Cadernos Brasileiros de Terapia Ocupacional
Brazilian Journal of Occupational Therapy

ISSN 2526-8910

Original Article

Analysis of curriculum content about accessibility and universal design in undergraduate architecture and occupational therapy programs in Brazil

Análise dos conteúdos sobre acessibilidade e desenho universal nos cursos de graduação em arquitetura e terapia ocupacional no brasil

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How to cite: Gomes, L., & Emmel, M. L. G. (2020). Analysis of curriculum content about accessibility and universal design in undergraduate architecture and occupational therapy programs in Brazil. *Cadernos Brasileiros de Terapia Ocupacional. 28*(1), 164-186. https://doi.org/10.4322/2526-8910.ctoAO2628

Abstract

Accessibility and Universal Design concepts were initially directed toward the conception of objects, equipment and the physical space of the Person with Deficiency. These themes became more relevant insofar as their use included people in general, independent of their physical, cognitional and sensorial limitations. Considering the importance of these themes to the professionals of Occupational Therapy, Architecture and Urbanism and the current legislation related to these themes, the purpose of this work is to investigate how the concepts of Accessibility and Universal Design are present on curriculum content of undergraduate programs for those professions, in both Federal and State Brazilian Universities. Curriculum content of undergraduate programs available on-line were analyzed considering their political-educational projects, syllabus, objectives and contents. The data were analyzed using the Content Analysis. The sample was constituted of 32 undergraduate programs of Architecture and Urbanism and 8 of Occupational Therapy. The results show that the activities of the occupational therapist and the architect are complementary: while the focus for accessibility in the case of the Occupational Therapy is the user, for the Architecture and Urbanism is the space. It was possible to see several different ways of analyzing accessibility according to the different courses. This shows a lack of homogeneity among the universities, in both areas. Concerning the concept of Universal Design, it is included broadly in Architecture and

Received on July 20, 2019; 1st Revision on Aug. 28, 2019; Accepted on Sept. 29, 2019.

Urbanism programs although there is a significant gap of this content in Occupational Therapy programs.

Keywords: City Planning, Professional Training, Architectural Accessibility, Occupational Therapy.

Resumo

A Acessibilidade e o Desenho Universal (DU) foram inicialmente voltados para a concepção de objetos, equipamentos e espaço físico para a Pessoa com Deficiência (PcD), mas passaram a ganhar maior relevância à medida que seus usos foram direcionados de forma a incluir a maioria das pessoas, independente de limitações físicas, cognitivas ou sensoriais. Considerando a importância desta temática para os profissionais de Arquitetura e Urbanismo (AU) e de Terapia Ocupacional (TO) e a legislação referente aos temas na atualidade, buscou-se investigar como os conceitos de Acessibilidade e do DU vêm sendo contemplados nos currículos dos cursos de graduação destas profissões, focando nas instituições públicas federais e estaduais brasileiras. A amostra foi composta por 32 cursos de AU e 08 cursos de TO que tinham os projetos político pedagógicos, ementas, objetivos e conteúdos disponibilizados *on-line.* Os dados foram analisados por meio da Análise de Conteúdo e os resultados mostram uma complementariedade entre a atuação do terapeuta ocupacional e do arquiteto urbanista, enquanto na TO o enfoque da acessibilidade está no usuário, na AU o enfoque está no espaço. Foi possível visualizar uma multiplicidade de enfoques sobre acessibilidade entre as disciplinas, o que indica uma falta de homogeneidade para este conteúdo entre as diversas universidades de ambos os cursos. Em relação ao DU, ele é contemplado de forma mais ampla nas disciplinas dos cursos de AU, com uma importante lacuna sobre sua inclusão nas disciplinas dos cursos de TO.

Palavras-chave: Urbanismo, Formação Profissional, Acessibilidade Arquitetônica, Terapia Ocupacional.

1 Introduction

For Carli (2010), one of the great challenges of the environment constitution in its use is to compensate for limitations that can only be considered of quality when bearing all people and their needs. In this context, we can think that universal spaces are those capable of providing with security, autonomy and independence to any individual. Such a statement is in accordance with the right to access, ensured by laws and technical norms, and not only for humanistic reasons.

Santos (2004) points out that accessibility is one of the main factors that governs the interrelationship between society and the Person with Disabilities (PwD), influencing various aspects related to their rights as a citizen. For Dischinger & Bins Ely (2006), accessibility enables the right to access and autonomous use of spaces, promoting the inclusion and exercise of citizenship, without discrimination. An accessible space should be easy to understand, allowing the user to get around, communicate, in addition to enjoying the space safely, comfortably and

autonomously, regardless of their restrictions. In addition, looking for further expand the use of spaces, products and services to a larger number of people, the expression Universal Design was created by the architect Ron Mace, who articulated and influenced a change in the paradigms of architectural projects and design. According to him, the term should be used to describe the concept of designing and building products and environments to be used by all, to the greatest extent possible. Universal Design (UD) is the term used in Brazil (Cambiaghi, 2007).

Considering the breadth of the themes addressed, it is worth looking beyond what is usual in the search to see the whole, in a way that allows an interdisciplinary approach of professionals for the design, construction, occupation and use of space, product or service, considering the specific view of each of them, paying attention to the different points of view, perceptions, forms of locomotion, spatial needs and understanding, focusing on a greater number of people (Duarte & Cohen, 2004).

Such reflections relate to the theory and practices that involve the performance of the occupational therapist and the architect and urban planner, considering their different points of view regarding the insertion of the individual in the environment. Therefore, the legislation and guidelines of occupational therapy and architecture and urbanism courses with regard to both professions are indicative.

