

UNIVERSAL DESIGN FOR LEARNING: SCIENTIFIC PRODUCTION IN THE PERIOD FROM 2011 TO 2016¹

DESENHO UNIVERSAL PARA A APRENDIZAGEM: A PRODUÇÃO CIENTÍFICA NO PERÍODO DE 2011 A 2016

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ABSTRACT: The principles of Inclusive Education point to the need to address the barriers present in different educational contexts in order to guarantee access to all students within education systems, as well as guarantee their continuous attendance. In this context, this paper aims to characterise the scientific production regarding the Universal Design for Learning (UDL) and to systematise some of the contributions aimed at the elimination of methodological barriers within learning contexts. For that, an integrative review of the literature regarding the UDL was conducted. The information obtained was analysed in the light of the *Disability Studies in Education* (DSE) and the social model of disability. The categories that emerged in the data collection, which structure the discussion, were: a) historical and legal contributions; b) conceptual and critical contributions about disability; c) contributions of practical applicability. The results show the concentration of studies on the UDL in North America and the inexpressiveness of research in Brazil. In addition, they demarcate the differentiation between the principles and guidelines of the UDL and the other perspectives of the Universal Design (UD); they point out strategies aimed at eliminating barriers in access to knowledge and briefly map the field of investigation regarding the UDL and the gaps that require further investment. Finally, the study shows that UDL, as it contemplates the diversity of ways of learning, has the potential to promote inclusive educational processes.

KEYWORDS: Universal Design for Learning. Accessibility. Disability Social Model. Distance Education. Special Education.

RESUMO: os princípios da Educação Inclusiva apontam para a necessidade de enfrentamento das barreiras presentes nos diferentes contextos de ensino com o intuito de garantir o acesso e a permanência de todos os estudantes nos sistemas de ensino. Assim sendo, este artigo tem como objetivo caracterizar a produção científica sobre o Desenho Universal para Aprendizagem (DUA) e sistematizar algumas contribuições voltadas à eliminação de barreiras metodológicas nos contextos de aprendizagem. Para tanto, foi realizada uma revisão integrativa da literatura sobre o DUA. As informações obtidas foram analisadas a luz dos *Disability Studies in Education* (DSE) e do modelo social de deficiência. As categorias que emergiram na coleta de dados e estruturaram a discussão foram: a) contribuições históricas e legais; b) contribuições conceituais e críticas acerca da deficiência; c) contribuições de aplicabilidade prática. Os resultados evidenciam a concentração dos estudos sobre o DUA na América do Norte e a inexpressividade de pesquisas no Brasil. Além disso, demarcam a diferenciação entre os princípios e as diretrizes do DUA e as demais perspectivas do Desenho Universal (DU) e apontam estratégias voltadas à eliminação de barreiras no acesso ao conhecimento e mapeiam brevemente o campo de investigação sobre o DUA e as lacunas que precisam de maior investimento. Por fim, o estudo mostra que o DUA, por contemplar a diversidade de formas de aprender, tem o potencial de promover processos educativos inclusivos.

PALAVRAS-CHAVE: Desenho Universal para Aprendizagem. Acessibilidade. Modelo Social de Deficiência. Educação a Distância. Educação Especial.

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1 INTRODUCTION

The ways of organization of teaching and learning contexts, in many situations, carry the historical inheritance of social segregation that embraces few variations that the subjects present in the way of learning and, with this, the logic of normalization and the production of ableism are perpetuated. The norm, socially constructed, privileges certain forms of learning, and all who distance themselves from them somehow experience greater confrontations to access knowledge. In the search for possibilities to qualify the space of Distance Education, the academic field of Disability Studies in Education (DSE) was located. Some of the researchers in this field present the perspective of the Universal Design for Learning (UDL) as one more possibility in the process of developing educational environments organized to confront and eliminate barriers to the schooling of all people, including those with disabilities.

The field of DSE is relatively new and has been concerned with the enhancement of educational spaces more welcoming to human functional variation and, therefore, has provided some insights and reflections on the learning of students with disabilities. Researchers such as Baglieri, Broderick, Connor, and Valle (2011), Barnes (2009), Collins (2013), Valle and Connor (2014) understand that it is through the transformation of the pedagogical environment, mainly the elimination of barriers and the implementation of collaborative practices, that all students can have access to knowledge with participation, since, in this way, it is possible to consider the singularity present in the different ways of learning.

