Professional Development:
The International Journal of
Continuing Social Work Education

Engaging with Technology Governance in Social Work Education: An Essential for Preparing Future Social Work(ers)

Engaging with Technology Governance in social Work Education: An Essential for Preparing Future Social Work(ers)

Gregor Wolbring and Lucy Diep

Introduction

The special issue *Preparing Social Work Professionals to Work with Persons with Disabilities* of the International Journal of Continuing Social Work Education focuses on the state of training programs for professionals and social workers that relate to disabled people. Since technology will play an important role in the social work field in the years to come, both in its impact on social workers and also on the disabled clients they serve we contribute to this special issue an investigation of how social work, as an academic field, engages in the governance of technology discussing our results in light of the purpose of social work.

Purpose of Social Work

Social workers have historically tried to enhance the interplay between individuals and their environments for the purposes of problem solving, according to Parsons (Parsons, 1991). Researchers suggests that empowerment is the purpose of social work (Parsons, 1991). Other purposes mentioned are: "to promote recovery, restore individual, family and community well-being, enhance development of each individual's power and control over his or her life and advance principles of social justice" (McGarry & Storey, 2014); to address need in the light of people's lived experience (Cox & Hardwick, 2002); "to advocate for, and/or with people changes in those policies and structural conditions that maintain people in marginalized dispossessed and vulnerable positions, and those that infringe the collective social harmony and stability of various ethnic groups, insofar as such stability does not violate human rights" (Rock, 2013); to enhance people's well-being (Knauth & Mazanova, 2014); to increase betterment of living conditions of a client, family, or community (Soydan & Sundell, 2011);

and to promote "social change, problem solving in human relationships and the empowerment and liberation of people to enhance well-being" (Walker & Beckett, 2011). Social workers apply the theories of human behavior and social systems, according to Walker and Beckett, to intervene at the points where people interact with their environments. Principles of human rights and social justice are fundamental to social work (Walker & Beckett, 2011). On the subject of social work education's purpose within U.S. history, Reisch outlines two contrasting interpretations: one linked to charitable and the other to justice-oriented perspectives on social welfare (Reisch, 2013). The researcher suggests that one regards social work as "an instrument that supports existing institutional arrangements, assimilates marginalized populations into the dominant culture and attempts to ameliorate the excesses of a market economy" (Reisch, 2013). Reisch sees this intent as the dominant "commitment of schools of social work today, particularly within public universities, to serve the interests of their states (which are often their primary funders)" (Reisch, 2013). The other school, in Reisch's view, sees "social work practice as a catalyst of individual, community and societal change, and social work practice and education as arenas for social struggle" (Reisch, 2013). Moriarty and Manthorpe see social work qualifying education "to prepare students to work in regulated social work settings or if they should be provided with a wider repertoire of transferable skills and understanding" (Moriarty & Manthorpe, 2014) see also (Furness & Gilligan, 2004). Rimmer concludes that "[social] work must challenge all forms of oppression, whether by reason of race, gender, sexual orientation, age, class, disability or any other form of social differentiation upon which spurious notions of

Gregor Wolbring, PhD is an Associate Professor at the University of Calgary.
Lucy Diep is a Master student at the University of Calgary.

superiority and inferiority have historically been (and continue to be) built and kept in place by exercise of power" (Rimmer & Harwood, 2004).

Social Work and the Global South

According to Moosa-Mihta, "the history of international social work education, in the form of educators from the global north influencing social work education in countries of the global south, is a long one" and she posits that there is very little consensus on what exactly is meant by international social work education or whether it is even necessary to engage in it" (Moosa-Mitha, 2014). Moosa-Mihta further notes the longstanding critique of universalizing tendencies of international social work education from the global north to the global south (Moosa-Mitha, 2014). At the same time, *Draft 1 of the 2015 Educational Policy and Accreditation Standards (EPAS)* of the Council of Social Work Education states that the social work profession is guided by a global perspective; that one of its purposes is the enhancement of the quality of life for all persons, globally; it recognizes the global interconnections of oppression; and that global influences that affect social policy and programs are influenced by global contexts (Council of Social Work Education, 2014). Furthermore, the International Federation of Social Workers (IFSW), the International Association of Schools of Social Work (IASSW), and the International Council on Social Welfare (ICSW), introduced a global social agenda in 2012 in which they stated the following: "We will prioritise our endeavours to these ends. We intend during the period 2012-2016 to focus our efforts on the following areas:

- Promoting social and economic equalities
- Promoting the dignity and worth of peoples
- Working toward environmental sustainability
- Strengthening recognition of the importance of human relationships" (Gamble, 2012).

