

ARTIFACTS FOR DRAWING AND WRITING: A STUDY IN PRODUCT DESIGN

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Keywords: Adaptation, Product design, Graphing

1 Introduction

Drawing is a children production by which it expresses real situations and will be performed with any instrument as an extension of its body (CASSIS; FRANCISQUETI, 2006). However, some children, when experiencing Cerebral Palsy sequela (PC), deficiency that compromises the programming and proper execution of voluntary movements, need some kind of adaptation to develop graphic activities (MARCELINO; MARTINS, 2015).

In this sense, the designer can dedicate himself toward proposing special solutions and devices for making it more accessible. In the field of Design, among other scholars described by Marcelino, Araújo e Martins (2016), Clarkson et al (2003) discuss the inclusion, based on the understanding that the disability results from the environment and opportunities offered to the subjects. Multidisciplinarity is fundamental in the development of Assistive Technology products. The designer starts from the general idea, thinking about an accessible product; while the occupational therapist evaluates accurately the relationship between the functional performance of the user versus the product.

The assistive devices developed to overcome difficulties in pencil gripping are also called "adaptations", whose numerous models are available on the market, expanding the range of opportunities for people with motor disabilities.

With the objective of subsidizing one doctoral research in Design entitled " Efficacy and Efficiency of National Assistive Products on the Graphomotricity of Children with Dyskinesia ", this study, which is a result from one PIBIC and one extension project, aims to analyze the design of products for drawing or writing commercialized in the current market scenario, public teaching network and topic

research.

2 **Methods**

This is a qualitative cross-sectional study in which participated 149 professionals from the Specialized Educational Service (AEE) and 3 Design students.

The study period was from the second half of 2015 to the second half of 2016.

The data was collected through literature review, visiting sites, stores in Recife and one municipal school, and were extracted from field notes.

The literature review aimed to subsidize theoretically topics of interest for this research, including topics such as assistive technology, disability, graphing, inclusion, Occupational Therapy and Product Design.

The market research was conducted both online and in physical stores, and involved the identification of commercialized artifacts. The online survey was based on the search of national and international English language websites, specialized in occupational therapy, accessibility, assistive technology and related topics, in the catalogs of available adaptations until the items included in the research were exhausted. Finally, the search was carried out from the descriptors: graphic adaptations, assistive technology, pencil adaptation, assistive technology, adapted pencil. The survey was conducted in 3 stores from Recife, selling rehabilitation equipment, and 6 large stationery stores, located on main avenues and accessible streets.

The research in the Municipal School Network was conducted through one project as an extension from the Occupational Therapy course, which offered training and knowledge/experience exchange with AEE professionals on Cerebral Palsy and pencil adaptations, as well as through a visit to one of the schools, collecting information on the availability of these artifacts in this environment.

For the evaluation of the aesthetic perception of the products, a query was conducted on 3 Design students, who had access to the images of the artifacts found on the market, available in a Word document, which they classified through the use of the Likert scale with 5 points: unpleasant, low pleasant, neutral, pleasant and very pleasant.

For the data analysis, a table was developed in the excel program, where information about the artifacts were released. The database contains the images of the devices and recordings of the grip / grip of people in the use of them. Their configurations were analyzed qualitatively, according to their characteristics, with support of the literature in the area of Product Design and Ergonomics. The field notes resulting from the school visit, training and the discussion with the AEE professionals, were analyzed by the method of Discourse Analysis.

3 Results

In total, the study was able to compile 29 adaptations, of which only 2 were found at stationers. The 27 artifacts collected online were collected from 16 different sites - 6 national and 10 international. However, only a few found online obtained the design analysis, in this study, since insufficient information was obtained from other sources.

The studied Municipal Schools didn't have access to pencil adaptations commercialized during the study period. The artifacts used by the AEE professionals were handcrafted, and generally had a simple configuration, termed "thickeners", to provide the diameter increase to the pencil. The materials used therein to provide this increase in diameter are various, such as adhesive tape, PVC pipe, rubbery, recyclable tubes and bicycle handle.