This field is interdisciplinary and is based on the understanding of disability as a social phenomenon: 'disability' and 'capacity' are socially and culturally constructed and are closely intertwined with the construction of other social identities (Collins, 2013; Taylor, 2011). Reaffirming the place of the social context, Baglieri et al. (2011) state that the norm is more a characteristic of a certain type of society than a condition of human nature. The logic of the reproduction of the norm is present with differentiated facets, either in the characteristics of the people, or in the different ways of teaching. In this way, researchers in the field of disability studies show that the social structure reproduces according to the establishment of normative body and functioning standards. This normative pattern perpetuates the idea that people with disabilities are less capable, leading to the belief that there is a partial way in which people with disabilities relate to knowledge because they carry a perspective that only shows the lack or absence of something. Baglieri et al. (2011) points out the need to question conventional and naturalized ways of thinking about difference to be able to bring greater breadth in understanding the mechanisms of coping with barriers that minimize access to knowledge.

In this paper, deficiency is understood as arising from the interaction of injuries and impairments of physical, sensory or intellectual nature with the barriers experienced in social contexts that act as obstacles to the equitable participation of people with disabilities (Barnes, 2009; Lei nº 13.146, 2015). Thus, the medical model of disability is criticized, as it reduces the understanding of the phenomenon to deviations from a supposed norm and places its social practices in the field of rehabilitation, besides pointing to the need to insert the phenomenon in the field of human rights (Nussbaum, 2007). It is combined with the so-called second generation social model from the perspective of representatives such as: Eva Kittay, Carol Thomas, Romarie Garland, Tom Shakespeare, among others. DSE researchers, based on the social model, oppose the practice of curricular adaptation. What is proposed is a

curriculum adapted to the variations of the abilities of the students of the classroom qualifying the teaching for all and, in this way, present the UDL in different researches (Baglieri et al., 2011; Liasidou, 2014; Valle & Connor, 2014).

We understand, in this study that, in addition to disability, the focus should be shifted to distinctions in the student learning process. People with the same disability (injury)⁵ diagnoses may have different needs in their schooling, whether in the methodology, strategies or resources to be used. People are not defined exclusively by their injury, there is a completeness of features that encompasses this bodily and functional variation and this goes beyond clinical diagnosis. Actions that enable access and effective participation of people with different conditions cannot be proposed only under the aegis of legislation, but rather because they understand that changes are needed in the adoption of methodological strategies so that they are adequate to the needs, the potentialities, in short, to the characteristics of each person. Thus, we believe that the guidelines and principles of UDL, which are evidenced in the studies of different researchers, such as Rao, Ok, and Bryant (2014), Rose, Harbour, Johnston, Daley, & Abarbanell (2006), Edyburn (2010), Cha e Ahn (2014), among others, present perspectives that make minimizing barriers in the academic career of students with and without disabilities possible, not hierarchizing or privileging a single way of learning, creating flexible learning environments for students and teachers.

The present study consists of an integrative revision on the UDL on a national and international bases with the purpose of characterizing the scientific production related to this theme and systematizing some of the contributions aimed at the elimination of methodological barriers in the learning contexts. This review is relevant since the studies on the UDL are inceptive in Brazil and there is not yet an integrative review published in a Brazilian journal. Thus, in addition to the contributions regarding the breaking of barriers, we intend to map the field of investigation on the UDL and the gaps that need greater investment in research.

2 METHOD

In order to lead the path to Integrative Revision (IR), we opted to work with the five phases of the elaboration process proposed by Cooper (1984):

- *Problem formulation* - The question that led to look at the choice and careful reading of the paper was: How can UDL contribute to the elimination of methodological barriers in educational contexts? The contributions have the aim of enhancing Distance Education as a space for continuous and welcoming education of human variations.
- *Data collection* - The researches were carried out on scientific production bases and were finalized in July 2016. In this study, the papers published in the scientific form between the years of 2011 and 2016 were included. In 2010, two important reviews were published. The findings up to that point were, therefore, synthesized, representing the first decade of UDL existence. The revision proposed with this study will present the years that followed, showing the repercussions and expansion to different realities beyond the United States, UDL birthplace.

⁵ In the social model of disability, aspects related to bodily limitations, biological aspect, are referred to as injury.

