

A study on the state of knowledge produced relative to technology and education of deaf students in Brazil from 1999 to 2018

Um estudo sobre o estado do conhecimento produzido em relação à tecnologia e educação de surdos no Brasil de 1999 a 2018

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ABSTRACT

This study is the result of a Masters Program research with the objective of presenting knowledge produced by Brazilian science on the education of the Deaf and its relations with the use of technology, as well as the paths, challenges and directions for what has still not been approached. In this sense, the main objective of this research is to reflect on the convergence between technology and the education of Deaf students through the analysis of dissertations and theses defended in the period from 1999 to 2018, available in the CAPES. To that effect, this investigation, predominantly qualitative, sought to collect data and information from the CAPES dissertations and theses database relative to research conducted on the convergence between areas of education of Deaf students and technology. The analysis and reflections made on the data collected revealed several trends, such as intensification of research relative to the investigative theme, based on the passing of the Brazilian Sign Language Act in 2002, the concentration of research projects in the Brazilian Southern and Southeastern regions, predominance of development of qualitative approach research, the arising and the importance of research developed by Deaf researchers.

Keywords: State of knowledge; Technology; Education of Deaf students; Brazilian sign language.

RESUMO

Este trabalho é resultado de uma pesquisa de mestrado que teve o objetivo de apresentar o conhecimento produzido pela ciência brasileira sobre educação de Surdos e suas relações com o uso de tecnologias, bem como os caminhos, os desafios e os direcionamentos para o que ainda não foi abordado. Nesse sentido, o objetivo principal desta pesquisa foi refletir sobre a convergência entre tecnologia e educação de Surdos por meio da análise de dissertações e teses defendidas no período de 1999 a 2018, disponibilizadas no portal da CAPES. Para tal, buscou-se nesta investigação de cunho eminentemente qualitativo, dados e informações junto ao banco de teses e dissertações da CAPES sobre as pesquisas realizadas na convergência entre as áreas educação de Surdos e tecnologia. As análises e reflexões realizadas sobre os dados coletados demonstraram várias tendências, tais como a intensificação das pesquisas relacionadas à temática investigativa a partir da criação da Lei de Libras em 2002, a concentração das pesquisas nas regiões Sul e Sudeste do Brasil, o predomínio do desenvolvimento de pesquisas de abordagem qualitativa, o surgimento e a importância de pesquisas desenvolvidas por pesquisadores Surdos.

Palavras-chave: Estado do conhecimento; Tecnologia; Educação de Surdos; Língua Brasileira de Sinais.

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INTRODUCTION

Digital information and communication technology (TDICs) is, day by day, present in each and every level of people's lives, especially in the cities. In addition to being a source of leisure, entertainment and work, they are also important instruments for education, and, for that reason, research on the use of education technology has become more and more common.

Concurrently, the area of Education of the Deaf reveals to be an important field of research within the context of studies on education, especially after the passing of Law 10.436 of April 24, 2002 (BRAZIL, 2002), which officialized recognition of the Brazilian Sign Language (Libras) as the legal means of communication and expression of individuals from communities of the Deaf in Brazil. As of the passing of this law, Libras [T.N.: Acronym for Brazilian Sign Language] officially becomes a language that must be respected, and its status as a linguistic visual-motor nature system must be respected, with its own grammar structure, as used by the Brazilian Deaf community.

Decree 5626 of 2005 (BRAZIL, 2005), regulated the law, providing for education and health, among other aspects of the life of the Deaf in the country. As reported by Pagnez and Sofiato (2014), the enacting of that law caused the interest of academic research of the education of the Deaf to increase.

For recognizing the importance of these two subjects briefly addressed above, the study proposes to examine the state of knowledge produced in Brazilian education research through Doctorate theses and Masters' dissertations, addressing the convergence between Education of the Deaf and the use of digital information and communication technology, between years 1999 and 2018.

The overall objective of this research was to reflect on the convergence between technology and education of the Deaf through analysis of dissertations and theses presented between 1999 and 2018, available in the CAPES portal.