Related to people with disabilities, they seek implementation of the UN Convention of the rights of persons with disabilities and to promote "strong inclusive communities that enable all members to participate and belong. We will promote policies aimed at social integration and cohesion as a means for achieving the economic and social well-

being of all persons, including older people and persons with disabilities, mental health needs, and/ or learning difficulties" (Gamble, 2012).

Governance of Technology

For a long time, technology governance has been seen as an important goal (De la Mothe, 2004). The entry of ethics discussions into the realm of scientific and technological advancements has provided some guidance (Wolbring, 2003, 2012a). Ely, Van Zwanenberg and Stirling highlight that "the ever-growing pervasiveness of new technologies and their impacts heighten the need for international co-ordination in democratic technology governance (Ely, Van Zwanenberg, & Stirling, 2011). Fisher, Mahajan and Mitcham call for the "reflexive participation by scientists and engineers in the internal governance of technology development" (Mahajan, 1985). India and other countries of the global south also see governance as an issue (Srivastava & Anand, 2013). Interestingly, when one searches the phrase "governance of science and technology" in Google Scholar, it only currently leads to a single result period, a result which relates to disabled people.

Brain machine interface (BMI)/Brain computer interface (BCI). Communication among humans has changed throughout history mostly due to the constant appearance of new disruptive communication devices. Thought control as one possible aspect of communication receives increasing attention with the continued advancement in brain-machine interfaces or brain computer interfaces. BMI/BCI as a therapeutic intervention for disabled people is just one application of such devices (Awan, Lozano, & Hamani, 2009; Demetriades, Demetriades, Watts, & Ashkan, 2010). The potential scope has widened far beyond its therapeutic role for people with disabilities to the military (Kotchetkov, Hwang, Appelboom, Kellner, & Connolly Jr, 2010), space (Menon et al., 2009), gaming (Neurogaming conference, 2013), and entertainment (Patil & Turner, 2008) applications. Indeed, studies show these devices acting in tandem with robotic limbs, smart wheelchairs, communication devices (Birbaumer,

Murguialday, & Cohen, 2008; Demetriades et al., 2010; Friehs, Zerris, Ojakangas, Fellows, & Donoghue, 2004; Mason, Bashashati, Fatourechi, Navarro, & Birch, 2007; Nicolelis, 2001) or robot surrogates (Sebastian Anthony, 2012).

Work is underway on brain-brain interactions, with one study showing that a human can control an animal through thought (although in a limited way so far) (Sebastian Anthony, 2013b; Yoo, Kim, Filandrianos, Taghados, & Park, 2013). Brain hacking has already been described as an issue for various neuro-interventions, including those related to BMI (Sebastian Anthony, 2013a; Leggett, 2009; Takagi, 2012).

Social robotics. Social robotics is an emerging field that designs robots to engage in social interaction with humans and with each other (Angulo et al., 2012; Boccanfuso & O'Kane, 2011; Cabibihan, Javed, Ang Jr, & Aljunied, 2013; Flandorfer, 2012; Fridin & Belokopytov, 2014; Heylen, van Dijk, & Nijholt, 2012; Kachouie, Sedighadeli, Khosla, & Chu, 2014; Keren & Fridin, 2014; Lakatos et al., 2014; Leite et al., 2012; Mordoch, Osterreicher, Guse, Roger, & Thompson, 2012; Prado, Simplicio, Lori, & Dias, 2012; Stafford, MacDonald, Li, & Broadbent, 2014; van den Brule, Dotsch, Bijlstra, Wigboldus, & Haselager, 2014; Wainer, Dautenhahn, Robins, & Amirabdollahian, 2014; Welch, Lahiri, Warren, & Sarkar, 2010; Wu, Fassert, & Rigaud, 2012; Yumakulov, Yergens, & Wolbring, 2012). Applications that could help disabled people range from monitoring the person to providing companionship to assisting with certain tasks (Wolbring & Yumakulov, 2014; Yumakulov et al., 2012).