The term used in the research were ‘Universal Design for Learning’ and ‘*Desenho Universal para Aprendizagem*’ (in Portuguese) defining the search terms mentioned in the title, abstract or keywords. Due to the interdisciplinary nature and the exploratory character of this theme, five databases were chosen that have a wide and important coverage in the area of Human Sciences, especially in Psychology and Education. Those with the highest number of publications and that were in accordance with the research question were emphasized, namely: 1) Web of Science - Multidisciplinary database with paper indexing and journals of great impact; 2) OneFile (GALE) - Database with complete papers at no cost, of the most important journals in the world, with extensive coverage in the area of Human Sciences; 3) SCOPUS (Elsevier) - one of the largest databases of peer-reviewed scientific literature in the *Coordination for the Improvement of Higher Education Personnel* (CAPES); 4) PsycINFO - Edited by the American Psychological Association (APA), with wide coverage in the areas of Psychology and Education; 5) ERIC (U.S. Department of Education). The last point of reference was chosen because it belongs to the United States Department of Education, a precursor to UDL studies that presents a variety of studies on Education. In the thesaurus of this database, the descriptor ‘Universal Design for Learning’ is located.

In this stage, searching the five databases, we located 201 (two hundred and one) papers with the descriptor ‘Universal Design for Learning’. After the elimination of duplication of works, which were made available on more than one database, and the subsequent careful reading of the titles and abstracts located, the criteria for the selection of the composition of the study collection were defined. For the initial selection, one hundred and twenty four (124) papers written in a language other than those written in Portuguese, English or Spanish and in the area of Early Childhood Education, as well as those with a focus on physical activity exclusively, were excluded. However, seventy-seven (77) papers between 2011 and 2016 were selected for verification of agreement by two judges. The judges were two researchers in the field of studies on deficiency in Education who have knowledge about the object of research.

Result of the Judges’ analysis: the intention was to verify if the papers answered the research question. Thus, two researchers individually performed their analyzes and, later, the concordance index was verified. The result was 92% of agreement, since only six abstracts had differing opinions. In order to resolve this discrepancy, we decided to access the entire paper, and a second analysis was carried out by the judges. At the end, we decided to exclude these papers and to include 54 (fifty-four) for the data collection stage.

- *Data evaluation* - This stage had great relevance in the study, because it was the moment to elucidate the main findings of the researchers who had already investigated the UDL. The data collection in the papers was organized in order to contemplate the most relevant findings in the analyzed studies, maintaining a standardization that enabled a more reliable analysis. Some elements that were tabulated in a spreadsheet were chosen from the careful reading of each paper, namely: identification; methodological characteristics of the studies; conceptual aspects; results and generalizations; other interesting data.

3 RESULTS

- *Analysis and interpretation of data* - Some central issues have been observed, both in terms of the theoretical conceptual part and the methodological issues in the published

research, such as UDL guidelines and principles and their applicability in educational contexts. The studies analyzed have a diversity of approaches, objectives and results. Among these studies, there were forty-four (44) in North America (United States), five (5) in Europe, three (3) in Asia and two (2) in Oceania (Australia). No study of Brazilian universities was published in the databases investigated. Of the analysed papers, ten (10) were quantitative studies, twenty-nine (29) qualitative, thirteen (13) mixed and two (2) papers were not defined, since they presented only descriptive analyzes, but they could be considered qualitative.

Different levels and modes of teaching were investigated by researchers. Some studies in Basic Education were included in the analysis. What is new is the predominance of studies related to Higher Education, Graduate and Continuing Education (all from professionals of the area of Education). In addition to the classroom context, other spaces were objects of research attention, such as the three studies on the applicability of UDL in libraries and one on school management. Digital learning environments and technology-based education have been largely highlighted in the findings, which is consistent with the understanding of technology as a facilitator of participation and access to knowledge.

For the analysis of the data and discussion of the results, we proposed the structuring from the following categories: a) historical and legal contributions; b) conceptual and critical contributions about disability; c) contributions of practical applicability. These categories emerged in the analysis of content, from a thematic organization that proposed to contemplate the main findings, not leaving out any research results or relevant conceptual elements that have been approached by the researchers in their papers.

