Applying the human factors engineering approach to equality, diversity and inclusion in occupational therapy training

Angela Paula Simonelli[1]

José Marçal Jackson Filho[2]

Summary

The pursuit of equality, diversity, and inclusion is on the social agenda, calling on various social actors and movements, as well as various disciplines, to contribute to changing social patterns centered on discriminatory, unfair, and exclusionary processes. Ergonomics contributes to addressing these issues. The Human Factors in Equality, Diversity, and Inclusion (FHIDI) approach was designed for this purpose. The objective of this article is to present the use of the FHIDI approach to develop the topic of social inclusion of groups, especially in the workplace, and to contribute to the training of undergraduate Occupational Therapy students. The students interviewed thirty workers with diverse individual and social characteristics. Through the stimulation provided by the FHIDI approach in the classroom, students were encouraged to develop a situated perspective on the cases presented to each of them (in their interviews) and on the difficulties and problems of these individuals. At the same time, the collective debate refocused on cross-cutting issues across the group and the need for systemic thinking in the search for analysis of the role of the law and solutions. Ultimately, the results, materialized in posters, the fruit of individual and collective learning, point to an expanded perspective for everyone, students and faculty alike, and therefore validate the approach as a training tool for other health and occupational disciplines.

Keywords: Equality, diversity, inclusion, human factors, occupational therapy.

1. INTRODUCTION

The search for equality, diversity and inclusion is placed on the social agenda, calling on various social actors and movements, as well as various disciplines to contribute to changing social patterns centered on discriminatory processes and , therefore , unfair and promote exclusion .

According to the Chartered Institute of Ergonomics and Human Factors (CIEFH, 2022), the terms can be defined as follows:

- "Equality means treating all people fairly, regardless of whether they are protected by law." It's about ensuring that everyone has equal access to opportunities. It differs from the notion of equity, which "consists of addressing the barriers that can prevent people from thriving by recognizing that some people need more because they started with less." (p. 5)

[1]Department of Occupational Therapy, Federal University of Paraná. https://orcid.org/0000-0003-4337-5796. angelapaulasimonelli@gmail.com.
[2]Fundacentro, Paraná Advanced Office. https://orcid.org/0000-0002-4944-5217.

- "Diversity means recognizing people's differences. Considering diversity can mean explicitly monitoring people's characteristics and identifying underrepresented groups. Understanding the systemic reasons behind underrepresentation allows positive steps to be taken to address it." (p. 5)
- " Inclusion means ensuring that everyone feels involved and that the environment in which they work is

find make everyone accepted and comfortable with each other." (p.5)

Although provided for in the Quota Law, inclusion is not a simple process, but depends on overcoming several barriers—physical, social, spatial, among others. Analyses of social inclusion show that limited social and individual representations of the people and communities involved, their limitations, and/or capabilities, are among the most significant barriers to the process (Toldrá et al., 2010; Simonelli & Jackson, 2017). If inclusion is already the subject of research and practice in several areas of knowledge, especially in Occupational Therapy (OT), which develops it in its interface with Ergonomics and Occupational Health, equality and diversity are urgent issues that also arise in the professional practice of OT and other disciplines in the health and work fields.

In this sense, it is essential to think about the training of future professionals to develop educational processes designed to: 1) transform students' perspectives and representations about confronting inequality and promoting equality and the value of diversity and; 2) help them appropriate methodological tools to act on reality .

How can we train Occupational Therapy professionals with the understanding of the issue and the tools to take action? This question applies to both OT and other disciplines.

Ergonomics can help address these issues. An alternative methodological approach was proposed by the Chartered Institute. of Ergonomics and Human Factors [3]- CIHFE (2022), based on Human Factors Engineering, aims to influence the design of systems and products involving issues of age, disability, gender reassignment, marriage and civil unions, pregnancy and maternity, race, beliefs and religion, sex and sexual orientation. The approach is supported by the Equality Act 2010 in the United Kingdom (United Kingdom, 2010), which gives people legal protection against discrimination in the workplace and in society with respect to the nine (individual) categories protected by that law.