But many people have concerns about this potential reality. In a recent study, 60% of EU citizens said that robots should be banned from caring for children, elderly people and people with disabilities, and only 4% thought robots should be used for disabled people (European Commission, 2012). However, at the same time, social robots offer promise in alleviating the human resource and economic pressures on health care systems (e.g., created by growing elderly populations) (Sparrow & Sparrow, 2006).

Human enhancement. So far, physical,

cognitive, and mental abilities are linked to the species-typical. Lack of certain abilities is seen as impairments or a defect. The discourse around impairment is highly contentious, with competing ability/diversity and ability/deficiency narratives. The pressure to meet species-typical ability expectations is everywhere, and scientific and technological advancements increasingly are seen as a way to enable humans to outfit their bodies with beyond species-typical physical, cognitive and mental abilities, modifying the human body in such a way that it attains beyond species-typical abilities. And we see a move toward beyond species-typical ability expectations with an accompanying change of what is defined as an impairment and ill health (Wolbring, 2005, 2006, 2008a, 2008d, 2010b).

Neuro-enhancement/Cognitive enhancement. Cognitive enhancement or neuro-enhancement uses interventions to improve cognitive functioning *above* a level considered 'normal' or species typical for humans. Cognitive enhancement (CE) is a topic increasingly discussed (Bush, 2006; Hall & Lucke, 2010; J.C. Lucke, Bell, Partridge, & Hall, 2011; B. J. Partridge, S. K. Bell, J. C. Lucke, S. Yeates, & W. D. Hall, 2011) with ethical and philosophical issues identified (Banjo, Nadler, Reiner, & Priller, 2010; Forlini & Racine, 2012; Franke, Bonertz, Christmann, Engeser, & Lieb, 2012; Jayne C Lucke, 2012; Mendelsohn, Lipsman, & Bernstein, 2010; B. J. Partridge, S. K. Bell, J. Lucke, C., S. Yeates, & W. D. Hall, 2011). Disabled people and various groups linked to them "from parents to staff of disability service organizations to professionals working with disabled people to teachers"(Ball & Wolbring, 2014) to disability rights groups are underrepresented in the CE discourse.

In the next three sections we provide details of our research design and present the findings related to our two research questions: (a) is social work as an academic field engaged in the governance of technology as a means to influence how technologies are used, and (b) is the field of social work visible within the three concrete emerging technologies (social robotics, brain machine/brain computer interfaces, neuro-enhancement/cognitive

enhancement) and one general area of technology application (human enhancement). Finally, we discuss the findings with a particular focus on what the findings mean for relationship between social work and people with disabilities.

Experimental Section
Data Sources
Brain machine interface (BMI), brain computer interface (BCI), social robotics, neuro-enhancement, cognitive enhancement. The academic databases ScienceDirect, Scopus, EBSCO (All), and Web of Science were accessed through the University of Calgary Library and searched May 22, 2014, for the phrases brain machine interface (BMI), brain computer interface (BCI), social robotics, neuro-enhancement, cognitive enhancement, social work, disabled people and people with disabilities, alone or in various combinations. We also performed the same searches with Google Scholar.

Social work education. We accessed all (two) academic journals with social work education in the title that were still producing issues through the University of Calgary (Social Work Education and Journal of Social Work Education). We searched the two journals for articles that covered: (a) disabled people/people with disabilities; (b) technology in relation with disabled people/ people with disabilities (using search term disab*), and (c) technology and governance. We gleaned 151 relevant articles covering disabled people or people with disabilities, 88 articles on technology and disab*, and 51 articles on technology and governance.

We uploaded the articles into ATLAS.ti©, a qualitative data analysis software (CAQDAS). The literature underwent separate analysis by two researchers in Atlas.ti 7 to increase the reliability of our findings.