Considering the perspective of this work, we can assume that Occupational Therapy (OT) and Architecture and Urbanism (AU) areas are able to include, from different points of view, the individual in the environment, seeking to eliminate barriers, provide access and facilitate interaction with the environment and with the tasks to be executed. Specifically, having as parameter Decree No. 5.296 (Brasil, 2004) and the *Lei Brasileira de Inclusão* (LBI), 2015, which mention the inclusion of contents related to the UD in the curricular guidelines of higher education.

In this context, occupational therapists and architects and urban planners are the actors who can minimize or eliminate the functional limitations of the individual in the face of the demands of the environment, as well as provide good performance in Activities of Daily Living (ADL), considering the different looks of each profession. However, the practice of these professionals are not always linked to accessibility and the UD, which arise questions about undergraduate training considering these specificities.

It is noticeable that notes for a diverse and citizen training of these future professionals is implicit in the *Lei de Diretrizes e Bases da Educação Nacional* - LDB (Law 9394 – 20 December 1996)[1] (Brasil, 1996), considering it is an important guide for the *Diretrizes Curriculares Nacionais* (DCN) of undergraduate courses. In addition to giving greater autonomy to Higher Education Institutes (HEI) in defining the curricula of their courses, they also provide a guide for introducing and implementing the political-pedagogical projects involving each HEI (Santana et al., 2005).

Regarding accessibility and the UD, the DCN of occupational therapists of 2001 (Brasil, 2001), emphasizes their work with regard to environmental and urban adaptations, mobility, accessibility and other support technologies for socio-community inclusion and intercultural dialogue. Thus, favoring the development of activities through communication, information, Assistive Technology (AT) and accessibility, in

[1]Law establishing the guidelines and bases of national education by the Ministry of Education.

addition to favoring access to digital inclusion as empowerment tools for people, families, groups and communities (Brasil, 2002).

According to Article 5 of the DCN of AU undergraduate course, 2010, their professional training must include the skills necessary to design architectural, urbanism and landscaping projects and to carry out constructions, considering the legal regulations, to meet the cultural, economic, aesthetic, technical, environmental and accessibility requirements of the users (Brasil, 2010).

In the case of the occupational therapists and architects and urban planners training, based on the curriculum guidelines, accessibility in their initial formation of each of them is relevant.

2 Objective

The general objective of this research was to investigate how the concepts of Accessibility and UD have been contemplated in architecture and urbanism and occupational therapy undergraduate courses offered by public educational institutions in Brazil.

3 Method

The research sought to cover the documentary, exploratory, descriptive and analytical nature of this work. Therefore, data collection had the initial criterion to identify the number of higher education public courses (federal and state) for occupational therapists and architects and urban planners training. This information was initially sought on the e-Mec website to cover all the courses of public universities in both areas.

After finding the 70 undergraduate courses (n=19 of OT and n=51 of AU), we searched the Pedagogical Political Projects and/or the Curriculum of both courses on the sites of each university. Based on the analysis of these documents, it was possible to identify whether there were courses, mandatory or elective, that addressed the title, and/or syllabus, and/or the objective(s), and/or the content(s), the words "accessibility" and/or "universal design" specifically, following the choice of the sample analyzed. The final sample that was considered after the exclusion of those courses that did not meet the criteria of this study consisted on 40 courses, 32 of AU and 08 of OT.

After documentary surveys, textual information was arranged in spreadsheets for data analysis and discussion, considering quantitative and qualitative approaches.

It followed a descriptive analysis of the data based on numerical results, considering the courses and the definition of the variables that were part of the analyses performed based on the information made available in Excel spreadsheets, considering "Accessibility" and "UD" as guiding. The results were obtained based on the content analysis, which, for Bardin (2010), is performed based on raw data, through the exhaustive reading and categorization of the contents explained in the documents.

Table 1 shows the sample of AU courses studied.

Table 1. Undergraduate courses in Architecture and Urbanism.

Nº	INSTITUTION
1	Universidade Federal do Amapá (UNIFAP) – Macapá – AP
2	Universidade Federal do Amazonas (UFAM) – Manaus – AM
3	Universidade Federal de Roraima (UFRR) – Boa Vista – RR
4	Universidade Federal do Tocantins (UFT) – Palmas – TO
5	Universidade Federal de Alagoas (UFAl) – Arapiraca – AL
6	Universidade Federal da Bahia (UFBA) – Diurno – Salvador – BA
7	Universidade Federal da Bahia (UFBA) – Noturno – Salvador – BA
8	Universidade Federal do Ceará (UFC) – Fortaleza – CE
9	Universidade Federal da Paraíba (UFPB) – João Pessoa – PB
10	Universidade Federal de Pernambuco (UFPE) – Recife – PE
11	Universidade Federal do Piauí (UFPI) – *Campus* Terezina – PI
12	Universidade Federal do Rio Grande do Norte (UFRN) – Natal – RN
13	Universidade Federal Rural do Semi-Árido (UFERSA) – Pau dos Ferros – RN
14	Universidade Federal de Juiz De Fora (UFJF) – Juiz de Fora – MG
15	Universidade Federal de Minas Gerais (UFMG) – Belo Horizonte – MG
16	Universidade Federal de São João Del Rei (UFSJ) – São João Del Rei – MG
17	Universidade Federal de Uberlândia (UFU) – Uberlândia – MG
18	Universidade Federal de Viçosa (UFV) – Viçosa – MG
19	Universidade Federal do Rio de Janeiro (UFRJ) – Rio de Janeiro – RJ
20	Universidade Estadual Paulista "Júlio de Mesquita Filho" (UNESP) – Bauru – SP
21	Universidade Estadual Paulista "Júlio de Mesquita Filho" (UNESP) – Presidente Prudente – SP
22	Universidade de São Paulo (USP) – São Paulo – SP
23	Universidade Federal de Mato Grosso (UFMT) – Campus Cuiabá – MT
24	Universidade Federal da Fronteira Sul (UFFS) – Erechim – RS
25	Universidade Federal da Integração Latino-Americana (UNILA) – Foz do Iguaçu – PR
26	Universidade Federal do Paraná (UFPR) – Curitiba – PR
27	Universidade Federal de Pelotas (UFPel) – *Campus* Pelotas – RS
28	Universidade Federal do Rio Grande Do Sul (UFRGS) – *Campus* Porto Alegre – RS
29	Universidade Federal de Santa Maria (UFSM)Diurno – Cachoeira do Sul – RS
30	Universidade Federal de Santa Maria (UFSM) – Noturno – Santa Maria – RS
31	Universidade Federal de Santa Catarina (UFSC) – Florianopólis – SC
32	Universidade Tecnológica Federal do Paraná (UTFPR) – Apucarama – PR

