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RESEARCH PAPER

Universal Design and disability: an interdisciplinary perspective

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Abstract

Purpose: To discuss Universal Design (UD) as an interdisciplinary topic with relevance for rehabilitation professions and planning and building professions. Significant for this topic is to discuss to what model of disability UD strategies correlates. The paper argues that the UN Convention on the Rights for Persons with Disabilities (CRPD) pre-supposes a relational model of disability. *Method*: This is a theoretical paper on the understanding of UD and the significance of UD as a subject of interdisciplinary research and teaching. The paper is based on literature and focuses on how to understand UD in interdisciplinary contexts. Both impairment effects and disabling barriers are important for understanding UD. Rehabilitation professions together with user-representatives provide knowledge on impairments as an aspect of human diversity; planning professionals provide knowledge on architecture and spatial planning. As an emerging field of knowledge, UD involves different knowledge; however, these differences may also lead to difficulties in communication. *Results*: Both theoretically and practically UD must correspond to an understanding of disability as relational, involving person, interaction and barriers. Implementing UD strategies ought to be linked to a concept of person that clearly includes impairments as a dimension of human plurality. *Conclusion*: In conclusion, the paper suggests that a common knowledge platform can prove productive for interdisciplinary work with UD.

➤ Implications for Rehabilitation

- Universal Design is a strategy to improve equal access for people with disabilities.
- A concept of the person and of disability is of importance for implementing Universal Design strategies.
- The interdisciplinary involvement in Universal Design must involve rehabilitation professions to attend to the individual dimension in Universal Design.

Keywords

CRPD, human plurality, interdisciplinary field of knowledge, rehabilitation professions, relational model, Universal Design

History

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Introduction

How is the relation between disability and Universal Design (UD) to be understood, and what concept of disability is most adequate for UD purposes? The last decade has brought a profound change in the understanding of disability, from a medical approach towards a human rights approach. Rehabilitation scholars have referred to this evolvement as a paradigm shift [1–3]. A shift in paradigm bears many consequences and involves a change in policy and in legal systems, together with a call for a renewed conceptualizing of disability. The aim of UD is to promote equal rights and opportunities for all people. However, understanding UD implies a conception of disability. So far, the political concept of person and disability guiding the interpretation of UD is contested and has been poorly developed. Thus, it is a pressing issue to clarify both *person* and *disability* in the context of UD.

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The *UN Convention on the Rights for Persons with Disabilities* (CRPD) provides a comprehensive understanding of equal rights for people with disabilities [4]. The convention also emphasizes to raise awareness throughout society regarding respect for the rights and dignity of persons with disabilities. This international political and moral document constitutes an important contribution to future work towards inclusion and equal rights. The CRPD is part of the paradigm shift, and thus focuses on the need for more research on UD [4]. As a subject for research and teaching, UD encompasses different academic traditions, such as architecture, spatial planning, law, ethics, rehabilitation and public health.

Occupational therapist Karen Hammel observes that ''[T]he rehabilitation professions – occupational therapy, physiotherapy, social work, speech and language pathology and nursing – are still more closely aligned with each other than with those of architects, lawyers, economists, politicians, social policy maker or with disability activists'' (p. 68) [5]. She thereby challenges rehabilitation professionals to be involved in strategies for forming a more inclusive society. Her analysis is productive for an interdisciplinary approach to UD. The interdisciplinary dimension of UD has been discussed, but is not sufficiently addressed [6–8]. Hammel's observation is productive for a discussion of the term *universal*

in UD. As Per-Olof Hedvall asserts, the individual person is not supposed to be a universal individual [9]. To design universally means that the designer envisions users as a plurality of different individuals. UD does not correspond to *one* particular user group but to a larger group of different individuals. Rehabilitation professions are significant for developing UD further as their knowledge of impairments, age and disability are fundamental for understanding what specific design solutions are best suited for whom.

In this paper, I will take the challenge from Hammel as an opportunity to discuss the role of rehabilitation in an interdisciplinary approach to UD. I start with a discussion of disability, arguing that UD correlates with a relational concept of disability and accessibility, involving both person and environment. The person–environment relation indicates that more than one discipline is necessary when developing UD further. For UD strategies to be responsible towards human diversity, both rehabilitation professions and user-organizations need to be more strongly involved.