4 DISCUSSIONS

The understanding of the emergence of the UDL, how its incorporation into curricular organization and the ways of planning the educational spaces and the contextualization about the insertion of the UDL in the legislation occur, are some of the evidences located in the papers, which revealed the need for contextualisation prior to the presentation of the practical applications of UDL. Edyburn (2010) undertook an important review that covered the period between 2000 and 2010. The author drew attention to the gaps in the first decade of research of UDL, pointing out some directions for the second decade. In the present review, which intends to broaden Edyburn's findings, some thematic categories have been found, which advance the understanding about the contribution of UDL in the elimination of methodological barriers in Higher Education.

- a) *Historical and legal contributions* – from the second decade of UDL, it is necessary to present the emergence of this perspective that is still confused with the model from which it had its starting point - the Universal Design (UD) in the physical contexts. The UD has its origins with Ronald Mace, architect and director of the Center for Universal Design from North Carolina State University (NCSU). He introduced the Universal Design (UD) in 1997 in the conception of products and environments so that the largest number of people could use them without the need for adaptations (Dalton, Proctor, Uccelli, Mo, & Snow, 2011; Katz, 2013; Mcghie-Richmond & Sung, 2013; Rao et al., 2014;

Webb & Hoover, 2015; Zhong, 2012). Commonly, the expansion of this conception in products and real environments can be seen, but, when it comes to education, special attention must be paid to other developments of the UD. Universal access is the main goal of all. However, some principles and some guidelines focus on removing barriers in the built environment, others focus on learning environments and contexts. Even for those researches that focused on learning contexts showed that they have distinctions, such as the conceptions of the Universal Design for Learning (UDL), Universal Design for Instruction (UDI) and Universal Instructional Design (UID) (Davies, Schelly, & Spooner, 2013; Black, Weinberg, & Brodwin, 2014, 2015; Rao et al., 2014; Pastor, Del Rio, & Serrano, 2015). The confusion with these models materializes in a delay in the implementation of proposals that underpin the participation of students in the different levels of education. Therefore, it is important to discern the roots of the guidelines and the principles of UDL.

These perspectives in the field of Education emerge as an alternative to the models that think about inclusion from the diagnosis of a disability, break with the idea of planning for the class and another for the disabled student, or, still, that accessible resources only need to be included in the contexts for the existence of this student. The UDL broadens the understanding of the processes by which students access knowledge, not only by taking into consideration resources that eliminate barriers, but also by developing and designing appropriate courses and curricula, and for that reason, it is not possible to speak of curricular adaptation. This is one of its premises: barriers to learning occur at the intersection with the curriculum (Rappolt-Schlichtmann, Daley, Robinson, & Johnson, 2013). The UDL has proven itself as a great ally to design instruction in courses, materials and content in order to benefit people of all learning styles without adaptation or replacement of equipment (Zhong, 2012). In addition to this idea, it is necessary to reinforce that the UDL does not remove academic challenges, it removes barriers to its access (Nielsen, 2013).

Under the Americans with Disabilities Act of 1990, the rights of people with disabilities were affirmed as having equal protection and access to the US education system (Larocco, & Wilken, 2013; King-Sears et al., 2015; Webb, & Hoover, 2015). For this and other reasons, the UDL embraces some legislations, and this becomes a differential for practical applicability. An example is the 2008 Higher Education Opportunity Act (HEOA), which claims to be a scientifically valid framework for guiding educational practice (Black et al. 2015). In the Education for People with Disability Law, from 2004, it is determined that the Universal Design should be used as an intervention to help students with disabilities participate in the general education curriculum as fully as possible (Hinshaw & Gumus, 2013; Larocco & Wilken, 2013; King-Sears et al., 2015; Webb & Hoover, 2015).

In addition to Federal laws, there are policies at the local level, such as the Government of Manitoba (province of Canada) legislation, which adopts UDL stating the need for school communities, including teachers, to develop plans for the full diversity of their student population (Katz, 2015). The incorporation of the UDL in the legal documents of general education is opposed to the inclusion model based on specific legislations. The proposal for a welcoming school of the different expressions of the human is distinguished from the one that emits labels for inclusion from diagnoses, that is, an educational model with actions for

minorities in which the discourse of the ‘pupil of inclusion’⁶ is still evident. Reflection of this are the segregated actions, and many of them insufficient, for the development of any student. Realities that incorporated the UDL are more satisfactory in participation, involvement and access to student learning. Coyne, Pisha, Dalton, Zeph, & Smith (2012) suggest that, in accordance with the objective of reducing potential learning barriers and increasing learning opportunities, the plans from the UDL bring better learning outcomes for all individuals.