Research of the state of the art of knowledge is important because, upon identifying an interest in researching technology and Education of the Deaf in Brazil, for example, the graduate student may pursue a research on the state of the art, reading this investigation for understanding what has already been produced on the matter, and then reading on the research produced, if of interest to the investigation to be conducted. Therefore, the researcher in training has a direction for beginning reading the theme of his/her research.

Moreover, for carrying out any scientific investigation, it is necessary making bibliographic research on the matter to be researched. For that reason, research on the state of the art or of knowledge is also important after defining the subject matter and the problem to be addressed by the research, since researchers may use these studies for preparing bibliographic research, since they gather that which has been researched on a given matter, in a predetermined term, and propose a possibility of analyzing said information.

Romanowski and Ens (2006) presented a proposal for differentiating denominations of research on the “state of the art” and the “state of knowledge”. To the authors, “State of the Art” is the best denomination for research conducted based on i) the analysis of theses and dissertations, ii) studies presented in conventions; and iii) articles published on a given theme in a period, i.e., in this case, the analysis considers all these possibilities of scientific publications on a given theme or a certain area. As for the denomination “state of knowledge” it is more adequate when only one of these types of publications is analyzed, when analyzed only theses and dissertations, or only published articles, or, moreover, only papers presented in a given convention. We understand there is no consensus on this distinction, however, for preparing this research, we chose to consider this definition presented by Romanowski and Ens (2006).

In this article, we made qualitative reflections on the use of technology in the education of Deaf students between 1999 and 2018, based on the systematization of information (description) and qualitative analysis on scientific research from Masters and Doctorate Programs that addressed technology and Education of the Deaf.

METHODOLOGY

For selecting the research, in the catalog of theses and dissertations available in CAPES³, the descriptions “technology” and “education of Deaf” using Boolean Operator “and”. The goal was then, identifying the theses and dissertations that worked on technology and education of the Deaf.

For defining the analysis period, was considered that Bill of Law 4.857, which passed into Law 10.436 (BRAZIL, 2002) was accepted in the Federal Senate in November

³Link to the CAPES theses and dissertations website catalog: <https://catalogodeteses.capes.gov.br/catalogo-teses/#/>

1998, after countless parliamentary and academic discussions, as well as with the intensive participation and repercussions in the Deaf community. For considering the discussion on the Brazilian Sign Language and, consequently, on the education of the Deaf, we considered relevant the 1998 public debate, this research decided to analyze the research defended and published as of 1999, the year immediately following the reception of the Bill in the Federal Senate.

For defining the end of the period to be considered in this study, it was defined that would be analyzed research presented until the year of 2018. This decision is justified by the fact that materials presented in 2019 were still not available in the CAPES dissertations and theses database at the time of the survey of the work that would be analyzed, namely, the months of March, April and May, 2020.

That happened because the period for presenting these studies in 2019 in the Sucupira Platform⁴ ended in June 2020, i.e., some time after the search conducted in the CAPES portal for preparing this research. Therefore, the investigations analyzed in this Masters Program dissertation were presented between 1999 and 2018, over a period of 20 years, and presented before public and private higher education institutions.

Upon making that search, 105,784 research projects were presented and, by reading all titles and some abstracts, 43 were found that addressed the themes of Education of the Deaf and digital information and communication technology. After reading these documents, only 33 research projects revealed to be actually within the scope of this investigation.

The submission of an annual report of the graduate programs for CAPES passed to be made by the Sucupira Platform as of 2014. For research projects presented as of the year of implementation of the platform, and for which publication was authorized, those are available in a link that redirects the user directly to the text file in Portable Document Format (PDF)⁵.

For accessing the research projects presented prior to the creating of that platform, it was necessary searching virtual catalogs of the universities where the research projects were developed. Both in the Sucupira Platform and in the catalogs of universities, it was

⁴ The Sucupira Platform is the platform where graduate programs file, on an annual basis, data relative to studies developed in the programs, for CAPES analysis and for classification thereof.