This is a design perspective, characteristic of human factors engineering, proposed as *a framework* called 'Human Factors in Equality, Diversity, and Inclusion (FHIDI).' It contains four

---

[3] The CIEHF is the British association that brings together professionals in human factors and ergonomics, following the example of the Brazilian Ergonomics Association.

principles: adopting a participatory approach; using quantitative and qualitative data; recognizing the impact of existing design on behavior; and, finally, adopting a systemic perspective . The publicly available guide (CIEHF, 2022) explores various situations that cause RDI problems, including the impact of confusing user interface language and terminology, inadequate personal protective equipment (PPE) design, and biases in equipment and space design .

From this practical perspective , which aims to respond to current regulations in England and promote systems that favor the inclusion of people with characteristics protected by law (including some minorities), the discipline equips its professionals for consistent and well-founded technical action .

The objective of this article is to present the use of the FHIDI approach to address the issue, especially in the workplace, and to contribute to the training of undergraduate students in Occupational Therapy.

2. METHODS

The sociohistorical - cultural activity theory, developed in the work of L.S. Vygotsky and his followers, considers that development is not merely an individual process, but also socially and culturally mediated (Virkkunen & Newnham, 2015). From this perspective, educational practice aims to expand students' knowledge and practices through methods and instruments that provide stimuli for development. It is the teacher's role to mediate the individual and collective learning process by proposing stimuli so that students individually and collectively acquire tools for action (see, for example, Cenci et al., 2020).

From this perspective, FHIDI was used as a stimulus to address the theme of equality, diversity and inclusion in the Special Topics in Occupational Therapy discipline, which has a workload of 30 hours (aimed at developing relevant, current and pertinent subjects for the training of future professionals).

The approach was presented in a lecture, in which the developed concepts and the guiding principles of the proposed reasoning were presented - carrying out a participatory approach, using quantitative and qualitative data, recognizing the impact of design on behavior and adopting a systemic perspective - to understand and propose systemic solutions.

After presentation, the 30 students were divided among the eight personal characteristics to be worked on, namely: disability, gender reassignment, age, pregnancy and motherhood, race, religion and belief, gender and sexual orientation. They were asked to find a worker with one of the characteristics to interview, in order to obtain information about the person's perception of the influence or lack thereof of their characteristic on their work situation.

The interviews were proposed to address the first principle of the method: adopting a participatory approach.

The following guiding questions were made available:

- Have you ever experienced a situation at work where you felt excluded, didn't belong, or faced prejudice? Have you ever missed opportunities?
- you ever missed opportunities? Which ones? Were the situations experienced?
- In what way was a system, application, service, building/physical accessibility, urban, service, or attitudinal action a barrier for you?
- Have you ever been invited to participate in the development of a service, application, flow, among others, explaining issues that would help you and possibly help other people?

At the next meeting, the students were grouped in class according to the characteristics they explored in the interviews, forming two groups of three, two groups of five students, three groups of four, and finally, a pair. Each group met in class so each student could present their interview, and together they could present common questions and discuss the situations that had emerged in the interviews.

The next activity developed in the discipline was the group discussion about the characteristics and emerging themes of the interviews conducted and the search for quantitative and qualitative data, available on the internet to deepen the debate and the impact of the findings on people's behavior (according to the principle proposed by the guidance).

Finally, the groups were invited to manually create a poster - which could use resources such as cutting and pasting, drawing, writing, among others - and present which issue or issues would need a systemic solution in our society - highlighting the impact of drawing on behavior (third principle) - and some existing and/or possible proposals, thus meeting the fourth principle: adopting a systemic perspective.

The experience carried out is an integral part of the research project "Inclusion of people with disabilities at work" approved by the Research Ethics Committee - CEP/UFPR under registration no. 22640919.9.0000.0102 and by the Research Committee of the Health Sector of UFPR. All interviewees were informed about the objectives and methods of the research before beginning the interview. Participation was voluntary and the participants signed the Free and Informed Consent Form (FICF) before the interview.

3. RESULTS

4

Thirty interviews were conducted, four with male and female workers with 'disabilities', three with the characteristic 'gender reassignment', three with the characteristic 'age', four workers who could talk about the characteristic 'pregnancy and motherhood', five with the characteristic 'race', four workers were interviewed to talk about 'religion and belief', four for 'gender' and two to discuss 'sexual orientation'. (The main contributions of the interviews are described in the following items).