The history of the emergence of the UDL leads to the comprehension that the roots of what is universal, adequate, flexible to different ways of participating in the learning process, do not combine with fatalistic, deterministic and excluding perspectives of the teaching models adopted by different countries. Policies for minorities differ from one policy for all. The analyzed papers, in general, demonstrate that the researchers share an understanding of the principles and the three main guidelines of the UDL, which are: a) the multiple forms of access to information and knowledge (the ‘what’ of learning); (b) the various ways of approaching strategic tasks (the ‘how’ of learning); and (c) various ways of becoming and staying engaged in learning (the ‘why’ of learning). These same researchers, supported by the studies of Meyer, Rose and Gordon (2014), Rose and Meyer (2002) and Edyburn (2010), present the three main neural networks that are involved in the learning process variability: 1) recognition networks (gathering and categorizing what one sees, hears, and reads); 2) strategic networks (organizing and expressing ideas); and 3) affective networks (link the learning experience to an emotional background, determining involvement and motivation) (Coyne et al., 2012; Pastor et al., 2015; Scott, Temple, & Marshall, 2015; Courey, Tappe, Siker, & LePage, 2013; Katz, 2013). In this conceptual and historical aspect of the UDL, the incongruities were evidenced, mainly in the way to understand the disability and in how the UDL may be present in the services to be offered, which will be object of the next analysis.

b) Conceptual and critical contributions about disability - Understanding disability, which permeates the investigations and the researchers’ conceptions, shapes practices when it comes to education. This is evident in the studies analyzed in this review, since a lot of research are born from the needs of the contexts or those applied in them, in addition to some present propositions for modifications of realities. Few papers have been found that have made explicit the field of study in which the authors have upheld the understanding of disability or the model of disability they have adopted. Among these papers, only two declared their foundations from the Social Model of Disability, the theoretical conception used here. As pointed out earlier, this conception bases the Disability Studies in Education (DSE) that, according to Gabel and Danforth (2008), seeks to challenge limited understandings, which often see disability as a medical or clinical condition.

The UDL dialogues in a very congruent way with the field of DSE and with the social model of disability, since they are aligned with the premise that it is necessary to transfer the burden of responsibility of the students regarding the adjustments and adaptations to the environments and learning contexts (Kumar & Wideman, 2014). Based on different authors, Fovet, Mole, Jarrett, and Syncox (2014) affirm that the UDL is the procedural translation and the application of the social model of disability not only as an individual technique of access.

⁶ An expression commonly used in a pejorative way to define the student with a disability in the common school.

Researchers who used the social model to understand disability which had inspiring results in their studies suggest that with the applicability of UDL, students would feel more in control of their own learning process and with the possibility to make personal choices that would better support their own learning, in addition to the anticipated identification of barriers and proposers of facilitators to minimize the need for the so-called 'support services for inclusion' or educational accessibility services (Fovet et al., 2014; Kumar & Wideman, 2014). This is one of the main differences between the UDL model associated with DSE and the traditional models in the field of Special Education. Gabel and Danforth (2008) highlight the importance of emphasizing that Disability Studies in Education (DSE) should not be confused with the field of Special Education. Although their differences and their similarities have not yet been mapped in a consensual way by the researchers of the area, it seems paradoxical for research to adopt the UDL in Special Education, such as those found in this review.

The UDL gained considerable attention in the field of Special Education, acclaimed for its promise to promote inclusion by supporting access to the general curriculum (Rao et al., 2014). However, one of the premises and goals of the UDL is to provide a framework for planning instruction that meets the needs of all students, the purpose of the Special Education to provide individualized instruction to help minimize the impact of a specific disability condition towards a task or a set of demands (Kennedy, Thomas, Meyer, Alves, & Loyd, 2014). It becomes clear that there is a distinction between the bases and the structures of each model. The UDL is designed to project the curriculum to encompass all students with different learning styles, skill levels, backgrounds and preferences (Yang, Tzuo, & Komara, 2011; Wilson, Boyd, Chen, & Jamal, 2011; Zhong, 2012; Smith, 2012; Katz, 2013; Rappolt-Schlichtmann et al., 2013; Kumar & Wideman, 2014; Caruana, Woodrow, & Pérez, 2015; Webb & Hoover, 2015; Daley, Hillaire, & Sutherland, 2016). This calls attention to the variability in the learning process and the need to rethink the way in which teaching is carried out for a closer relationship with the premises of the UDL in general education. Rappolt-Schlichtmann et al. (2013), in their paper, emphasize a criticism commonly directed at those who advocate the universal proposals: being universal does not mean being equal to all, but it implies that curricula and materials must be conceived/designed to accommodate the widest possible range of preferences and needs of learners. In this perspective, it is suggested that, through the UDL lens, student variability is anticipated and considered highly influential in the instructional planning process (Smith, 2012).