⁵ O Portable Document Format (PDF) é um formato de documento digital que foi criado pela Adobe Acrobat®, para que fosse possível compartilhar documentos sem depender de compatibilidade de software, hardware ou sistema operacional.

possible to download research projects of interest in PDF format, and reading all documents through digital support, i.e., on the computer.

We understand there may be research projects that focused on this theme, but that did not enter the descriptions on the title, and which may not have been identified during the search made in the CAPES database of theses and dissertations. However, for conducting this investigation, it was important to consider studies that could be identified in the midst of an enormous quantity of studies listed in the portal through a search made with the previously presented descriptions. Since over 100 thousand research projects were identified, it was necessary to consider reading the titles as the first action for either including or excluding the thesis or dissertation from the scope of this study.

For defining which theses and dissertations that would be part of the final list of this Masters Program Dissertation, the following conditions were analyzed: whether the title or the abstract allowed identifying that the study addressed technology and education of the Deaf, if the project had been presented between 1999 and 2018, whether the thesis or dissertation addressed technology and education of the Deaf, and if the work had its disclosure authorized at the time of the search. After reading, we have also identified whether the studies were based on scientific studies available at the time they were developed.

After assessing these criteria for inclusion and exclusion of theses and dissertations to be analyzed, we consider that would be analyzed, for conducting this study, a total 33 theses and dissertations. Therefore, after the second check, 10 research projects were removed from the first list.

PRESENTATION OF DATA AND DISCUSSION OF RESULTS

For organizing the presentation of the discussion of results, this session was divided into subsections. The discussion of the results found during the progress of the research will be presented next.

Quantity of masters and doctorate program research projects and distribution thereof through time

Of the 33 research projects analyzed, 29 were Masters Program research projects, which indicates that the theme of education of the Deaf and its relation to the use of digital information and communication technology has been gaining relevance in the academia,

first through Masters Program research and little by little, it is also becoming a subject of investigations in Doctorate programs.

Analyzing the data on the quantity of Masters' Program dissertation presentations per year, we noticed a substantial increase in the number of dissertations on technology and deafness after year 2010. While from 1999 to 2009 we found 3 Masters' Program Research projects on the theme, after 2010, that number was 26 (dissertations).

One of the possible justifications for that significant change in the number of research projects after 2010 is the passing of the Brazilian Sign Language Act, in 2002 (BRAZIL, 2002) and its regulating Decree in 2005 (BRAZIL, 2005), since after legal recognition of the Brazilian Sign Language, we see an increase in scientific production on the matter. That fact could also be observed in the analysis performed for this research.

Of the 33 research projects analyzed, only 4 were Doctorate Program projects, and they were all presented starting in 2005, and 3 of them were presented as of 2010, which confirms the trend previously presented, regarding the concentration of research projects after year 2010. Moreover, this information is evidence of the trend that there are, initially, more Masters Program Research Projects than Doctorate Program Research Projects on a subject that is still recent, but which is gaining space on the graduate level of academic discussions.

Both discussions on the education of Deaf students after the passing of the Brazilian Sign Language Act in 2002 (BRAZIL, 2002), and debates on technology and education have been intensifying in the last few years, due to the relevance technology has been having in society, and also, due to its importance in promoting accessibility to Deaf individuals. That was revealed both in the proportion of dissertations and theses analyzed on this matter and in the quantity of research projects developed after year 2010.

Distribution of research projects in the different regions of the country

Regarding the regions of the country where presented the dissertations and theses, 03 were presented in the North region, 04 in the Northeast, 05 in the Midwest, 10 in the South and 11 were presented in the Southeast.

We may understand the different in the quantity of projects presented by region due to the distribution of graduate programs in Brazil. On the Sucupira Platform is available to researchers and interested individuals, a table with the distribution of postgraduate courses (Masters, Doctorate Programs, Professional Masters' Programs and

Professional Doctorate Programs) by region of the country. Currently, there are 7,085 courses recognized by CAPES in Brazil, and from those, 3,217 are in the Southeast, 1,549 are in the South, 1,366 in the Northeast, 572 in the Midwest, and 381 in the North (CAPES, 2020).