The groups produced posters on disability, reassignment and gender, age, pregnancy and motherhood, race, religion and belief, gender and sexual orientation, which, in a way, summarize the themes discussed and constitute the substrate of the collective work of each group (see figure 01).

Poster - Disability	Poster - Gender Reassignment
Poster - Age	Poster - Pregnancy and motherhood

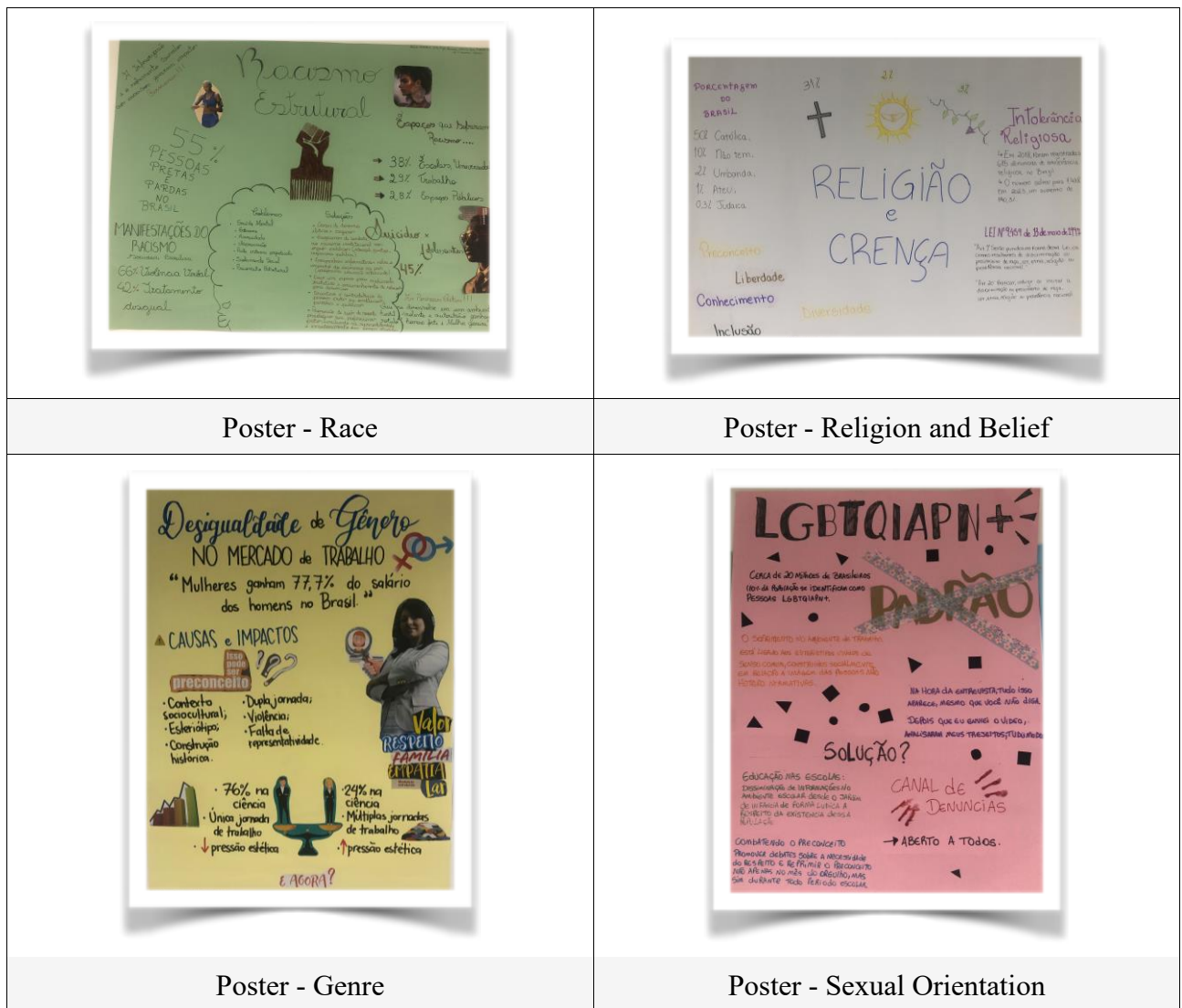|	
Poster - Race	Poster - Religion and Belief
Poster - Genre	Poster - Sexual Orientation

Figure 01 – posters.