As for the survey in the physical stores, the rehabilitation was consulted by telephone, when no artifact was identified. The sale of this type of product only occurs by order to distributors that are located in the South and Southeast Brazil, and some of these stores can mediate the order. In only two of the six stationers, were found 2 models of adaptations, thickener and extender.

Following the analysis of the product design, the artifacts were distributed according to some categories studied, based on Munari (1981), Bonsiepe e Yamada (1982), Gomes Filho (2006) e Löbach (2001), on: material, dimension, fixation to the limb, purpose, type of handle and aesthetic variability.

The material was an open category. It was tried to define what composes the raised artifacts, being found: silicone and special flexible carbon; Polyethylene; foam; plastic; latex; Metal and magnet; Velcro and plastic; eraser; PVC foam; Neoprene ®; Silica gel; cotton; Satin and plastic; Silicone coated steel wire; Polyvinyl acetate foam, velcro and polyethylene.

The (approximate) dimensions were identified and described, as well as closed categories were formed, which generated a classification, taking into account the anthropometric measures of the child hand, based on Esteves et al (2005), for an analysis of the possibility of using the products by this public. The dimensions were classified in: a) without restrictions; B) with variation in size or from the age of 11; C) unavailable measures. It was identified that only one has no size variation and has measures incompatible with the child hand. Dimension information was unavailable for 6 of 27 products, and when available, some showed size variations. However, it was perceived that this variable is difficult to evaluate at a distance, considering the circumferential characteristics of the artifacts, as well as being composed of parts with different configurations.

Some artifacts are handled from their hand and / or forearm coupling, by means of velcro, straps and handles, among others, keeping fixed to the user even without a voluntary process. Others already allow free handholding. Thus, the artifacts were

classified as fixation to the limb, resulting in 13 fixed and 14 non-fixed.

Therefore, 17 of the artifacts are unique to the graphing and 10 have multiple purpose (can adapt other artifacts, such as cutlery).

There are several ways to project limbs when an object is being used, that is, how the hand is conditioned to interact with adaptation. Therefore, Then, the type of handle was classified in: a) free hand, when the handle can direct, but does not condition one specific hand position, characteristic of 10 products; B) Positioned hand, when the artifact induces a slightly variable position, found in 17 of them.

The aesthetic variability was identified from an initial evaluation of aesthetic perception by Design students, who tended to express similar opinions, occurring a great discrepancy with only 6 of the analyzed artifacts. The aesthetic receptivity of the products, when negative, seems to come from the lack of familiarity of the participants with the presented items, an important factor to be considered in the usability assessment, since it is often necessary to allow a time of approximation of the user to the artifact. The articles that, unanimously, were evaluated as pleasant approach the commonly commercialized thickeners.

4 **Conclusions**

The shortage of pencil adaptations was observed in stores in the City of Recife, which makes it difficult for people with motor disabilities to access them.

The process of synchronous analysis, resulting from online search, was hampered by the lack of information available to users in relation to the products offered, which led to the exclusion of many relevant adaptations. Another deadlock was that most of the cataloged products found in virtual stores are produced and sold by US stores, which made it difficult to contact suppliers.

The multidisciplinary character of this study, which furthers the knowledge of Design, Occupational Therapy and Assistive Technology, as well as the experience of categorizing the products, generated more knowledge, especially in the face of a lack of theoretical support for the analysis of the studied products.

Graphing, so relevant in communication, is hampered by the absence of instruments adapted to the users' needs for their development. Starting a process of analyzing these products makes solutions and gaps that still need to be fulfilled in an inclusive scenario.

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6 **Acknowledgments**

We thank the support agencies for the realization of PIBIC and the Extension Project. Our gratitude also to the educators of the City of Recife and the students of Design for having contributed as volunteers.