Table 2 shows the sample of OT courses studied.

Table 2. Undergraduate courses in occupational therapy.

Nº	INSTITUTION
1	Universidade Estadual do Pará (UEPA) – Belém – PA
2	Universidade de Brasília (UNB) – Ceilândia – DF
3	Universidade Estadual de Ciências da Saúde De Alagoas (UNCISAL) – Maceió – AL
4	Universidade Federal do Espírito Santo (UFES) – Vitória – ES
5	Universidade Federal de Minas Gerais (UFMG) – Belo Horizonte – MG
6	Universidade Federal do Rio De Janeiro (UFRJ) – Rio de Janeiro – RJ
7	Universidade Federal do Triângulo Mineiro (UFTM) – Uberaba – MG
8	Universidade Federal de Santa Maria (UFSM) – Noturno – Santa Maria – RS

4 Results and Discussion

After organizing the research data, the information collected in the documents of both courses studied was categorized and worked into four categories and subcategories, based on the principles of Bardin (2010) Content Analysis, which supported the analyses presente, as shown in the Table 3 below:

Table 3. Data Analysis Categories and Subcategories.

CATEGORIES	SUBCATEGORIES
1. The person as a center in the discussion of Accessibility and UD	1. Beyond physical space 2. Functionality 3. AT as an inclusion factor
2. Different types of barriers	3. Architectural or physical barriers 4. Urban barriers 5. Transport barriers 6. Technological barriers 7. Attitudinal barriers 8. Social barriers
3. Different conceptions/concepts of accessibility in Teaching	1. Architectural or physical accessibility 2. Urban accessibility 3. Universal or integral accessibility 4. Spatial accessibility 5. Cultural accessibility
4. Content on Universal Design	1. Anthropometry

4.1 Category 1: the person as a center in the discussion of Accessibility and UD

This category sought to cover the contents on accessibility and/or UD with this relationship centered on the subject. This is a differential when thinking about the concepts of accessibility and UD beyond the built space, because it considers the user. In this sense, it draws attention to the different life cycles and also to health conditions, such as the presence of disability and morbid conditions, such as obesity.

> *Health-disease process in old age; Elderly care and support network and their permanence in the community* [...] (University 4 – Syllabus of the course "Geriatrics and Gerontology" – OT).
>
> *PNEs and the city* (Universities 1 and 12 – Content of the course "Environmental Accessibility" – AU).
>
> *Social inclusion of people with disability or reduced mobility* (University 14 – Syllabus of the course "Assistive Technology and Accessibility" – AU).

The courses offered by OT and one of AU include issues involving the analysis of projects, equipment and different care resources used in the process of social rehabilitation of individuals. They aim at maintaining and/or improving their performance in activities of daily living, searching for possibilities of alternative solutions and methods for achieving autonomy and independence of the user,

maximizing occupational performance at work, leisure, play, etc. accessibility is associated with AT in a complementary way in six OT courses and in just AU course.

Considering the individual as a central figure, there are notes for their "normality", which is sometimes seen through a biomedical expectation of the specie's functioning pattern, and others as a moral norm of productivity and adequacy to social norms. However, disability should be an understood not only as a biomedical concept, because it contains variables related to the functioning body (Diniz et al., 2009). Deficiency can be seen as a condition and emphasized when there is a relationship of inequality, determined by the barriers arranged in the environments for a body with impairments.

In addition to disability, People with Reduced Mobility (PwRM), such as the elderly, are also part of the context previously placed, however, aging should be treated as a multifaceted socio-vital process that occurs during life, within different social, political and individual contexts (Neri, 2008). Groups that include obese and pregnant women, for example, although often the physical limitations of these people are temporary, also imply conditions in which environmental barriers hinder or prevent those people from being able to movement and use spaces freely.

Accessibility and the UD are terms that indicate rights based on human rights and citizenship, established as a right of equality, as an isonomy of social opportunities, access to work, education and leisure (Canotilho, 2003).

4.1.1 Subcategory 1: beyond physical space

The content of the analyzed courses also refer to a contextualization that goes beyond the user and environment, they contemplate psychosocial and cultural aspects of the issue of disability and the PwRM, which influence AU and OU teaching, when they have these users as a reference.

Thus, it is possible to understand that the space not only comprises its physical dimension but it is also found in the psychosocial sphere, that is, its construction takes place through exchanges between the individual and society. The psychosocial dimension can be seen as the product of the dialectical relationship between the individual and their historical and spatial context (Lima et al., 2013). Pichon-Rivière (1986) states that space, as a social dimension, is embedded in the inner world of the individual, who recreates it in the process of appropriation. In addition, in this space individuals perceive and share the collectivity, considering the bonds that permeate the relationships between the subject and society, forming a social fabric.