The difference in the quantity of postgraduate courses between the Southeast and the North regions, for example, is enormous, and that is directly related to the number of theses and dissertations found in all areas of knowledge.

A similar result was found by Pagnez and Sofiato (2014), who, in investigating the State of the Art of research on education of the Deaf, also faced a concentration of research projects in the South and in the Southeast.

This data found both in the research of Pagnez and Sofiato (2014) and in this investigation, show the concentration of the discussions on the education of the Deaf in these regions. It is important for the debate to become interiorized, and to reach Universities in other regions of the Country beyond the South and the Southeast. Therefore, the Deaf who are in the various cities and states will be benefited by the development of studies on education of the Deaf and the use of digital information and communication technology.

Distribution of research projects by university and postgraduate program

Regarding the Universities where the research projects were conducted, it is possible to say there is a great dispersion, i.e., in most Universities, there is one research project presented, except for Universidade Federal do Pará, Universidade Federal da Paraíba, Universidade Federal de Mato Grosso, Universidade Federal da Grande Dourados and Universidade Federal do Rio de Janeiro which have two projects presented each. In one single institution, Universidade Federal do Rio Grande do Sul, three studies were presented. This data shows that during the studied period, no institution is a substantial center of development of research connecting TDICs and Education of the Deaf.

This dispersion is not a negative point, since it shows several universities develop research on education of the Deaf and use of the TDICs. It is relevant to monitor the development of investigations for identifying whether any university will become the development center for research on this theme.

It was possible to note there was a continuity in the research projects presented at Universidade Federal da Grande Dourados, since both projects were conducted by the same research group, and we identified the theme was continued. However, only two research projects are connected to this institution, the last of which presented in 2016. Therefore, there is still no sufficient data to consider it an important research center on the field.

Concerning the postgraduate programs where the dissertations were presented, it is possible to note that each program also counted on one dissertation presented, except for the Graduate Program in Education, which had 14 dissertations in different Universities (Universidade Federal do Amazonas, Universidade Federal do Rio Grande do Sul, Universidade Estácio de Sá, Universidade do Vale do Rio dos Sinos, among others). This data is justified - and was, sort of expected - due to the criteria adopted for the research in the CAPES portal, since it contained the word “education” when searching for “Education of Deaf students”.

Moreover, the Masters Program in Diversity and Inclusion of Universidade Federal Fluminense, records 02 dissertations presented, which can be justified by the choice for the word “Deaf” in the search conducted in the CAPES Theses and Dissertations Portal.

We have previously mentioned that the research projects analyzed by this investigation were presented in different universities and one of the possible consequences arising of that reality lies in the fact that there could be, also, a dispersion relative to the postgraduate programs in which the research was developed. This possibility was confirmed upon analyzing information referring to the programs where the investigations were presented, and for having identified that these research projects were developed in various postgraduate programs.

This data also show that the discussion concerning education of the Deaf and the technological tools that has been explored in several areas of knowledge and in several universities, which causes professionals from various fields and from several locations in the country to have the opportunity to come into contact with important discussions regarding the possibilities for improving the offer of education to Deaf students.

If the insertion of the theme in areas of knowledge is made consistently, information on the need to make adaptations for Deaf students will reach more people,

which may promote, on the long-term, an improvement in the social inclusion of this group.

Research conducted by deaf or non-deaf authors

Of a total 33 research projects analyzed in this study, 26 were written by non-Deaf authors, and 07 by Deaf authors. This data shows how the presence of the Deaf in the research on education and use of information and communication technology for the education of the Deaf is still low.

We expect this number to progressively increase, since there is current legislation on the books with greater recognition of the need to respect the rights of the Deaf, such as, for example, the responsibility of the education institutions to ensure the presence of Brazilian Sign Language translators in public and private universities. That opens the path for the Deaf to increase their levels of interest in entering postgraduate programs, which, consequently, would result in more dissertations and theses presented by Deaf individuals. It is imperative to encourage more Deaf individuals to join the academia, and that is achieved by effectively offering accessibility and conditions for their access and permanence.