Coding
We used ATLAS.ti©, for generating qualitative and quantitative data. After all sources were imported into ATLAS.ti©, we performed hermeneutical keyword coding. We employed various coding strategies, one being a deductive strategy using a set of predetermined terms fitting our coding analytical frameworks and the research questions. The words used deductively were: disab*, purpose, "purpose of", tech*, ability, able, theory, oppression. We then used the Query tool to determine the incidents of the terms: of disab* and tech* (n=9 articles), disab* and purpose (n=9), disab* and oppression (n=31), oppression and ability (n=2), oppression and able (n=10), oppression and purpose (n=5), oppression and tech* (n=6), purpose and tech* (n=6), governance and tech (n=2) mentioned within the same paragraph and marked them as "supercodes". All articles containing supercodes and containing the phrase "purpose of" were read fully to generate quotes and to look for context around the CFP focus themes. For any given source, at least two authors performed the coding to increase reliability, and we resolved any differences during our discussions.

Limitation
As to the articles we downloaded for content analysis, we only investigated two academic journals. There might be more journals and articles that focus on social work education but do not have that phrase in the title or they are not available through the University of Calgary; however, our work does not aim to generalize. In the same way for the quantitative data, we only searched five academic databases.

Results
Who is mentioned with which technology?
See Table 1.
Purpose of Technology
Although there were n=6 articles with technology and purpose in the same paragraph, only one article talked about the purpose of technology, stating that technology enables "quality of life and expanded opportunities for vulnerable groups" and that technology can assist with the social inclusion of all (Sharkey, 2000).
Technology and Disabled People
Although n=9 articles had technology and disab* in the same paragraph, only one article addressed the use of technology for people with disabilities. Most articles talked about education delivery to disabled people in general but did not focus on the technology. This one article

Table 1: Frequency of social work mentioned in relation to various technologies

Keywords	EBSCO (all)(abstract) +(abstract) ++ (abstract) +++ (all text)	Scopus (title, abstract, keyword)	Science direct (title, abstract, keyword)	Web of Science (topic)	Google Scholar
Brain machine interface	763	1,377	169	694	7,090
Brain computer interface	3,183	6,148	573	3,210	22,600
Social robotics	93	253	8	114	3,780
Human enhancement	629	204	25	109	5,090
Neuro/cognitive enhancement	201/1,863	111/762	14/242	87/696	1,290/12,200
Technology governance/governance of technology	657/261	199/21	16/5	87/8	6,310/695
Social work	156,908	33,786	871	17,422	1,480,000
+social robot	0	0	0	0	27/5 relevant
+brain machine interface	0	0	0	0	12/0 relevant
+brain computer interface	1	0	0	0	55/1 relevant
+human enhancement	0	0	0	0	0 relevant
+neuro/cognitive enhancement	0/3	0/7	0/0	0/2	27(0 relevant)
+technology governance/governance of technology	0/0	0/0	0/0	0/0	91/6 but none relevant
Social work	156,908	33,786	871	17422	1,480,000
+disabled people	1622 (full text)	72	2	35	17400
++social robot	0	0	0	0	8/1 relevant
++brain machine interface	0	0	0	0	1 relevant
++brain computer interface	0	0	0	0	1 relevant
++human enhancement	0	0	0	0	1 relevant
++neuro/cognitive enhancement	0/0	0/2	0/0	0/0	0/0
Social work		33,786	871	17,422	1,480,000
+people with disabilities	2,301 (full text)	88	2	26	17,400
++social robot	0	0	0	0	8/1 relevant
++brain machine interface	0	0	0	0	1 relevant
++brain computer interface	0	0	0	0	1 relevant
++human enhancement	0	0	0	0	1 relevant
++neuro/cognitive enhancement	0	0/0	0	0/0	0/0

(Sharkey, 2000) highlights the view that technology is soon to be a major aspect of care and an important factor enabling disabled and older people to remain in the community with the help of communications equipment (telephones and alarms), equipment to aid problems of mobility, personal and domestic care, `smart homes' and telemedicine/telecare. The article further questions electronic tagging, with its "dangers of excessive surveillance and over-reliance on technology at the expense of face-to-face support" (Sharkey, 2000). Interestingly, the article gives an immediate reason for the acceptance of electronic tagging, noting that it is better than the alternatives, even though it represents "a continuation of existing safety and restraint methods" (Sharkey, 2000). The article also links communication and internet technology to equal opportunities issues and anti-oppressive issues by asking about access to the technology and mentioning the concepts of "information rich" and "information poor" (Sharkey, 2000).