> *Psychosocial Nature of the use of Architecture: its relationship with disability and the ideology of social integration* (University 15 – Syllabus of the course "Architecture Without Barriers" – AU).

> *Developing critical concepts, understanding and carrying out processes inherent to: construction of environments based on relevant social, economic and anthropological aspects, and meeting cultural, economic, technical, environmental and accessibility* (University 20 – Objectives of the course "Experimental Building Site" – AU).

4.1.2 Subcategory 2: functionality

Another aspect associated with teaching Accessibility and UD is functionality, understood as the ability of a person to perform certain activities or functions, using their skills in different ways in different occasions. This performance serves as a reference to measure whether or not a person can perform activities independently, being able to take care of themselves and their surroundings (Duarte et al., 2007).

Although essential, this content little appears in the results. It is noteworthy that it was present in only one course of OT and four of AU:

> [...] *products, resources, methodologies, strategies, practices and services aimed at promoting functionality, improving autonomy, independence, quality of life and social inclusion of people with disability or reduced mobility* (University 2 – Content of the course "Assistive Technology and Accessibility" – OT).

> *Functional capacity, the person with disability or reduced mobility and disability and restriction* [...] (University 14 – Content of the course "The individual and the space" – AU).

4.1.3 Subcategory 3: AT as an inclusion factor

According to OT, activities may be related to Practice Models and Practice Structures. In the Canadian Model of Occupational Performance, for example, occupations are understood as groupings of activities composed of tasks, which in turn consist of actions provided by voluntary movements and mental processes. The activities are divided into self-care, productivity and leisure, considered as a link between the person and the context, the means by which the environment is modified (Polatajko et al., 2007).

Self-care activities include those related to the maintenance of a condition that allows function. Productivity refers to occupations aimed at economic preservation, maintenance of the home, family, volunteer work or personal development. Finally, leisure activities are those occupations performed by the individual when they are free from the obligation to be productive (McColl et al., 2000).

The practice structure originates in the United States. According to the American Occupational Therapy Association (AOTA), activities of daily living (ADL) can be classified as: basic activities of daily living (BADL), instrumental activities of daily living (IADL), rest and sleep, education, work, leisure, games and social participation. The basic activities of daily living are those focused on the care of the body itself, such as bathing, bowel and bladder control, clothing, eating, mobility, use of toilets and personal hygiene (American Occupational Therapy Association, 2008).

Instrumental activities of daily living are those that maintain daily life such as domestic and community activities. These activities generally require more complex connections than BADL, such as taking care of others, animal care, childcare, driving, community mobility, financial management, purchasing (American Occupational Therapy Association, 2008).

At a time when there is some difficulty in performing occupations successfully, there is a need to adapt the environment through modifications, envisioning the

individual's functionality, in order to expand their degree of independence in performing their activities (Araujo, 2007).

In this context, it is possible to understand that AT is present in Accessibility and UD teaching, as highlighted in the OT courses, which can be an important instrument for the individual.

> Assistive Technology is an area of knowledge, of interdisciplinary characteristic, which encompasses products, resources, methodologies, strategies, practices and services that aim to promote functionality related to activity and participation of people with disabilities or reduced mobility, aiming at their autonomy, independence, quality of life and social inclusion (Brasil, 2015).

In TO, accessibility and UD contents seem to be a cross-cutting theme for profession training, being more related to function, the use of AT and adaptations for daily life. This content was best described in OT courses (when compared to AU courses), and with the focus on human occupation, as noted below:

> [...] *and accessibility, aiming at the application of the main methods and techniques of evaluation, prescription, preparation and training of technical resources in occupational therapy for the process of social and technological inclusion* (University 1 – Syllabus of the course "Assistive Technology and Accessibility" – OT).

> *Analysis of activities of daily living, enabling the construction of alternative solutions and methods for achieving autonomy and independence* [...] (University 3 – Syllabus of the course "Analysis of Activities of Daily Living" – OT).

> *Assistance technology used in the process of rehabilitation and social participation of individuals to maximize occupational performance in activities of daily living, work, leisure and play* (University 5 – Syllabus of the course "Assistive Technology" – OT).

Despite being an area of interdisciplinary knowledge, the appropriation of the AU courses analyzed regarding teaching in the area of knowledge of AT is questioned, since this term did not appear in the analyzed contents.

We know, however, that the development of technological solutions that value the knowledge of the user, their demands and the context in which this technology will be applied, allows this user greater identification, thus they can take such a resource with greater use success. However, it is possible to believe that urban architect training is associated, among other points, with the evolution of architectural thought, with changes related to the philosophical view of the world, with the environment, with cities and their surroundings, with the social classes, with the globalization of politics and the economy, and the changes that permeate these themes cause new professional demands to emerge (Salvatori, 2008).

4.2 Category 2: different types of barriers

In this category, the barriers were considered as an important concept addressed in the courses, because they impose different limitations not only for the work of architects and urban planners, but also for occupational therapists.

> *Means for accessibility: a market approach to barriers as a guideline of professional action* (University 15 – Syllabus of the course "Architecture Without Barriers" – AU).

Barriers can be considered an important concept, mentioned in nine disciplines of AU courses. They counterpoint with accessibility and UD, since they are obstacles imposed in the environment and can cover different concepts, such as architectural or physical, urban, transport, technological, attitudinal and social obstacles, which indicates the breadth of its meaning. Although they are also important elements for OT, the lack of courses in the area that talk about them is evident.