Themes of theses and dissertations

The themes of theses and dissertations are varied, but it is possible to say that of the 33 research projects analyzed, the most recurrent theme was teaching of Sciences, which was the subject matter of research in 07 of the 33 research projects analyzed, whereas 05 research projects were focused on the teaching of Portuguese Language.

The teaching of Portuguese Language (reading and writing) was also the most debated theme in the articles analyzed by Nascimento, Melo and Araújo Neto (2018). As for the teaching of Mathematics, Physics, Chemistry and Sciences, it also stood out as a highlighted theme in the research of Pagnez and Sofiato (2014), which focused on the production of theses and dissertations in the area of education of Deaf students. It is worthy of note that the same trend was repeated when the study also considered convergence with TDICs. This trend shows that there is, in recent productions on the education of the Deaf in Brazil, concerns, especially with the teaching of Portuguese Language and Sciences.

Main theoretical references

Among the authors used in the research projects analyzed, we identified the following scholars and the ones to whom most references were made: Ronice Müller de Quadros, one of the authors most used in 04 of the 33 research projects, and Lev Vygotsky as one of the authors most cited in 03 research projects.

Pagnez and Sofiato (2014) and Nascimento, Melo and Araújo Neto (2018) also found author Ronice Müller de Quadros one of the most cited, which shows this author is one of the main references in research on education of Deaf students and Brazilian Sign Language. Therefore, she was identified as one of the most relevant authors in this field of research, and in the two studies of the State of Knowledge who dedicated to the education of Deaf Students based on different perspectives and different methodologies.

Relative to the area of knowledge, we have identified that the authors from the field of education of Deaf students/history of education of Deaf students show as the ones most used in 12 of the 33 research projects analyzed. That is evidence that the study in this field of knowledge is scientifically relevant, since they are theoretically substantiated in several other research projects.

Main methodologies

Regarding methodology, 20 projects with qualitative and applied methodology were analyzed, and 12 studies with qualitative and descriptive methodology. Only one research project informed that quantitative analysis would be made in conjunction with qualitative analysis.

The use of qualitative and quantitative methods is the theme of debate between researches that reflect on research in education. André (2005) makes a historic analysis of the development of research in education and finds several differences of different levels between research developed in the 1960s and 1970s and investigations in the 1980s and 1990s.

Despite 19 of the studies analyzed during this investigation having not been developed in education postgraduate programs, all research projects are somehow related to the area, and for that reason, the reflection provided by André (2005) reveals to be relevant to this discussion. To the author,

if the themes and references are diversified and become more complex in the 80s-90s, the methodological approaches also follow these changes.

“Qualitative” studies gain strength, encompassing an heterogeneous set of methods, techniques and analyzes, ranging from anthropological and ethnographic studies, participating research, case studies to action-research and speech, narrative and life-story analysis (ANDRÉ, 2005, p.30).

André (2005) raises a reflection on the urgency of qualitative studies in the field of research in education, and this trends remains during the 2000s, as we can see in the text “Methodological construction of research in education” by Gatti (2012). In this text, the author makes a presentation of how that field of knowledge is constituted.

According to Gatti (2012), we note in the field of research in education a predilection for qualitative research, as if that methodology was better than quantitative, for some reason. The author also stresses that the research methodology must be chosen based on the definition of the problem to be analyzed. The author argues that it is necessary overcoming the dichotomy between qualitative and quantitative research, and a look that accepts that methods can be combined, depending on the problem to be investigated must be used.

To Gatti (2012), data (qualitative or quantitative) cannot be used by itself, it has the purpose of bringing some information within a given context and, therefore, the information must not be analyzed in isolation, out of the context where it was produced.

Technology type

There was great variation in the technology analyzed, designed or used in the studied research projects. Among the technologies that may be considered similar, we found 03 research projects that prepared and analyzed remote learning courses, 03 research projects produced videos, and 03 research projects developed software.