Technology and Governance

Within our downloaded literature we found n=9 articles that covered governance and "social work" in the same paragraph. Of that, none covered technology governance but all talked about governance of social work. Furthermore, table 1 revealed no hits on social work and technology governance in five academic databases.

Discussion

Our results indicate that social work is not visible in technology governance and in the discourses around emerging technologies and new applications. Governance of science and technology is seen as so important that the field of anticipatory governance was generated. Anticipatory governance aims at understanding the potential social, ethical, and political impacts of emerging discourses through "reflexive" practice, foresight analysis, and the engagement and integration of relevant stakeholders (Guston, 2014). We posit that disabled people and social work practitioners, researchers, educators, and students are all relevant stakeholders. And if the impact discourse is moving to a dynamic where the impact is debated before the products is on the market, that makes it imperative that stakeholders

such as disabled people and social work practitioners, researchers, educators, and students contribute to this discussion. Clearly, social work educators, practitioners and researchers have to engage with technology development in a foresight manner if they want to have a say in the product development. Given our findings, however, we submit that social work education and research has to adopt a much more creative and forward thinking mentality around its engagement with emerging technologies.

Their current disengagement has many implications for the relationship between social work and disabled people, and also for the ability of social work students to understand future challenges for themselves and their profession independent of whether they are engaged with people with disabilities. Next, we highlight two key issues: identity and global agenda.

Identity

Chand, Clare and Dolton explain the opening module on the Diploma in Social Work at the University of Central England has the objectives to equip students "with a knowledge and understanding of their personal values and beliefs, and how these might complement and/or conflict with professional/organisational values; increasing students' self-awareness, particularly in relation to issues of power, discrimination and oppression; analysing how different groups in society are disadvantaged because of their gender, ethnicity, disability, sexuality and age, and the role of social work within this context" (Chand, Clare, & Dolton, 2002). Heenan suggests that the concept of the social model of disability enables "students to reassess and review their own values and assumptions" (Heenan, 2005). And Dupré asserts that "the study of disability culture provides an important focus for examining the dynamics of cultural oppression and how individual, cultural and structural levels of oppression intersect to create 'ableism' (Dupré, 2012).

One of the main premises of how social work students perceive themselves and people with disabilities are based on ability expectations. Ability expectations are based on species-typical body-linked ability expectation. That is, humans

are meant to walk but not to fly, but birds are meant to fly. If these species-typical body-linked abilities are not met, one perceives oneself and is perceived by others as impaired. The term ableism was coined to question species-typical, normative body ability expectations and prejudice and discrimination experienced by people whose body ability functioning was labelled as impaired and in need of being fixed as much as possible towards the species-typical (Campbell Kumari, 2001; Carlson, 2001; Finkelstein, 1996; Overboe, 2007; Wolbring, 2008b, 2008c, 2012b). With technologies that enable beyond species-typical body linked abilities, a change in the concept of ableism is becoming evident, in which the ability to obtain beyond species-typical, body-related abilities through various means is increasingly discussed, with some even saying that one might be morally obliged to enhance oneself (Wolbring, 2012a). A 2006 Association for the Advancement of Science workshop (Williams, 2006) looked into the dynamic of human enhancement and concluded that the following ability desires are the main drivers for human enhancements: (1) to keep one's local and global competitive advantage; (2) to live securely; and (3) to maintain one's quality of life and one's consumer life-style.