The importance of excluding barriers in the environment is clear according to the Convention on the Rights of Persons with Disabilities. It determined their elimination, especially those created by man, so that the spaces designed do not impose obstacles that prevent the full enjoyment and rights exercise of PwD, or any other person who will use such spaces (Laquale, 2017).

Considering the extent with regard to different barriers, different aspects have to be considered so that the free movement of individuals or groups is possible.

4.2.1 Subcategory 1: architectural or physical barriers.

They are obstacles to the use of the physical environment, usually originated by the morphology of buildings or urban areas that relate to the inadequacy of space that prevents coming and going, reinforcing the arbitrary understanding of disability as a "problem" (Elali et al., 2010).

Bahia (1998) points to some usual examples of architectural barriers: stairs for access to buildings; narrow doors and halls; small elevators and no braille and sound signaling, no adapted bathrooms and counters, among others.

It is important the look of professionals as occupational therapists and urban architects for the barriers that exist in the built environment, because their interventions can offer equal opportunities regarding their use. However, cities, when built disregarding human diversity, deprive some users to enjoy the spaces. It should be emphasized that while architectural or physical barriers are more directly associated with PwD and PwRM, they can become an obstacle to any user.

In the sample analyzed, the contents about architectural or physical barriers are present in six courses of AU, and there is no mention of them in courses of OT.

> *Architectural Barriers* – (University 1 and 12 – Content of the course "Environmental Accessibility" – AU).

> *Accessibility in Buildings – classification, types of physical barriers* (University 8 – Content of the course "Universal Design and Accessibility in Built Space" – AU).

> *Main architectural barriers* (University 11 – Content of the course "Universal Design and Accessibility in the Built Space" – AU).

4.2.2 Subcategory 2: urban barriers

According to Decree No. 5296/2004, urban barriers are present in public roads and spaces of public use and seen as such for providing discontinuous forms in the urban structure, and may exist due to the presence of landscape elements, natural phenomena or interference from architectural projects (Ribeiro et al., 2016).

They can be seen on unmaintained sidewalks, irregular ramps, grates with inadequate opening dimensioning and positioning, inadequate floors, tables and chairs occupying the space of the free lane of circulation, rubble on the sidewalk, lack of signals, among others. The barriers, when inserted in the public space, show an important flaw that should be attributed to the public authorities and their different spheres, because they do not consider the provisions of Brazilian legislation on the importance of providing the user with free access.

The projects and adequacies of the spaces are within the scope of action of both the occupational therapist and the architect and urban planner, which implies knowledge about the theme in these future professionals training, however, considering the analysis of the courses, we found the subject inserted in two AU courses, and was not found in OT.

> *Urban Barriers* – (University 1 and 12 – Content of the course "Environmental Accessibility" – AU).

4.2.3 Subcategory 3: transport barriers

These barriers are associated with impediments or difficulties caused to users of different modes of transport, whether collective or individual, terrestrial, aerial or aquatic (Brasil, 2006). However, it should be emphasized that this type of barrier is not only based on the means of transport, but also covers the entire urban infrastructure, its scope and how it impacts people's lives, displacements and their relationship with different regions of the city, as well as with the limitations caused, for example, by the absence of paving, sidewalks, bus lines, etc. (Brasil, 2006).

In the case of PwD or with reduced mobility, barriers can become major obstacles and impair the users to come and go. If a wheelchair user, for example, needs to use a bus for their displacement, it is necessary a well-executed sidewalk project for the depression of the guide, the bus have to be equipped with a lift platform and the space in its interior needs to be sufficient for the user to be driven safely. This displacement will only be possible if there are no barriers along the way, considering universal access to means of transport.

There is no courses in OT curriculum that addresses barriers in transport, and in the AU they appear in two courses.

> *Transport barriers* – (University 1 and 12 – Content of the course "Environmental Accessibility" – AU).

4.2.4 Subcategory 4: technological barriers

Technology is increasingly present in people's daily lives, and it also impacts the lives of PwD and PwRM, covering different aspects, such as allowing greater independence and autonomy for users. It can help in education, training, work and leisure, and collaborate to improve quality of life, reduce social exclusion and increase social participation; however, access to it can run into technological barriers.

Part of them is related to difficulties regarding the use; for example, an equipment that does not allow to use it intuitively, and other barriers such as social, economic and political, can make technology inaccessible (Agência Europeia para as Necessidades Especiais e a Educação Inclusiva, 2013). Although this is a reality for many people, for others, access to some tools allows the use of applications that can be downloaded for free on smartphones; screen readers that capture any and all information in text form and transform it into a spoken response through a voice synthesizer, the use of audio description helps in locomotion, among other possibilities of tools capable of helping minimize disability or other difficulty in accessing.

The insertion of the content on technological barriers in the courses can provide the occupational therapist and the architect with an understanding of the scope and possibilities of its use, as well as instigate the development of solutions in order to eliminate such barriers. To this end, the use of concepts linked to it can be broaden, since it is present specifically in two courses of AU.

> *Technological barriers* – (University 18 – Syllabues and Content of the course "Building and urban accessibility 4" – AU).

4.2.5 Subcategory 5: attitudinal barriers

Currently, accessibility is a theme constantly discussed in social media and academic debates, but most approaches are based on discussing the lack of physical accessibility in public places, without considering other aspects, such as attitudinal barriers. They directly relate to inclusion restrictions, which covers stereotypes, stigmas, abuse of rights, prejudices in work and/or school environment, because these discriminatory attitudes interfere with the inclusion of the human being in today's society (Ponte & Silva, 2015).