Despite this, we still experience a situation of great dilemma, both in Brazil and in some other realities, since the construction of an Inclusive Education remains deeply rooted in the discourse of Special Education (Baglieri et al., 2011). Inclusion is still based on a perspective of guaranteeing to teach people with disabilities from legal terms and with implicit ideas of the biomedical model. It seems opportune to clarify that Special Education and Inclusive Education are not synonymous and that the UDL is especially suitable for use in general education, in classrooms in which there is the presence of the student with disability, learning difficulties or behavioral disorders (Johnson-Harris & Mundschenk, 2014). The implementation of practices based on the UDL creates an educational environment that is not only inclusive to students with disabilities, but it serves to all (Black et al., 2014; Kumar & Wideman, 2014; Katz, 2015; Navarro, Zervas, Gesa, & Sampson, 2016), besides being an expression of a modern vision

of disability centered in the interaction of an individual within his/her environment (Schelly, Davies, & Spooner, 2011).

Despite this understanding of UDL as an underpin for learning for all, many researches have also opted for exclusive research of students with disabilities. Making a cut in the UDL with the phenomenon of disability, we highlight the studies that sought to provide data on the number of students who identified themselves as having a disability (Schelly et al., 2011); those who presented the identification of facilitators and barriers (Schelly et al., 2011); and, among these, researches with the following directions were found: focusing on methodological strategies (Black et al., 2015); in the search for help and access to the support resources offered in the learning contexts (Kramer, 2015; Couzens et al., 2015); focusing on technology support (Knight, Wood, Spooner, Broder, & O'Brien, 2014; Vesel, & Robillard, 2013; Coyne et al., 2012); evaluation activities (Mislevy et al., 2013); and, in the students' perception about the accessibility in progress to Distance Education (Catalano, 2014). It is important to highlight that, even in those studies that focused on disability, another type of analysis is perceived, since the phenomenon of disability is displaced in relation to the learning context, evidencing the need to break with the barriers that limit participation, questioning the place of the normalizing and ableistic⁷ practices.

The studies analyzed indicate that it is inevitable and necessary to strengthen practices based on the principles of UDL in Education if there is interest in breaking with the perspective of an inclusion that occurs from diagnostics or 'labels' to the so-called 'student of inclusion' because, in this sense, a demarcation of the difference centered on a given subject is still present, disregarding the wide variation of each learner. That is, there is still a medical perspective of disability, in which there is an understanding that some people have had misfortune and this fatality is exclusively theirs (Gesser, Nuernberg, & Toneli, 2012). In the medical model, disability is not understood as part of the life cycle, since the understanding is the existence of a normality to be achieved. The medical model centralizes the norm as a regulating principle of discourses and practices. With this understanding still in force, many people with disabilities, when entering Higher Education, feel a certain fear of communicating their 'diagnosis' to their educational institutions.

Students with the so-called hidden disabilities (e.g. psychiatric illnesses that compromise relationships, communication, or even dyslexia) have been objects of investigation in some localized studies (Couzens et al., 2015; Black et al., 2015). These surveys indicated that students expressed discomfort to discuss accommodations or disclose their disability to teachers (Black et al., 2015). For students with explicit injury marks on their bodies, choosing not to disclose them is not an option. For those with a hidden disability, this option is also being disregarded. Evidence of this is the accessibility services that are available from a student diagnosis registry, that is, access to accessibility resources is possible only through self-declaration of the disability condition, which would be unnecessary if the UDL were used by teachers as a daily practice in their classes. In order not to surrender to the declaration or the institutional visibility, due to fears of prejudice, stigmatization and often medicalization to reach normative standards, these students seek and find in their informal network their most effective support

⁷ From the English term 'Ableism': Wolbring (2012) claims it to be one of the most accepted 'isms' and refers to the hierarchy of capacities. It supports different prejudices such as 'disablism'.