Human enhancement is questioning the core of identity of the species-typical social work students who see themselves as "normal", but it also changes the relationship between the so-called sub species-typical people (those traditionally labeled as impaired) and social work students. An increasing amount of therapeutic interventions are envisioned to allow recipients to outperform the species-typical body. Brain machine interfaces/brain computer interfaces, for example, could allow those traditionally labeled as impaired to thought control computer linked devices that can include social robots, wheelchairs, computer games or a future version of vacuum cleaners. That means social work students face the situation where the so-called impaired person outperforms them. In this scenario, social work students become the new impaired person in relation to the previously impaired person who, due to a therapeutic

intervention, outperforms a so-called "normal" person.

Human enhancement also leads to all kind of questions around sustainability of healthcare and the future make-up of the 'health care consumer' who are clients for some social workers.

It might create a whole new client group for social workers, who will engage with the techno-poor (Wolbring, 2006, 2008a), the ones who cannot afford or do not want enhancements. It is conceivable that many of today's social work students might become the techno poor clients of future social work professionals.

Some researchers have described a pattern of "reluctance among student social workers to plan future careers working with people with physical impairments" (Rees & Raithby, 2012). Social work programs still struggle with how to deal with people currently labeled as impaired. In 2002, an article stated that social work curricula primarily presents and examines disability through a diagnostic lens (Gilson & DePoy, 2002). On the other hand, a 2011 article outlines the involvement of the School of Social Work in developing the Interdisciplinary Disability Studies Program at the University of Windsor, Ontario, Canada in September 2008 (Carter, Leslie, & Angell, 2011).

Disability rights activists coined the earlier mentioned term "ableism" to question species-typical, normative body ability expectations and prejudice and discrimination experienced by people whose body ability functioning was labelled as impaired and in need of being fixed as much as possible towards the species-typical.

They are the only ones with a foundation from where one can question the enhancement form of ableism (Wolbring, 2010b, 2012a), which would be the expectation of beyond species-typical, normative body abilities and involves the prejudice and discrimination experienced by people whose body ability functioning will be labelled as impaired due to not being enhanced beyond the species-typical and therefore in need of being fixed as much as possible towards existing enhancement levels. The study of disability culture provides an important focus for examining the dynamics of ability based cultures

period, an area that will increasingly define not only human-human but also human-animal and human-nature relationships (Wolbring, 2014). As such, we submit that working on ableism is of high relevance to the numerous purposes of social work research, education and practice.

Global Social Agenda:

The International Federation of Social Workers (IFSW), the International Association of Schools of Social Work (IASSW), and the International Council on Social Welfare (ICSW), introduced a global social agenda in 2012 which has four aims:

(1) Promoting social and economic equalities
(2) Promoting the dignity and worth of peoples
(3) Working toward environmental sustainability
(4) Strengthening recognition of the importance of human relationships (Gamble, 2012)

Human enhancement poses direct challenges for items 1, 2 and 4 and, although it might not directly challenge area 3, human enhancement will impact various sustainability areas such as social sustainability. Biological enhancement definitely poses challenges for social workers, social work research, social work students and social work education in the global north and global south as it will increase ability inequity and inequality (Wolbring, 2010a). Furthermore, other emerging technologies may pose challenges for the global agenda and have the potential to impact social work practice and its identity and scope. The field of social robotics is just one example. If the vision of the social robotics field comes to pass, social robots will be able to interact socially with humans and be companions, helpers and problem solvers. Social robots might even eventually take over many jobs currently performed by social workers. Many social workers work with elderly people, and this group is also a targeted population for robot use (Wolbring & Yumakulov, 2014). Social robots pose questions around at items two and four, at least, of the global agenda. If not used in an ethical and thoughtful manner, social robots may weaken human relationships and diminish the dignity and worth of the individuals due to their surveillance abilities and other aspects.

Conclusion

A 2009 Human Performance Study, written for the Directorate General for internal policies, Policy Dept. A: Economic and Scientific Policy Science and Technology Options Assessments of the European Parliament, concluded that human enhancements would strain social solidarity and healthcare systems, and potentially impact health budgets. The report noted that Europe has no platform to monitor and discuss human enhancement issues and to bridge the gap between the needs and the concerns of the broader public and the practitioners and experts (Coenen et al., 2009). The same gap exists in other countries, including Canada.