Considering these notes, it is possible to understand that the process of inclusion of all individuals will be satisfactory when the society understand this concept, thus prevailing respect for people' rights and duties. Thus, Pereira et al. (2011) consider that society's attitudes can be facilitators of the inclusion process.

It is worth emphasizing that physical, sensory or intellectual condition should not be the determining factor for the participation of each individual in society, but the differences that could be seen as something positive are, in part of the society, a reason for humanization or human dehumanization. Its limitations or facilitations are determined socially and historically (Bianchetti & Freire, 1998).

It is up to the occupational therapist and the architect to signal, based on the established in each profession, the promotion of actions that can at least minimize prejudice and exclusion, although the theme is in only one course of AU, considering the sample studied.

> *Attitudinal Barriers* (University 18 – Syllabus and Content of the course "Building and urban accessibility 4" – AU).

4.2.6 Subcategory 6: social barriers

Social barriers can be understood as barriers, since as any form of obstacle, they hinder access to groups or institutions, preventing social mobility (Laquale, 2017). It is possible to understand that they can be the most comprehensive barriers, as they understand important limiters for all the above-mentioned barriers.

According to the 2016 Report on the World Social Situation of the United Nations (UN), this type of barrier is associated with a lack of opportunities for education, health, work and income, participation in political, civil and cultural life, indicating that people affected by social barriers generally live in poverty and unemployment, for example (Organização das Nações Unidas, 2016). This result also showed that there is a need to promote social inclusion, as well as the revision of laws, policies, institutional practices, discriminatory attitudes and behaviors.

> *Social Barriers* – (University 18 – Syllabus and Content of the discipline "Building and urban accessibility 4" – AU).

4.3 Category 3: different conceptions/concepts of accessibility in teaching

It is important to point out that accessibility is not only equivalent to the insertion of PwD and with reduced mobility into the physical environment; this also comprises the solution of a number of problems linked to the minimum conditions of usability, satisfaction and comfort in the use of the environment (Guimarães, 2001). For Dischinger et al. (2004), a space has environmental accessibility when it offers conditions for people to arrive and enter, understand the organization and spatial relationships that this place establishes, participate in the activities that occur there, using the equipment available with comfort and independence.

The content analysis showed the differences in the accessibility and UD approach explored in OT and AU courses. It seems clear that in AU the focus is on the built space, while in the OT the focus is on the person who will use the necessary space and environmental adaptations.

> *Study of assistive technology and accessibility, aiming at the application of the main methods and techniques of evaluation, prescription, preparation and training of technical resources in occupational therapy for the process of social and technological inclusion* (University 4 – Syllabus of the course "Geriatrics and Gerontology" – OT).

> *Sensitizing the student to the issue of environmental accessibility* (University 1 and 12 – Objective and Content of the course "Environmental Accessibility" – AU).

> *Accessibility: fundamentals, concepts, terminology and symbology* (University 18 – Syllabus and Content of the course "Building and urban accessibility 4" – AU).

4.3.1 Subcategory 1: architectural or physical accessibility

Understood as a basic right, architectural or physical accessibility should conceive free access to any physical barriers, because accessibility allows real conditions of body movement, spatial displacement, gain of autonomy and mobility to an increasing number of people, since it contributes to improve, transform and create a social reality more receptive to PwD, but also to a large extent for the whole society (Nonato, 2011).

An accessible space is a more inclusive space, as it contributes to the differences imposed by any physical, sensory or intellectual limitations being minimized only by environmental conditions. With regard to architectural or physical accessibility, there are important notes regarding its use in building projects, furniture, spaces and courses of AU. Considering the role of the occupational therapist with regard to the adequacies and adaptations of the spaces, the absence of the theme in OT courses is important.

> *Accessibility in Buildings* [...] *Accessibility in leisure and sports areas; Accessibility in lodging/residence locations* (University 10 – Content of the course "Universal Design and Accessibility in built space" – AU).
>
> *Introduction to accessibility in buildings* (University 16 – Syllabus of the course "Introduction to Environmental Comfort" – AU).
>
> *Elements of urban accessibility: parking lots and accessible routes* (University 18 – Syllabus of the course "Building and urban accessibility 4" – AU).

4.3.2 Subcategory 2: urban accessibility

The presence of accessibility in the urban environment is a legal requirement, whose objective should be to allow gains of autonomy and mobility to a greater portion of people, so that they can enjoy urban spaces with more security, trust and convenience (Almeida Prado, 1994).

Article 2nd of the *Estatuto da Cidade* (Brasil, 2001) recognizes urban accessibility as a necessary and instrumental condition for ensuring social inclusion, as well as access to goods and services, considering that access to goods and services is an important factor in the population living conditions. An important relationship between the "right to the city[2]" and urban accessibility must be considered because in this context are established some social rights, such as education, health, leisure, housing, work, among others. We can say that, in this sense, the right to accessibility is linked to social, economic, political and cultural aspects, qualifying it as a foundation to supply part of the population, especially PwD and PwRM (Nonato, 2011).

Urban mobility is inserted in this context, which is, above all, an attribute of cities. Public transportation is only one of its components, and includes the parks and

[2]The study on the right to the city began based on the work "Le droit à la ville", published in 1968, when the French Marxist sociologist and philosopher Henri Lefebvre, critic of capitalist society, argues that all those living in the city are beneficiaries or have access to collectively produced goods.

buildings, the roads capping layer, guidance and communication systems, among others (Nações Unidas Brasil, 2014).