3.1. PEOPLE WITH DISABILITIES

The main issues that emerged in interviews with people with disabilities in relation to work were discrimination, the existence of physical barriers, *bullying*, moral harassment and school dropout.

The systemic proposals presented by the group were: development of educational programs to raise awareness and prevent bullying *against* people with disabilities in schools; incentives for projects to build accessible and inclusive schools ; mandatory continuing education for educators and all school professionals in inclusive education ; monitoring compliance with the current public policies on accessibility and inclusion in various spheres, including the labor market; specialized internship programs for people with disabilities that assist in the transition from school to productive adulthood with skills training that respond to

the social demands and expectations of adult life; training of all employees based on inclusive and respectful training.

3.2. GENDER REASSIGNMENT

Regarding gender reassignment, the main issues presented were: use of the social name and name rectification, exclusion by coworkers, loss of job opportunities, tasteless comments from other company employees and problems with applications due to the information contained in their identification (General Registry - RG).

The proposed systemic solutions were: mandatory inclusion of the social name field, with the person's given name, and more gender options in all applications that require registration for transgender recognition. Thus, even with the requirement to include documents such as a photo of an ID card for digital registrations, the person would have the option to be addressed by their social name.

Such inclusion should begin with public bodies, as occurred in the Unified Health System (SUS), the Single Registry, the Individual Taxpayer Registry (CPF) and be implemented in all applications and systems, such as, for example, for purchasing food and digital and conventional banks (mentioned in the interview).

Another change that could be made is the new national identity card, which presents the "sex" and "social name" fields separately from the legal name. This separation can cause embarrassment for the individual; one solution would be to present only the social name, without the registered name information. Furthermore, the need for mandatory inclusion of the "sex" field was questioned, suggesting, in this case, that gender only appear in some internal records, such as in the health system.

Current initiatives that support the trans population were presented, including: Transcendemos[4], a consulting firm focused on helping other organizations become more inclusive, offering support to companies seeking greater diversity and inclusion; and Transempregos[5], a free platform that aims to publicize job postings for the trans population in Brazil. Users can also enroll in training courses and professional development activities.

3.3. AGE

---

[4] https://transcendermos.com.br/
[5] https://www.transempregos.com.br/

The group that focused on age emphasized the elderly population. The interviews converged on the following themes: ageism, which is prejudice and discrimination against the elderly, hindering the inclusion and retention of older adults in the job market; lack of technology skills that interfere with their lives; lack of opportunities in the job market; and limited availability of professional training and retraining programs.

The permanence of elderly people in employment occurs either to supplement family income or for the meaning and The importance of work in a person's life, whether due to the need to feel useful or the need for social interaction. Furthermore, with social security reform, the presence of older people still working is increasingly noticeable; due to structural unemployment, older people have to compete with younger people in the labor market. However, a major challenge lies in the organization of work, which is designed primarily to meet the needs and characteristics of the young population.

Systemically, the solutions listed were: seeking greater effectiveness for the 2003 Elderly Statute, which reinforces and details the rights of the elderly in Brazil, establishing penalties and creating legal protection mechanisms; offering training and refresher courses for employment that consider the effective needs of the labor market.

3.4. PREGNANCY AND MOTHERHOOD

Interviews with women about the influence of pregnancy and motherhood on their lives, especially their role in the market and work, highlighted issues such as barriers to transportation when traveling with children or while pregnant, attitudinal barriers, people's ignorance about the pregnancy process and the difficulty in obtaining places in daycare centers.

The group highlighted the Emprega + Mulheres Law, in effect in Brazil since 2022, which guarantees tax incentives for citizen companies that offer equal pay for men and women, grants an additional sixty days of maternity leave or 120 days of part-time work, six days for fathers to accompany their wives to appointments during pregnancy, provides accommodations for breastfeeding women, and childcare assistance for children up to 5 years and 11 months of age, among other measures. The law favors systemic solutions to achieve equality in the workplace for pregnant women and mothers, but with low adoption among companies.

