that they received adequate information about what can be done to improve their child’s learning and information pertaining to a child’s development. Additionally, they agreed that the school communicates well. There was a majority consensus regarding how quickly the school dealt with questions/doubts and whether they were made aware of what students should be learning in each grade level; however, one participant showed indifference while another strongly disagreed.

Some recommendations stated by the parents and guardians were: additional projects that involved parents and students, using the school calendar to better organize direct communication opportunities and better patience and organization from school faculty. For the most part, parents felt that the current way of communication is adequate and felt they could not give any recommendations to better the situation. One parent that didn't have a recommendation further explained that "everything that happens I know, I found out that my child has ADHD through the school." The best initiatives taken on by the school, according to the parents and guardian interviewed, were: telephone calls and the Whatsapp group for parents, conferences, monthly meetings, the fact that they're always in contact and communicating information pertaining to the child, fieldtrips, *Projeto Familia Presente* and frequent guidance. Obstacles impeding the participation of some parents and guardians include: work obligations and transportation difficulties. Most parents and guardians interviewed took part in meetings with the school on a monthly basis. Some parents communicated on a daily basis with their child's teacher while others reached out every two or three months.

## 6 CONCLUSION

### 6.1 OVERVIEW

Multiple studies introduce tools used to promote the communication between teachers and parents/guardians. However, no studies published in English were found pertaining to a Brazilian context. In 2018, laws at the State level in Brazil were passed to announce and mandate electronic report cards throughout the country. However, this alone may not be a strong enough agent to promote the necessary level of communication between teachers and parent/guardians.

Four technological tools were found during the systematic literature review portion of this study, all of which further enhanced the communication between parents/guardians and teachers. As such, perhaps examining tools and systems available in the market and implemented in other school systems but adapting them to the Brazilian reality may accomplish a significant boost in communication.

The systematic literature review in this study was compiled into an article and presented at the *XXIII Conferência Internacional sobre Informática na Educação* (SILVA; SILVA, 2018).

### 6.2 FUTURE RESEARCH

An indepth analysis of how technology is being used to enhance current communications between teachers and parents/guardians within a wider net of the Brazilian public school context, and perhaps including private schools, could be elaborated in future studies.

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## APPENDIX A – CONSENT FORM FOR PARTICIPATION IN THE RESEARCH STUDY

Universidade Federal do Rio de Janeiro

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### TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

**ESTUDO:** Ferramentas tecnológicas como facilitadores para a participação de pais e tutores na educação básica de um aluno.

*Você está sendo convidado (a) a participar do projeto de pesquisa acima citado. O documento abaixo contém todas as informações necessárias sobre a pesquisa que estamos fazendo. Sua colaboração neste estudo será de muita importância para nós, mas se desistir a qualquer momento, isso não causará nenhum prejuízo a você.*

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Concordo em participar, como voluntário/a, da pesquisa intitulada "Ferramentas tecnológicas como facilitadores para a participação de pais e tutores na educação básica de um aluno", que tem como pesquisador/a responsável Yves Conceição Almeida da Silva, aluna do departamento de Ciência da Computação da Universidade Federal do Rio de Janeiro, orientada por Mônica Ferreira da Silva, os/as quais podem ser contatados/as pelo e-mail (yves.dasilva@gmail.com) ou telefone ((21)2293-8456). O presente trabalho tem por objetivos mapear tecnologias sendo utilizadas atualmente e descobrir as necessidades e demandas relacionadas à comunicação entre professores e pais/tutores dentro de uma escola do sistema público de ensino no estado do Rio de Janeiro. Minha participação consistirá em responder um questionário e me dispor a uma entrevista. Compreendo que esse estudo possui finalidade de pesquisa, e que os dados obtidos serão divulgados seguindo as diretrizes éticas da pesquisa, assegurando, assim, minha privacidade. Os resultados obtidos durante este ensaio serão mantidos em sigilo, mas concordo que sejam divulgados em publicações científicas, desde que meus dados pessoais não sejam mencionados. Sei que posso retirar meu consentimento quando eu quiser, e que não receberei nenhum pagamento por essa participação. Este Termo de Consentimento será emitido em duas vias, sendo que uma via ficará em poder do pesquisador e a outra em poder do participante.