Our results suggest that social work education does not train students in the emerging technologies we investigated and in technology governance, and that social work researchers and social work practitioners are missing from the discourses around technology and how it is used and governed. We submit that social work educators, researchers and practitioners have a vital role to play in technology discussions, right from the beginning of their emergence and their governance. Given the purpose of social work outlined in the beginning of the article, the contribution of the social work field to this endeavor could be tremendous.

We point to the example of human enhancement as evidence of how vital it is for social work (research education and practice) to engage with the cultural reality of ableism and to engage with people with disabilities beyond the diagnostic label. We also suggest that people with disabilities and the disability studies field have unique expertise to offer in the engagement with the ability expectation changes to come with the enhancement technologies (Wolbring, 2012b) and that that expertise would benefit social work education, research, students, and practitioners. On the other hand, it is also important for people with disabilities that social work engages with the challenges posed by the technologies mentioned so that they can fulfill their positive agenda toward people with disabilities as outlined in the global social agenda.

In regards to our own relationship to social work, we both work outside the social work field. We engage so far with social work through our attendance at the Canadian Disability Studies Conference and thus interact with social worker researchers who already are sensitized to the issue of ability expectations and disability issues. We are in the process of engaging with a university social work program as part of a collaboration with the university's social robot design laboratory. We intend to collaborate on a larger scale with social work programs and their faculty and students on the teaching and research level, as well as with social workers. Indeed, we hope the concrete data and thoughts we've presented in this article will be used to engage more with social work programs and their students and faculty along with social workers. Although not part of this article, one of us (GW) coined the field of Ability Studies in 2008 (Wolbring, 2008d, 2012b) as one tool to make interdisciplinary collaborations easier. We both believe that our work can benefit social work education and social work students, faculty and social workers, and we strongly believe that our work can also benefit from interactions with social work students, faculty and social workers. As to student collaborations, GW has an interdisciplinary student research team ranging from first year undergraduate to Ph.D. students that could easily incorporate social work students and benefit from their unique insights.

References

Angulo, C., Garriga-Berga, C., Luaces, C., Perez-Payarols, J., Albo-Canals, J., & D-¦az, M. (2012). Pain and Anxiety Treatment based on Social Robot Interaction with Children to improve Patient Experience. Ongoing Research. *JARCA 2012*.

Angulo, C., Garriga-Berga, C., Luaces, C., Perez-Payarols, J., Albo-Canals, J., & Diaz, M. (2012). Pain and Anxiety Treatment based on Social Robot Interaction with Children to improve Patient Experience. Ongoing Research. *JARCA 2012*.

Anthony, S. (2012). Real-life Avatar: The first mind-controlled robot surrogate. from http://www.extremetech.com/extreme/132389-real-life-avatar-the-first-mind-controlled-robot-surrogate

Anthony, S. (2013a). Hackers backdoor the human brain, successfully extract sensitive data. from http://www.extremetech.com/extreme/134682-hackers-backdoor-the-human-brain-successfully-extract-sensitive-data

Anthony, S. (2013b). Harvard creates brain-to-brain interface, allows humans to control other animals with thoughts alone. from http://www.extremetech.com/extreme/162678-harvard-creates-brain-to-brain-interface-allows-humans-to-control-other-animals-with-thoughts-alone

Awan, N. R., Lozano, A., & Hamani, C. (2009). Deep brain stimulation: current and future perspectives. *Neurosurgical Focus*, 27(1), 2.

Ball, N., & Wolbring, G. (2014). Cognitive Enhancement: Perceptions Among Parents of Children with Disabilities. *Neuroethics*, online first open access 1-20.

Banjo, O. C., Nadler, R., Reiner, P. B., & Priller, J. (2010). Physician attitudes towards pharmacological cognitive enhancement: safety concerns are paramount. *Plos One*, 5(12), e14322.

Birbaumer, N., Murguialday, A. R., & Cohen, L. (2008). Brain-computer interface in paralysis. *Current opinion in neurol*ogy, 21(6), 634.