(Couzens et al., 2015). Studies that did not have the centrality on people with disabilities also brought up promising results. This is not to say that they broke with the normalizing logic, since several of the findings point to resources, methodologies and strategies that underpin development, but at times with a medical model perspective. In this way, some questions arise: Are the available resources or the accessibility designed for all? Do these features meet a distortion correction of the standard? Next, we will discuss the findings regarding the place of technology when adopting the UDL in teaching practices.

c) *Practical applicability contributions* - To address the contributions of UDL to practical applicability, we cannot ignore what Brazilian legislations punctuate in terms of rights, after all we are a society that lives under the aegis of the norm imposed in laws and statutes. When we are dealing with accessibility, we are referred to the concepts and understandings of our legal documents, such as the United Nations Organization (2006) and the Brazilian Inclusion Law - Law No. 13,146, of July 6, 2015 (2015). When we refer to accessibility, the need for an understanding of the terminology 'reasonable adaptations' becomes evident, which distances itself from the conception of Universal Design embodied in the laws of other countries, for instance in the USA with the Americans with Disabilities Act (Equal Employment Opportunity Commission, 1990). The term 'reasonable adaptations' appears both in the United Nations Organization (2006) and in the Inclusion Law (Lei nº 13.146, 2015), but it is in the latter that we have a real definition when, in Article 3, it determines that, for the purposes of applying the Law, the following shall be considered as:

VI - reasonable adaptations: needed and adequate adaptations, modifications and adjustments that do not entail disproportionate and undue burdens, when required in each case, to ensure that the person with disabilities can enjoy or exercise, on an equal basis and opportunities and with others, all fundamental rights and freedom. (Lei nº 13.146, 2015).

When thinking about the applicability of UDL, there is a need to move beyond the boundaries of injury conditions to plan for accessibility. However, the reasonable adaptations foreseen in our legislation continue to treat accessibility as an exclusivity of people diagnosed with disability, that is, in a view that resources and services should be organized based on the demand presented by the disability condition of each subject, rather than applying the UDL principles and guidelines that embrace human variation as a premise for thinking about accessible educational environments from its outset.

Several examples of the applicability of the UDL in practical realities with similarities and distinctions have been found, presenting valuable contributions. The difficulties for applicability of the UDL draw attention to possible situations to be located in our research contexts and practices, such as: extra time used by the teacher for improvement and preparation of material (Rao & Tanners, 2011; Katz, 2015); limited/insufficient teacher education in the theme of UDL (Frey, Andres, Mckeeman, & Lane, 2011; Smith, 2012; Caruana et al., 2015); few computers in schools and limited access to the internet (Rappolt-Schlichtmann et al., 2013; Katz, 2015; King-Sears et al., 2015); and poorly inclusive public policies (Katz, 2015). These situations, located in studies of different realities that are similar to local issues, are not a reason to diminish the research development and practical application of the UDL, since there is an understanding that

the implementation can begin gradually with the application in different situations and contexts until the UDL is incorporated as a daily principle, going through teaching plans.

The results of the research have evidenced situations that do not require any technological implementation, computers or internet, referring to the strategies to be implemented as the so-called co-teaching or co-learning (Frey et al., 2011; Lee, & Picanco, 2013; Katz, 2013). These practices are interesting not only to the student, but also to the teacher, as they minimize the load and time demand for planning. In addition, adults learn best when they understand why they have to know something (Larocco & Wilken, 2013). It was identified that students become more involved and committed to learning when the learning goals and the reason for each activity to be developed are evident, that is, there is a greater commitment (Smith, 2012; Katz, 2013; Katz, & Sugden, 2013; Marino, Gotch, Israel, Vasquez, Basham, & Becht, 2014). Other simple, effective and low-cost strategies are attitudes that should permeate teaching practices, such as highlighting key concepts throughout the texts, providing written and oral activities, providing summaries and guiding questions along with texts indicated for reading (Frey et al., 2011; Nielsen, 2013; Davies et al., 2013). These are some of the strategies; however, many others may arise when we seek to understand that strategies should also be intentional, responsible practices, contemplating the premise of ethics of care pointed out by the second generation theorists of the social model.