It is possible to notice there is a trend in the research projects analyzed of building new tools for teaching the Deaf, since 14 research projects in total proposed the preparation of instruments for helping in pedagogic practices destined to the Deaf. We understand that this happens because there are few options available to be used by teachers/professors, and, for that reason, there is demand for postgraduate programs for the purpose of preparing possible options for use of technology in the Education of Deaf students.

Main results of the research projects analyzed

After reading and analyzing all results of the research projects analyzed, it was possible to indicate the result that is repeated the most - despite the variety of themes, objectives and methodologies among the 33 research projects - is that the use of technology is adequate for the Education of Deaf students, an argument that showed in 09 research projects. Another recurring argument is that the use of visual resources is adequate for Education of Deaf students, showing in 06 research projects. These two arguments can be considered complementary, since 03 research projects showed that both claims appeared simultaneously in the results.

It is relevant to say that research considering in its results that the use of visual technology resources is important for Education of Deaf students often making it evidence that these two resources must not be considered the resources that will solve every problem in the education of Deaf students. Some authors, such as Gretter (2015), Scantbelruy (2010), Fraga (2017), Couto (2017), Farias (2006) point out that visual resources must be used in conjunction with the understanding that it is fundamental using Sign Language as the language of instruction for any pedagogic practice concerning education of Deaf students who use that language. And, for those who do not use it, must be guaranteed the possibility to learn if for being able to use it, if they are so interested.

Deaf Students are students just as any other, i.e., these students may also experience family and social problems, and may have various learning difficulties, and be diagnosed with learning disorders. I.e., using, in a pondered manner, visual and technological resources, in addition to using the Brazilian Sign Language as the language of instruction, places these students in a learning condition that is closer to that of non-Deaf students, but it is expected that other challenges appear during the education of Deaf students, as it is expected that challenges will appear in the education of non-Deaf students.

What can be stated, after analyzing the data collected, is that the use of technological resources, combined with the use of visual resources, combined with the use of Sign Language as the language of instruction for these students are factors that favor the teaching-learning process in the case of Deaf students. Except that these actions will not solve all challenges found in the Education of Deaf students which, as we may see, is a broad and complex field, such as any activity involving the process of educating human beings.

FINAL CONSIDERATIONS

As our final considerations, we point out that in the last 20 years, a progressive increase in the number of dissertations and theses addressing convergence between technology and education of Deaf Students has been happening. We note that this expansion can be explained by the expansion in social and scientific discussions on technology and, concurrently, a growth in discussions regarding deafness and education of the Deaf, which also cause the number of studies addressing both themes to increase.

After the analysis of the theses and dissertations, we have also evidenced the arising of research performed by Deaf scholars, which suggests this is one of the effects of the recognition of the Brazilian Sign Language through Law 10.436/2002. It is necessary that there is time for society to accommodate the matter, and, for that reason, we expect that every year, the number of Deaf students in academia overall will increase, and that other Deaf individuals dedicate themselves to studying the point of convergence between technology and education of the Deaf, specifically.

Was identified the concentration of research on the matter of technology and education of the Deaf in the South and Southeast regions of Brazil, caused by a concentration of postgraduate programs in these regions. Was also identified the predominance of qualitative research when analyzing studies on the convergence between technology and education of the Deaf; that fact also occurs, in general, in research on Education in Brazil.

After performing the analysis of the 33 academic productions, we understand that despite characterizing resources with the great potential to aid in the effective education of Deaf students, the use of technological resources alone is not sufficient. It is an important process of the broader process of adaptation, which considers the educational specificities of Deaf students, especially the use of the Brazilian Sign Language as the teaching language.

Therefore, the use of technological resources for education of the Deaf requires adjustments that seek to adapt these resources to the needs of individuals who use visualization for interacting with the world, as well as those who use sign language as their first language.

Lastly, we understand that technology has intensively influenced the way individuals relate to society, as well as the ways human and social relations in the present day influence the development of technology. These changes in relations between people

happen not only in the way people are entertained and work, but also change the way education and human development actions occur. The Deaf are not apart from this technological and social development, since technology reveals to be a facilitating resource for educational processes for Deaf individuals too.

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