Some solutions have been proposed, such as extending maternity and paternity leave, as is the case in other countries, offering flexible working hours, and developing a reintegration plan after maternity leave.

3.5. RACE

The group that interviewed workers associated with race highlighted structural racism as the central problem faced by workers, generating mental health problems, stress, anxiety, depression, damage to self-esteem, social isolation, among others.

The systemic solutions presented include: improving reporting channels to ensure efficiency and user safety; increasing investment in anti-racist education programs; creating a space for welcoming, receiving, and forwarding reports within companies; encouraging the hiring of Black people in the private sector; and promoting psychological support for Black professionals within companies, ensuring representation and empowerment.

3.6. RELIGION AND BELIEF

The group that studied the characteristics of religions and beliefs and their influence on the workplace conducted three interviews: one with a self-identified Christian, one with a Jehovah's Witness, and one with a Ubandista. The interviews highlighted prejudice, lack of knowledge about religions, and lack of freedom of expression as the main factors causing harm in the workplace. Furthermore, a lack of tolerance toward cultural diversity fosters exclusion.

As a systemic solution, they pointed out, in addition to monitoring and compliance with Law No. 9459 of May 13, 1997, investment in teaching culture, religion, belief, and diversity from early childhood education onwards, with the aim of increasing tolerance for diversity within society, which will certainly be reflected in the work environment.

3.7. SEX

Regarding gender and the labor market, the main occurrences reported by the interviewees were bullying, sexual harassment, the widespread stereotype of women as naive and incapable, lower pay than men, multiple shifts, inflexible work hours, and the exclusion of women from non-care work. The interviewees emphasized that women's low representation in the legislative sphere and historical constructs contribute to gender inequality in the workplace.

Inflexible working hours hinder women's participation in the labor market, as well as their career advancement, and often force them into the informal market. All of these factors have impacted mental health, quality of life, and social participation.

Regarding the solutions highlighted, in addition to improving reporting channels and tools, tracking and punishing forms of harassment in companies and promoting access to mental health services, wage equality and transparency, the group emphasized that the adoption of flexible working hours or 4x3 shifts - four days worked and three days off - could encourage greater participation of women in the labor market in general.

3.8. SEXUAL ORIENTATION

The group, which interviewed LGBTQIAPN+ workers, found that prejudice is related to common-sense, socially constructed stereotypes about the image of non-heteronormative people. This prejudice has led to missed job interviews and embarrassment and harassment in the workplace from employers and coworkers.

As systemic solutions, investments were proposed in improving reporting channels and effective punishments for harassment cases and, most importantly, the effective inclusion of the topic of diversity in schools from early childhood education onwards, with the aim of combating prejudice and promoting social inclusion and equality.

3.9. THE OVERLAP OF CHARACTERISTICS

It can be seen in the discussions that as some characteristics overlap in a person's life story, the difficulties increase exponentially.

Furthermore, when socioeconomic issues are added, which in the Brazilian case involve social inequality, economic crisis and structural unemployment, among others, the quality of life and health of workers, who have one or more characteristics, are more affected.

4. DISCUSSION

While the importance of the topic today in the social dimension is recognized, it is important to emphasize both the need for its appropriation by organizations, systems, and production chains, and the existence of demand placed on companies. The Revista de Administração de Empresas (2025) launched a call for a thematic dossier associating the search for justice in organizational practices with issues involving equality, diversity, and inclusion: it is necessary, through academic production, *to " understand , conceptually and empirically , how the Operations and Supply Chain Management (OSCM) field can address different themes to promote justice by reducing inequalities in different units of analysis (individuals, groups, suppliers and the whole supply chain).*

Occupational Therapy, due to its historical development around inclusion issues (Toldra et al., 2010) and its practices, which occur in both service and organizational settings (Simonelli & Rodrigues, 2013), is called to contribute to solving RDI problems posed in society and in companies, in particular. Such problems call for an interdisciplinary approach and, necessarily, a search for solutions that require a design perspective, which focuses on men and women and

their activities. Ergonomics is a discipline that can respond to this social need, as evidenced by the CIEFH (2022) or Activity Ergonomics (Guérin et al., 2021).

Hence the importance of hybridizing practices (Hefetz & Ben-Zvi, 2020) to answer such questions. The educational process is a means for constructing new practices, explicitly constituting the object of the training reported in this article.