The technological resources were indicated as great allies in the applicability of the UDL and, with this, they have been the object of study in many researches. However, it is necessary to reflect on how these resources are entering this field of research and practice, and whether or not they reveal, in different situations, the expression of the medical model in its implementation. In some situations, these technological resources come together to correct the 'impairment' of a disabled subject so that he/she can participate equitably with his/her classmates instead of expanding the possibilities of choice from the ways he/she relates to knowledge. Functional skills should not be the limit for thinking about the implementation of technologies. Thus, the resource should not be limited to the diagnosis of the disability, in a medical model that values the reason for disability and its correction, but can provide new ways for students, in general, to have options and choices in their course of knowledge construction.

Research on reading and comprehension of texts or electronic texts with audio feedback were pointed out as facilitators for the different profiles of students (Dalton et al., 2011; Coyne et al., 2012). The use of the computer has been indicated as an instrument that enables customization of learning, flexibilization of individual goals, monitoring progress, increasing interest levels, engaging and student autonomy (Wilson et al., 2011; Smith, 2012; Hinshaw, & Gumus, 2013; Rappolt-Schlichtmann et al., 2013; Cha, & Ahn, 2014; Hall, Cohen, Vue, & Ganley, 2015). Virtual reality and the use of avatars also appear to underpin the learning of students with deafness and autism; however, the authors of the studies analyzed did not bring the implication of their use with other population (Vesel, & Robillard, 2013; Chia, & Kee, 2014; Marino et al., 2014). Another feature that was highlighted in the investigation was Webquest⁸, indicated as useful for accommodating individual differences and learning styles, and also potent in promoting higher order thinking, problem solving, motivation, creativity and collaboration

⁸ Webquest is a research methodology that measures the educational use of the WEB/Internet. Proposed by Bernie Dodge, in 1995, it has its foundations in Constructivism.

for learning (Yang et al., 2011). The UDL permeated the studies in the varied applicabilities presenting resources, strategies; finally, demonstrating ways of performing pedagogical practices that do not normalize but allow students to find their own way to participate, and this is an expression of ethics of care to be incorporated into Higher Education.

4 CONSIDERATIONS

The way in which the phenomenon of disability is understood has meaning in the effective use of teaching strategies and methodologies. Throughout this review, we highlighted the conceptual models of disability, accessibility and interlacement with the principles and guidelines of the UDL that permeated the studies analyzed. When one enters the field of Disability Studies, it becomes judicious to question and revisit the concept of normality and the practices that derive from it. There is neither single norm nor the unchanging permanence of it, since the definitions occur socially and in specific contexts (Baglieri et al., 2011). In this sense, it is possible to advance in the combat of ableism, since it has its bases in the binary understanding of capacity as norm and of incapacity as the deviation (Wolbring, 2012). However, if the norm is questioned and the student comes to be understood beyond the limits of the medical model of the disability, advancing to the understanding of the variations in the way of learning, it will enable responsive educational actions from the incorporation of the UDL. Thus, the way in which the student relates to the knowledge acquired and participates throughout the course becomes more flexible.

Different answers have emerged from the research question, showing that the UDL may, in fact, contribute in different ways to the elimination of methodological barriers in educational contexts. However, technique or only the applicability of methodologies are not enough without the understanding of who the learning subjects are. It is necessary that the UDL is more than a framework, that it becomes a culturally accepted principle lived in different contexts. Variability in the way of learning is reality, and in this variability there are situations that go beyond the definitions of disability. The understanding of disability as a human condition, allied with the principles of the UDL, has proved to be a potential driver of a change in the way the teaching-learning relationship is established.

It has become relevant to present the emergence of UDL and how research and practices are consolidating so that it is possible to envisage some paths to be covered. We highlight here Edyburn's (2010) propositions, mainly that the UDL is more complex than one can imagine, and therefore, it is necessary to invest more research applied in the Brazilian reality. Understanding that inclusion and accessibility in Higher Education are still a great challenge, research with the UDL focusing on this stage of education can be promising. In addition, if these researches are allied to Distance Learning technologies, methods to increase the reception of different ways of learning and the success of students can be unveiled. From the gaps evidenced in the review, we observe the need for greater investments in longitudinal and effective researches that explore technology as well as the resource of the student with disability, but as facilitating resources in the customization of the learning of all students.

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