It is necessary to point out that, unlike the concept of mobility of AU, for OT it is centered on the individual and consists of the ability that they have to move or change from one position to another when performing daily activities, such as moving in bed, transfers, ambulation, transport of objects and wheelchair locomotion (American Occupational Therapy Association, 2014). It is understood that mobility-related limitations can harm ADL and IADL, such as their locomotion, for example (Finlayson & Van Denend, 2003). The restrictions caused by mobility can affect the social participation of this individual and may cause emotional difficulties, of self-esteem, among others (Finlayson & Van Denend, 2003).

> [...] *Accessibility in urbanism and urban furniture* (University 11 – Syllabus of the course "Accessibility 3" – AU).
>
> *Typical urban forms, centrality, agglomeration, accessibility, economic and spatial concentration, density and built intensity. Urban morphology and urban intervention.* [...] (University 28 – Syllabus of the course "Morphology and Urban Infrastructure" – AU).
>
> *Urban mobility and accessibility. Urban infrastructure* (University 24 – Content of the course "Urban mobility and accessibility" – AU).
>
> *Orthotics, Prostheses and Mobility Devices* (University 7 – Content of the course "Assistive Technology and Accessibility" – OT).

4.3.3 Subcategory 3: universal or integral accessibility

Considering that, every human being is unique and must be able to exercise their uniqueness, universal or integral access pursuits their inclusion in the environment in which they are inserted, without any barrier that impairs this fact, since they hinder or limit the use of the environment, excluding the user from social daily life. In this context, universal or integral accessibility is a project vision that develops objects, environments, and buildings that take diversity into account.

For Sarraf (2018), this concept is not only linked to conditions of access and understanding but goes beyond the technical dimension to symbolize a set of rights and quality of life indispensable in the development of the PwD. Universal or integral accessibility covers the right to come and go of all citizens, being addressed in two AU courses and one OT.

> *Study of anthropometric dimensioning and its relationship with interior architecture project and universal accessibility* (University 4 – Syllabus of the course "Special topics in ergonomics" – AU).
>
> [...] *comprehensive accessibility and assistive technology* (University 3 – Syllabus of the course "Analysis of Activities of Daily Living" – TO)

4.3.4 Subcategory 4: spatial accessibility

This concept seeks to encompass the user's relationship with space, based on understanding their function, organization and spatial relationships, as well as enabling their participation in activities that may occur there.

This broad use of space can be comprehensive, to the extent that it considers the components of spatial accessibility, which are arranged in four categories: spatial orientation, communication, displacement and use. Each of these components consists of a set of guidelines that define spatial characteristics in order to allow accessibility to buildings, minimizing possible spatial constraints (Dischinger et al., 2012).

Among the courses listed, we found directions for its teaching in the course of AU; however, it is not included in the disciplines of OT.

> *Development of medium complexity projects at the level of preliminary studies, with the application of spatial accessibility concepts* [...] (University 5 – Syllabus of the course "Architecture Project 2" – AU).

> *Knowing spatial accessibility parameters and requirements* (University 8 – Objective of the course "Universal Design and Accessibility in built space" – AU).

> *Spatial Accessibility: concept and components* (University 14 – Content of the course "Accessibility in the built environment" – AU).

4.3.5 Subcategory 5: cultural accessibility

Accessibility presupposes other fields beyond the issues of buildings or urbanism, covering other areas such as cultural accessibility. It assumes that all educational-artistic-cultural production (shows, exhibitions, collections, courses, spaces of coexistence and all permanent or itinerant services) should be available, seeking resources that can enable their use to most users. In addition to the physical space, design and disposition of furniture, communication is an important means for its understanding.

According to Sarraf (2006), to make exhibition design, spaces and cultural projects accessible and attractive to all people, it is necessary to consider different forms of perception, communication, locomotion and understanding in addition to architectural adjustments based on UD. In the case of cultural equipment, such as cinemas, theaters, auditoriums and the like, there are specific parameters contained in ABNT-NBR 9050/2015, which in its item 10.3 deals with the conditions of access in cultural spaces (Associação Brasileira de Normas Técnicas, 2015).

> *Diversity, cultural accessibility and occupational therapy* (University 6 – Syllabus of the course "Cultural Accessibility" – OT).

> *Identifying the needs and intervening in cultural accessibility* (University 9 – Objectives of the course "Supervised internship in occupational therapy in the field of culture and interface with arts" – OT).

> *Identifying and building occupational therapeutic procedures for demands of cultural accessibility* (University 9 – Content of the course "Supervised internship in occupational therapy in the field of culture and interface with arts" – OT).

Specifically inserted in two courses, one mandatory and one elective, cultural accessibility deals with creative processes and artistic enjoyment in OT, methods, instruments and techniques of artistic accessibility that includes audio description, sensory exposure and sign language. Accessibility is also treated in the field of culture and its interface with arts. There are no AU courses that include cultural accessibility.

4.4 Category 4: content on universal design

About UD, it is important to mention two important concepts, anthropometry and what concerns ergonomics, since the field of study of the UD casts a look at the diversity of the users.

Considering the look at a project in which UD is the aim, besides the basic needs of users, the physical and psychological impact caused by the environment should be taken into account, as well as safety and satisfaction performance, in the search to promote all the citizens' quality of life with regard to the environment. The use of the UD gives to the user the guarantee that they can enjoy an environment without receiving discriminatory treatment because of their personal characteristics (Cambiaghi, 2007).

> *Concept of Universal Design* (University 1 – Content of the course "Assistive Technology and Accessibility" – OT).
>
> *Application of universal design topics* (University 24 – Syllabus of the course "Landscape Architecture Project" – AU).
>
> *Instigate for a culture of Universal Design* (University 18 – Objective of the course "Building and urban accessibility 4" – AU).