The pedagogical method employed was designed based on the Theory of Cultural-Historical Activity. Thus, mediating the educational process through an artifact, in this case the FHIDI approach (2022), fosters an expansion of possibilities for action, i.e., new practices. Through the stimulation provided by the FHIDI approach in the classroom, students were encouraged to develop a situated perspective on the cases presented to each of them (in their interviews) and on the difficulties and problems of the individuals. At the same time, the collective debate refocused on cross-cutting issues across the group of people and the need for systemic thinking in the search for analysis of the role of the law and solutions. The harsh reality, on the one hand, and the need to transform it, thus constituted mobile devices for the development of collective projects, materialized in posters.

This dialectic, between the harsh reality and the possibility of transformation, is objectified by the principles of the FHIDI approach, which calls for participation as a central methodological dimension, the understanding of the problem to be addressed in depth to properly diagnose it – whether through the use of qualitative and quantitative data or the impact of the project on people's behavior – and, finally, the systemic perspective at the basis of the project to transform life and work situations.

The students' accounts repeatedly evoked people's resilience in adjusting to inadequate working conditions, that is, in seeking to adapt to the job. The need to find solutions, present in the FHIDI approach and ergonomic practices, as well as some solutions proposed by the working groups, on the other hand, aim for the opposite: adapting work to the diversity of workers. It is necessary to go beyond diagnoses; simply recognizing the harsh working conditions is not enough; it requires seeking transformations, unless the principle of practice is the adaptation of workers to the job (Clot et al., 2021).

Equipping future Occupational Therapy professionals with the premises of human factors ergonomics - the characteristics of men and women, the interfaces and instruments they use, and participation in systemic projects - can foster action not only based on moral and ideological values, but also based on socially legitimized technology.

5. THANKS

REFERENCES

Chartered Institute of Ergonomics and Human Factors. (2022). How human factors can enhance the delivery of equality, diversity and inclusion (EDI). Recuperado em 20 de agosto de 2024, de https://ergonomics.org.uk/common/uploaded%20files/publications/CIE HF-EDI-guidance.pdf

Clot, Y. (2021). Le prix du travail bien fait. La coopération conflictuelle dans les organisations. Paris : Editions La Découverte.

Guérin, F., Pueyo, V., Béguin, P., Garrigou, A., Hubault, F., Maline, J., & Morlet, T. (2021). Concevoir le travail, le défi de l'ergonomie. Toulouse: Octarès.

Hefetz, G., & Ben-Zvi, D. (2020). How do communities of practice transform their practices? Learning, Culture and Social Interaction, 26, 100410. DOI: 10.1016/j.lcsi.2020.100410

Revista de Administração de Empresas (2025). Pursuing justice logic in Operations and Supply Chain Management: insights from Diversity, Equity and Inclusion. Special Issue: Call for Papers. https://periodicos.fgv.br/rae/libraryFiles/downloadPublic/222.

Simonelli, A.P. & Rodrigues, D. S. (2013). Saúde e trabalho em debate. Velhas questões, novas perspectivas. Brasília: Paralelo 15.

Simonelli, A. P., & Filho, J. M. J. (2017). Análise da inclusão de pessoas com deficiência no trabalho após 25 anos da lei de cotas: uma revisão da literatura. Caderno Brasileiro Terapia Ocupacional, 25(4), 855-867.

Toldrá, R. C., Marque, C. B. D., & Brunello, M. I. B. (2010). Desafios para a inclusão no mercado de trabalho de pessoas com deficiência intelectual: experiências em construção. *Revista De Terapia Ocupacional Da Universidade De São Paulo*, *21*(2), 158-165. https://doi.org/10.11606/issn.2238-6149.v21i2p158-165

United Kingdon (2010) Equality Act 201. Recuperado em 20 de agosto de 2024, de
https://www.legislation.gov.uk/ukpga/2010/15/contents

Virkkunen, J.; Newnham D. S. (2015). O laboratório de mudanças. Uma ferramenta de desenvolvimento para o trabalho e a educação. Belo Horizonte: Fabrefactum Editora.

Simonelli, A. P., & Filho, J. M. J. (2017). Análise da inclusão de pessoas com deficiência no