Conceptualizing disability in the context of Universal Design

UD is not an abstract concept but a practical design strategy focusing on *usability*. According to CRPD, universally designed *products*, *environments*, *programmes* and *services* should be usable for different people [4]. The intended person universally designed objects aim at being usable for, includes individuals of different ages and with different physical, mental and cognitive impairments. In the CRPD, there is no demarcation towards any group of individuals. A rich understanding of human diversity therefore must guide interpretation and implementation of UD. Disability and UD is connected, insofar, as the aim of UD is to promote equal opportunities to participate in society for all citizens. Therefore, practicing UD strategies imply some concept of person and disability.

In an anthology presenting European and Scandinavian perspectives on the CRPD, Rannveig Traustadóttir claims that the social understanding of disability, ''usually referred to as 'the social model', has provided the knowledge base which has informed the international legal development aimed at full participation and human rights of disabled people'' [10]. In the same anthology, Michael Ashley Stein and Janet E. Lord also argue that the concept of disability in CRPD article 1 is grounded in the social model [11]. A social understanding of disability explains disability from the perspective of the disabling environmental barriers [12]. Disability is expressed as oppression and barriers in the social and material environment [13,14]. Such an interpretation of disability causes difficulties because a social model gives little room for recognizing people as individual embodied persons that experience barriers differently. Consequently, the individual perspective and experience is less valued as a source of knowledge when dismantling disabling barriers.

From a UD perspective this is problematic because dismantling barriers must build on an understanding of the particular person who experiences the concrete barriers. A social model is then reductive both epistemologically and ontologically by focusing first and foremost on the barriers. Ontologically a social model overlooks the complexity in impairments as human condition. Epistemologically such a model does not value impairments and individual embodiment as objects of knowledge [13,15]. The role of the individual body and individual experience as situated places for knowledge production is thus under focused in the social model, which makes this model less qualified as a knowledge base for UD.

What is the description of disability in CRPD article 1? The article states that ''persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others'' [4]. When analyzing this quotation we find three elements. First there are different people with disabilities that include *persons with long-term impairments*, next there is the person–environment *interaction*, and third there are the *barriers*. We can refer to these factors as x, y and z, where x represents people with disabilities who have impairments, y represents the interaction involving people with impairments and the barriers they encounter and z represents the barriers that hinder participation. Disability, understood as a hindrance for participation, is in this interpretation described as a product of the interaction, thus as a product of the person–environment relation. In the preamble of the convention this is expressed even more precisely: ''disability results from the interaction between persons with impairments and attitudinal and environmental barriers that hinders their full and effective participation in society on an equal basis with others'' [4,e]. Thus, I will argue that the understanding of disability found in CRPD first and foremost is *relational* [4]. The relation comprises a person–environment interaction motivated by the person's right to activity, participation and citizenship. As a basis for UD, such a relational model is coherent, unfolding disability as a complex person–environment interplay.

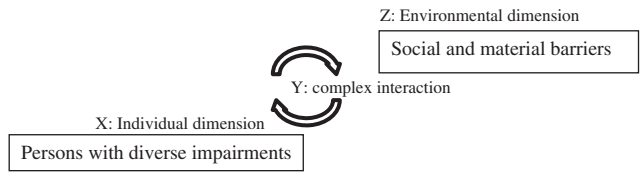

Figure 1. A relational model for disability as found in CRPD. Persons with impairments experience disability as a result of a dynamic person–environment interaction [14].

A relational model understands disability from the perspective of the *interaction* between the individual and the social, cultural and physical environment. UD is by nature a complex topic that involves a concept of person, the environment, the interaction [6,16]. Also *The International Classification of Function, Disability and Health* (ICF) conceptualizes disability as an interaction. This is a conceptual framework used for collecting data and for statistical analysis [17]. The ICF model has been assessed as too closely aligned to a medical understanding of disability [18,19]. The model is also not sufficiently clear on the distinction between activity and participation, and thus the understanding of citizenship [20]. For both these reasons, the ICF is less suited for an interdisciplinary approach to UD. The CRPD interpretation of disability as relational is, I will argue, sufficient and provides an adequate basis for UD.