The concept of UD can be understood as a central theme, which is present in all moments of project creation or in the space adequacy, both in general determinations and in the most specific solutions and in details.

4.4.1 Subcategory 1: anthropometry

To talk about the UD, it is important to refer to the concept of anthropometry, which aims, among others, to study the physical nature of the human being, their anatomical structure, racial differences of the populations, as well as data from the various dimensions of the body segments (Santos et al., 1997). Based on these studies, we can notice that there is no standard human being or perfect measures, but rather a wide variety of people who illustrate human diversity. There are also variations in physical, sensory and cognitive abilities and restrictions, cultural values, knowledge levels and individual preferences.

> *Anthropometric parameters: the seven principles of Universal Design* (University 18 – Syllabus of the course "Building and urban accessibility 4" – AU).
>
> *"Ergonomics. Anthropometry and Architecture; Concepts, principles and guidelines of universal design and Architecture* (University 19 – Syllabus of the course "Architecture and Human Rights" – AU).
>
> *Providing notions of anthropometry, universal design and ergonomic analyses to enable the understanding of its main applications in the fields of architecture, urbanism and design* (University 24 – Syllabus of the course "Ergonomics applied to the design of the housing" – AU).

Another important concept considered is ergonomics, which should be highlighted since it is tied to UD. Based on what *Associação Brasileira de Ergonomia* (ABERGO) pointed out on ergonomics, the concept allows to improve safety, comfort, well-being and effectiveness of human activities, as well as spaces (Associação Brasileira de Ergonomia, 2003).

The field of study of the UD in Brazil, because it is linked to questions related to accessibility and its technical regulations (which presuppose tangible, concrete and consistent reference elements), are measurable in the field of ergonomics and seek to explore the operational relations (environment-task) between a person and the built environment in which they are (Steinfeld & Maisel, 2012).

> *Concepts of universal design, anthropometry and ergonomics. The principles of universal design in the conception and implementation of architectural and urban projects* (University 3 – Syllabus of the course "Universal Design" – AU).
>
> *Study of universal design; Ergonomics of internal spaces. Study of the history and evolution of ergonomics. Classical and contemporary ergonomics* (University 5 – Syllabus of the course "Ergonomics and Accessibility in the Built Environment" – AU).
>
> *Universal Design. Ergonomics: analysis of anthropometric parameters* (University 11 – Syllabus of the course "Accessibility 3" – AU).

5 Final Considerations

Accessibility and UD constitute established rights, and, in view of this, the importance of training professionals, including occupational therapists and urban architects seeking to meet established needs. In this aspect, undergraduate courses are responsible for the initial provision necessary for these professionals' training regarding "accessibility" and "UD", established themes that guided the analysis of the contents that considered the user, the different barriers imposed on the environment, accessibility from different perspectives and UD.

As for the subject and their role of interacting with the resources and tools available, the PwD and the PwRM were pointed out. Although these concepts relate to the historical

context of the disability, there are courses that do not point to a given individual or group of people, thus expanding the use of concepts for the diversity of the users.

It is worth mentioning that, in the courses, accessibility received different names, such as spatial, environmental and universal in AU and integral. In OT, there is a trend to look for ways to integrate different users into the environment, enabling them to carry out different activities without restrictions. The concept is also present encompassing accessibility in order to include what is tangible, which is more broadly dealt in the courses analyzed, based mainly on architectural and urban accessibility, its physical aspects and its relationship with the city. However, accessibility is also understood in a more abstract way, little observed in the search. It covers communication or technology, for example, and its use primarily aims at providing comprehensive and accessible features to PwD.

The UD treated in Category 4 is a concept designed to expand the use of spaces for "everyone", which can be a utopian purpose, considering the amplitude of the theme. However, their directions can allow spaces, constructed or not, to be used by as many people as possible, seeking to expand their use to include the greatest possible diversity of users. Although it was mentioned less frequently, it is evident that there is a direction for using the concept and its characteristics in both courses, considering the diversity of the population. In AU, UD is present in 23 courses, while in the OT, DU is mentioned in one course. In the courses offered by OT and one of AU, there are issues involving the analysis of projects, equipment and different aid resources used in the process of social rehabilitation of individuals. They aim at maintaining and/or improving performance in activities of daily living based on possibilities for the construction of alternative solutions and methods to achieve autonomy and independence for the user, to maximize occupational performance at work, leisure, play etc.

Common theme between the two areas, functionality can refer to both the individual and the building directly relates to accessibility and UD. However, given its relevance for both courses, an important gap is perceived in the study of these topics.

Making a counterpoint between accessibility and DU, barriers are mentioned in different courses of AU from different perspectives, which indicates the breadth of its meaning. We can see the lack of courses that talk about barriers in OT, and they can be explored based on issues involving, for example, environmental adequacies, or other types of barriers, including attitudinal ones.

In general, it was possible to visualize a multiplicity of themes explored in the courses of the various universities in both areas studied, without a more homogeneous view than is central to the student's learning, considering the syllabus, objectives and/or contents that encompass accessibility and their connection to other topics. However, there is space for UD to be treated more broadly and thoroughly both in OT and AU courses, especially in what differs and what links the themes.

The characteristics and differences found here refer only to the courses offered by public educational institutions and an extension that would increase the reliability of the results obtained here would be to extend this research to the courses of private educational institutions. Even so, this work showed an important trend of direction for architects and occupational therapists training, reaffirming the confluence of work of these two professions.

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Author's Contributions
Luciene Gomes responsible for the conception and writing of the text, organization of sources, data collection and analysis and final review. Maria Luísa Guillaumon Emmel responsible for the research supervision; writing and revision of the text. All authors approved the final version of the text.

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