Declaro que, após convenientemente esclarecido pela pesquisadora e ter entendido o que me foi explicado, consinto em participar do presente Projeto de Pesquisa.

Rio de Janeiro, \_\_\_\_ de Dezembro de 2018.

**Participante :** \_\_\_\_\_  
Nome / Assinatura

**Responsável pelo Projeto:** \_\_\_\_\_  
Yves Conceição Almeida da Silva

**APPENDIX B – SCHOOL ADMINISTRATION QUESTIONNAIRE****Entrevista - Direção da Escola**

1.) Qual é a estrutura da administração dessa escola?

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2.) Qual é seu cargo cargo? \_\_\_\_\_

3.) Há quanto tempo está no cargo? \_\_\_\_\_

4.) Qual o número de turmas ou crianças que a escola abriga? \_\_\_\_\_

5.) Como a comunicação com pais/tutores está sendo feita atualmente (ferramentas) ?

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6.) Na sua opinião, qual é o maior obstáculo que impede a maior comunicação de pais/tutores na escola? Pode ser mais de um.

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7.) Na sua opinião, qual é o maior obstáculo que impede a maior participação de pais/tutores na escola? Pode ser mais de um.

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8.) Qual é a melhor ação tomada pela sua escola para ajudar pais/tutores se envolverem mais com a escola?

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9.) Qual recomendação você daria para a escola melhorar a comunicação com pais/tutores?

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## APPENDIX C – TEACHER QUESTIONNAIRE

### Questionário (professores)

#### Descrição

Esse questionário busca coletar informações sobre a comunicação de professores com pais e tutores sobre a educação de seus filhos/as e tutelados/as.

#### Escala

**Instruções:** Suas respostas, que serão usadas nessa pesquisa, serão mantidas em sigilo. Para cada afirmação abaixo, por favor selecione a resposta que melhor represente sua opinião referentes ao ano letivo atual.

Por favor, circule uma das opções que melhor represente a sua opinião para cada afirmação: discordo totalmente, discordo parcialmente, indiferente, concordo parcialmente ou concordo totalmente						
1.	Eu consigo emitir informações sobre o que pais/tutores podem fazer em casa para melhorar a aprendizagem da sua criança.	discordo totalmente	discordo parcialmente	indiferente	concordo parcialmente	concordo totalmente
2.	Eu consigo enviar informações sobre o desenvolvimento do meu aluno.	discordo totalmente	discordo parcialmente	indiferente	concordo parcialmente	concordo totalmente
3.	Eu tento pedir uma reunião em pessoa pelo menos uma vez por ano para discutir sobre como o aluno está na escola.	discordo totalmente	discordo parcialmente	indiferente	concordo parcialmente	concordo totalmente
4.	Eu tenho um canal disponível para comunicar com pais/tutores (exemplos: cartas, ligações ou e-mails).	discordo totalmente	discordo parcialmente	indiferente	concordo parcialmente	concordo totalmente
5.	Eu consigo responder perguntas de pais/tutores sobre alunos rapidamente.	discordo totalmente	discordo parcialmente	indiferente	concordo parcialmente	concordo totalmente
6.	Eu consigo emitir regularmente aos pais/tutores atualizações sobre o desenvolvimento de meus alunos.	discordo totalmente	discordo parcialmente	indiferente	concordo parcialmente	concordo totalmente
7.	Eu consigo disponibilizar informações sobre o que deve ser aprendido e o que devem saber no grau de instrução atual.	discordo totalmente	discordo parcialmente	indiferente	concordo parcialmente	concordo totalmente

Há quantos anos que atuo nessa profissão? \_\_\_\_\_

Quantos alunos estão sob a sua responsabilidade? Em quantas turmas?