Disability as a relation: the individual dimension

As stated in the CRPD, UD aims at creating usability and thus equal opportunity to participation for all people to the greatest extent possible. The individual dimension is of critical importance for understanding usability, and how accessibility and disability emerge. Sociologist Carol Thomas has discussed disability at length, and focuses on both individual and social dimensions [14,21]. She conceptualizes disability as social-relational. The individual dimension in disability is called *impairment effects* by Thomas. However, Thomas argues that the social dimension, what

she refers to as *disablism*, is most important in the understanding of disability. She defines disablism as ''a form of social oppression involving the social imposition of restrictions of activity on people with impairments and the socially engendered undermining of their psycho-emotional well-being''. Impairments and impairment effects are always bio-social and therefore partly culturally constructed in character [14, p. 211]. Thus, according to Thomas, the undermining of the well-being of people with impairments is best understood as socially engendered.

However, in her significant book *Female Forms*, Thomas provides an important contribution to the understanding of impairment effects in terms of experienced disability [22]. This element is further developed in her account of what is avoidable and unavoidable. Disablism, Thomas observes, leads to *avoidable* restrictions whereas impairments have *unavoidable* impacts [21]. She points out that the *disabling mechanisms* leading to restrictions in life activities *can be avoided* by social, political and physical measures. Effects from impairments, Thomas contends, are *not likely* to be avoidable. This distinction between what is avoidable and unavoidable constitutes a promising perspective for UD strategies. To avoid and dismantle disabling mechanisms and barriers are also the purpose of UD [1,4,23,24]. Thomas' distinction indicates how to unfold an interdisciplinary concept of disability as relational.

Different people experience disabling barriers differently. In order to develop the concept of human diversity workable for the purpose of UD, I will turn to the political philosopher Hannah Arendt [25]. Equality is, Arendt argues, a political concept. Humans are born different but can be recognized as equal citizens by political institutions. Disability is a well-qualified location for a reflection on human plurality because disability involves manifold individual experiences. According to Arendt, humanity is expressed as plurality. The basic condition for human life and action is *plurality*. Arendt herself did not focus on disability. However, her notion of plurality and a right to have rights have proved productive for disability scholars [15]. Arendt deepens the principle of *difference* as a basic condition for human life in the world. I find Arendt's understanding of plurality valuable for a reflection on the person and disability in the context of UD. A similar attention to human plurality is also important according to the CRPD. In article 3, *general principles*, the principle of difference is emphasized as one of the core guiding principles [4]. The diversity among humans is not a failure to be corrected, but *the* way human life is expressed. Consequently, this diversity is also what UD should accommodate.

Summing up at this point, individual bodies and impairment are important for understanding and working with UD. Carol Thomas' concept *impairment effects* together with Hannah Arendt's understanding of human plurality provide a sound perspective on the person epitomized in UD. I will now turn to the other side of the relational model of disability (Figure 1), and expand on the environmental barriers.

Understanding environmental barriers

Research motivated by CRPD can provide deeper knowledge of disabling processes, what Thomas referred to as the social dimension in disability, *avoidable disablism*. An analytical distinction between impairment as human condition at the ontological level, and the epistemological level that relates to the production of knowledge on disablism is productive for identifying differences between disability and the condition for disability [27,28]. Disabling barriers experienced by different individuals, are important as objects of study in the context of developing UD further as a strategy for inclusion. Disablism can be experienced in various contexts, such as in democratic processes and in public places. I will try to illustrate by an example: Trond, a man with sight loss finds that his local urban environment is being re-organized and physically changed. He has for many years participated in local urban planning processes, but has often experienced that his perspective is neglected when decisions are made. The last case he was engaged in, was the re-design of pedestrian crossings. The local municipality selected a design that made it easier for wheelchair users and at the same time more difficult for pedestrians with sight loss to orientate themselves on the pedestrian crossing. Trond felt his perspective was marginalized [16].

The specific problem Trond encountered was that he, as a pedestrian, became confused and lost directions since the slope of the kurb cuts was curved instead of located at right-angles at the intersection. His arguments as a representative to the local council were disregarded. Thus, he experienced a marginalization both in the concrete situation and as a cooperating citizen, engaged in local political processes [16]. Hannah Arendt contends that a right to have rights corresponds to a right to belong to some sort of organized society [26]. The municipality has a responsibility to accommodate citizens with impairments, such as sight loss. Therefore, political, material or social conditions, such as policy, law, architecture and public institutions, provide different mechanisms that have effects upon individuals' opportunities to function. UD concerns participation as citizens. This includes both access to political participatory processes and to public areas. However, having access to democratic processes does not necessarily mean to be listened to.