\_\_\_\_\_

Qual recomendação você daria para a escola melhorar a comunicação de professores com pais/tutores?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Qual é a melhor ação tomada pela sua escola para ajudar pais/tutores se envolverem mais com a escola?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Qual é o maior obstáculo que te impede a comunicação de professores com pais/tutores? Pode ser mais de um.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Em média, quantas vezes por ano letivo você encontra e/ou comunica com pais/tutores?

\_\_\_\_\_

Em média, quantas vezes por semestre/trimestre/bimestre você encontra e/ou comunica com pais/tutores? \_\_\_\_\_

## APPENDIX D – PARENT QUESTIONNAIRE

### Questionário (pais/tutores)

#### Descrição

Esse questionário busca coletar informações sobre o envolvimento de pais e tutores na educação de seus filhos/as e tutelados/as.

#### Escala

**Instruções:** Suas respostas, que serão usadas nessa pesquisa, serão mantidas em sigilo. Para cada afirmação abaixo, por favor selecione a resposta que melhor represente sua opinião referentes ao ano letivo atual.

Por favor, circule uma das opções que melhor represente a sua opinião para cada afirmação: discordo totalmente, discordo parcialmente, indiferente, concordo parcialmente ou concordo totalmente					
1. Eu recebo informações sobre o que posso fazer em casa para melhorar a aprendizagem da minha criança.	discordo totalmente	discordo parcialmente	indiferente	concordo parcialmente	concordo totalmente
2. Eu recebo informações sobre o desenvolvimento da minha criança.	discordo totalmente	discordo parcialmente	indiferente	concordo parcialmente	concordo totalmente
3. O professor da minha criança me pede uma reunião em pessoa pelo menos uma vez por ano para discutir sobre como minha criança está na escola.	discordo totalmente	discordo parcialmente	indiferente	concordo parcialmente	concordo totalmente
4. A escola de minha criança é muito boa de se comunicar comigo (exemplos: cartas, ligações ou e-mails).	discordo totalmente	discordo parcialmente	indiferente	concordo parcialmente	concordo totalmente
5. Quando a escola de minha criança se comunica comigo eu consigo ler e entender o que foi enviado.	discordo totalmente	discordo parcialmente	indiferente	concordo parcialmente	concordo totalmente
6. Se eu tiver uma pergunta, preocupação ou comentário sobre minha criança, o professor entra em contato rapidamente.	discordo totalmente	discordo parcialmente	indiferente	concordo parcialmente	concordo totalmente
7. Eu recebo atualizações regulares sobre o desenvolvimento da minha criança.	discordo totalmente	discordo parcialmente	indiferente	concordo parcialmente	concordo totalmente
8. Eu recebo informações sobre o que deve ser aprendido e o que devem saber em cada grau de instrução.	discordo totalmente	discordo parcialmente	indiferente	concordo parcialmente	concordo totalmente



Por quantas crianças sou responsável? Há quantos anos? \_\_\_\_\_

Qual recomendação você daria para a escola melhorar a comunicação com pais/tutores?

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Qual é a melhor ação tomada pela sua escola para ajudar pais/tutores se envolverem mais com a escola?

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Qual é o maior obstáculo que te impede de participar mais na escola de seu filho/a ou tutelado/a? Pode ser mais de um.

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Quantas vezes por ano letivo você encontra e/ou comunica com a/o professor/a de seu filho ou tutelado/a? \_\_\_\_

Quantas vezes por semestre/trimestre/bimestre você encontra e/ou comunica com a/o professor/a de seu filho/a ou tutelado/a? \_\_\_\_

**APPENDIX E – STATA DO-FILE ARCHIVE (TO GENERATE THE GRAPH)**

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**TCC do-file

*Generate scatterplot

graph twoway (scatter Quest1 Participant) ///
             (scatter Quest2 Participant) ///
             (scatter Quest3 Participant) ///
             (scatter Quest4 Participant) ///
             (scatter Quest5 Participant) ///
             (scatter Quest6 Participant) ///
             (scatter Quest7 Participant)
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