Persons with impairments tend to experience more barriers than persons without impairments [29,30]. It is therefore vital that research on disabling barriers makes evident what barriers different individuals experience and how the different barriers and disabling mechanisms can be avoided or dismantled. In order to find strategies to dismantle disabling barriers, it is critical to understand how barriers emerge, and for whom. In the above example, Trond encounters both a barrier in the built environment together with a barrier at a political level, finding that his perspective is not valued in political decision processes. Disabling physical barriers in the urban environment can be avoidable, as can barriers that hinder participation in a democratic context. However, disablisms and disabling mechanisms are complex and lead to difficulties in judging what to value most when there are disagreements among different perspectives. Prioritizing in real situations calls for interdisciplinary knowledge as a sound base for judging between ordinary friction in person–environment interactions and substantial excluding mechanisms.

Interdisciplinary field of knowledge

UD is an emerging field of knowledge. If UD is to be interpreted in the light of a social model of disability or disentangled from a concept of disability, the person epitomized in UD is under focused. This is the most important reason to accentuate Hammel's observation and highlight the responsibility rehabilitation professions bear. As pointed out, the CRPD signifies a paradigm shift in the understanding of disability as a human rights issue, and conceptualized as relational. Politics, law and technical standards must also be rooted in the same concept of disability. At a macro level, UD relates to human rights and democratic values, at a meso-level technical standards are tools for accessibility. At a micro level UD can have effects on people's lives and opportunities when interpreted in the light of human diversity [23].

A relational model of disability implies an interdisciplinary approach to UD. Both architects, spatial planners, politicians and rehabilitation professionals have responsibility in

promoting inclusive and accessible environments for citizens. When disabling mechanisms are to be replaced with mechanisms for inclusion, different kinds of knowledge are relevant for different purposes. As a *practical* strategy for inclusion UD involves dilemmas and often difficult priorities.

Working with UD in interdisciplinary processes revitalizes basic values of citizenship and equal opportunities. However, the term *universal* does not imply that UD suggests an accommodation for *one* universal citizen. Due to the differentiation of impairments as human conditions, knowledge on impairments is important as a part of the knowledge-based UD practice builds upon. Rehabilitation professions possess knowledge on different individual conditions from a therapeutic and medical perspective. Physical therapists and occupational therapists hold an understanding of citizenship and activity together with knowledge on impairments and use of individual devices. The knowledge that they utilize are, among others, analyses of activity and function [31,32].

Planning professionals build on spatial theories describing different understandings of human–environment interactions [33,34]. Spatial theory analyses the person–environment interaction from the environmental perspective, often focusing on the lived spaces. For the purpose of UD, both of these knowledge bases and methods of analysis are relevant. The planning professions approach the social at a structural level, whereas the rehabilitation professions approach the social from individual perspectives and often on a therapeutic basis.

Whereas planning professionals analyze the person–environment interaction from a spatial perspective, rehabilitation professionals analyze the interaction from an individual, often therapeutic perspective. In the context of UD, the social and the spatial factors are best conceptualized together. Spatial theorists have argued similarly in the context of *right to the city* and urban life and gender inequalities [33,34]. Accessibility and barriers are both entangled phenomena that involve individual, social and spatial factors [35–37]. The individual factors also involve changes over the life span [19,31,32]. At a social level, health, impairments and prejudices can have effects on an individual's accessibility, whereas at a spatial level safety, way finding and architecture are of importance. Accessibility can be measured technically and in detail, such as the width of doors openings, the slope of ramps and visual contrasts in outdoor areas. When working with UD, such measurements must be seen from the perspective of a rich human diversity in order to safeguard equal accessibility for different individuals. Knowledge of differences in needs for people using electric wheelchairs, manual wheelchairs, crutches, mobility sticks, rollators, and so forth therefore are highly relevant, not least in order to detect dilemmas or conflicts. One such source of dilemma is long wheelchair slopes, which may be good design for people with wheelchairs but often experienced as a barrier by people with walking restrictions using canes, crutches or rollators.

Inclusive processes

Rehabilitation professions' individual and therapeutic perspectives are of critical importance, and yet not sufficient for expanding on impairments in the UD context. Understanding UD concerns understanding barriers and accessibility from individual perspectives. Disability rights advocates' and activists' situated, embodied knowledge plays an essential role when expanding on the individual perspective. Individual perspectives are developed as user-based knowledge from a first-person perspective, *embodied* knowledge. Embodied perspectives are described by a number of disability scholars in disability studies literature [38–40]. In political and democratic processes, embodied knowledge is included by involving user-representatives in planning and design processes. A person using a wheelchair has knowledge of accessibility and barriers from a first-person perspective, situated, embodied knowledge. As a wheelchair user this person perceives the social and spatial environment as his or her environment. Such embodied knowledge is valuable for both academic and practical involvement in UD. In the Norwegian context, the first years of UD strategies have been presented in *National Action Plans* [41]. Protagonists have been disability rights organizations and national governments. The Norwegian Disability and Accessibility Act (DAA) came into force in January 2009 and the CRPD was ratified in June 2013 [16].

The work with UD strategies in the Norwegian context have now reached a second stage, where production of knowledge and implementing assessment strategies is of significant importance. Due to the relational model of disability and accessibility, the knowledge that UD builds upon is both interdisciplinary and trans-disciplinary involving user-perspectives from outside academia. One source for this knowledge is, as noted, disability studies literature. Another source is involving citizens in participatory processes [42]. Due to the complexity of such processes, it is necessary to acknowledge that when professionals and representatives from disability advocate organizations work together they risk encountering conflicts, dilemmas and clashes between perspectives. Mismatches are not necessarily to be avoided, as productive learning lies exactly in these kinds of meetings between persons with different knowledge and from different scientific traditions. The challenge is to learn together with and from people who think and understand differently from the traditions one has been trained in.

Practical knowledge is closely linked to tacit knowledge, being personal and contextual [43,44]. Knowledge derived from rehabilitation professions and from people with disabilities are both necessary in order to expand upon the individual dimension in UD. New legislation requires user representatives' involvement in planning processes [31,45]. This is, however, also a challenge as both the theoretical and practical knowledge differs. According to CRPD, what is universally designed is to be usable for as many people as possible. Therefore, assessing UD must seek to contribute to the knowledge production by involving valid knowledge and a plurality of individual perspectives and reach a renewed understanding of the problems with barriers and accessibility.

Hannah Arendt focuses on the importance of being able to take another person's perspective in addition to one's own, what she calls *representative thinking* [46]. This can be done by training in taking the position of the other, thinking from the standpoint of someone else. However, the disability rights movement has argued that people with disabilities have a right to be heard as stakeholders in democracies.

UD comprises both impairment and environmental accommodations. If the social and the spatial are conceptualized together, different scholars, students, professions and representatives for councils and organizations bring different theories, skills and competences to the table. Rehabilitation professionals can strengthen the individual's condition by focusing on the individual level. Insights from rehabilitation professions are vital for analyzing who the target group might be in concrete situations by identifying *who* the environment or product is usable for, and *how* in each different situation. However, these insights may be challenged by insights from user representatives, representing different groups of people with disabilities. Differences in perspectives on how UD should be implemented are valuable and enriching but also pose problems and difficult priorities. UD is not a fixed technical standard to realize but a value-based

policy to be worked with in processes and practiced differently in different contexts. As regards accessibility and disability, I will suggest that UD is also best interpreted as a relational and contextual concept.

Concluding remarks

UD as an implemented strategy, take the form of an affirmative initiative towards persons with impairments. However, manifold different individual perspectives are of importance for working with UD in concrete situations as what is to be designed universally has to be usable by ''all people, to the greatest extent possible'' [4, article 2]. The aim is usability for individual people with real bodies. For this reason, it is crucial that the interpretation and implementation of UD is informed by many different individual perspectives. The CRPD definition of UD involves judgment and well-argued priorities because *all people to the greatest extent possible* never covers all people in total at an empirical level. Practical UD strategies must be based on theories of human plurality and human–environment interactions. UD has thus far not been sufficiently grounded in an understanding of disability and a concept of the person. As a practical strategy for inclusion, UD is not a panacea, but involves difficult compromises, needs systematic evaluation, and continuous critique. Further research and teaching on UD should build upon and involve rehabilitation together with spatial planning professions. One important challenge is how to gain sufficient and valid knowledge on the person–environment interaction. In this paper, I have argued that UD must be based on an understanding of disability as relational and be worked with in interdisciplinary processes. Implementing UD in various arenas must integrate professional knowledge from rehabilitation and spatial planning together with situated knowledge from disability advocates.

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