Boccanfuso, L., & O'Kane, J. M. (2011). CHARLIE: An adaptive robot design with hand and face tracking for use in autism therapy. *International journal of social robotics*, 3(4), 337-347.

Bush, S. S. (2006). Neurocognitive enhancement: ethical considerations for an emerging subspecialty. *Applied neuropsychology*, 13(2), 125-136.

Cabibihan, J.-J., Javed, H., Ang Jr, M., & Aljunied, S. M. (2013). Why robots? A survey on the roles and benefits of social robots in the

therapy of children with autism. *International journal of social robotics*, 5(4), 593-618.

Campbell Kumari, F. (2001). Inciting Legal Fictions: 'Disability's' Date with Ontology and the Ableist Body of the Law. *Griffith Law Review*, 10(1), 42.

Carlson, L. (2001). Cognitive Ableism and Disability Studies: Feminist Reflections on the History of Mental Retardation. *Hypatia*, 16(4), 124-146.

Carter, I., Leslie, D., & Angell, B. (2011). Promoting accessibility and adding value to social work education. *Professional Development: The International Journal of Continuing Social Work Education*, 14 (1).

Chand, A., Clare, J., & Dolton, R. (2002). Teaching anti-oppressive practice on a diploma in social work course: lecturers' experiences, students' responses and ways forward. *Social Work Education*, 21(1), 7-22.

Coenen, C., Schuijff, M., Smits, M., Klaassen, P., Hennen, L., Rader, M., & Wolbring, G. (2009). Human Enhancement Study *Science and Technology Options Assessment S T O A*.

Council of Social Work Education. (2014). Draft 1 of the 2015 Educational Policy and Accreditation Standards (EPAS). from http://www.cswe.org/File.aspx?id=69943

Cox, P., & Hardwick, L. (2002). Research and critical theory: their contribution to social work education and practice. *Social Work Education*, 21(1), 35-47.

De la Mothe, J. (2004). The institutional governance of technology, society, and innovation. *Technology in Society*, 26(2), 523-536.

Demetriades, A. K., Demetriades, C. K., Watts, C., & Ashkan, K. (2010). Brain-machine interface: the challenge of neuroethics. *The surgeon : journal of the Royal Colleges of Surgeons of Edinburgh and Ireland*, 8(5), 267-269. doi: 10.1016/j.surge.2010.05.006

Dupré, M. (2012). Disability culture and cultural competency in social work. *Social Work Education*, 31(2), 168-183.

Ely, A., Van Zwanenberg, P., & Stirling, A. (2011). New models of technology assessment for development.

European Commission. (2012). Public Attitudes towards Robots *European Commission Special Eurobarometer* (Vol. 382). Online: European Commission.

Finkelstein, V. (1996). Modelling disability. *Disability Studies Program, Leeds University, UK*. http://www.leeds.ac.uk/disability-studies/archiveuk/finkelstein/models/models.htm

Flandorfer, P. (2012). Population Ageing and Socially Assistive Robots for Elderly Persons: The Importance of Sociodemographic Factors for User Acceptance. *International Journal of Population Research*, 2012.

Forlini, C., & Racine, E. (2012). Added Stakeholders, Added Value (s) to the Cognitive Enhancement Debate: Are Academic Discourse and Professional Policies Sidestepping Values of Stakeholders? *AJOB Primary Research*, 3(1), 33-47.

Franke, A. G., Bonertz, C., Christmann, M., Engeser, S., & Lieb, K. (2012). Attitudes toward cognitive enhancement in users and nonusers of stimulants for cognitive enhancement: A pilot study. *AJOB Primary Research*, 3(1), 48-57.

Fridin, M., & Belokopytov, M. (2014). Acceptance of socially assistive humanoid robot by preschool and elementary school teachers. *Computers in Human Behavior*, 33, 23-31.

Friehs, G. M., Zerris, V. A., Ojakangas, C. L., Fellows, M. R., & Donoghue, J. P. (2004). Brain–machine and brain–computer interfaces. Stroke, 35(11 suppl 1), 2702-2705.

Furness, S., & Gilligan, P. (2004). Fit for purpose: issues from practice placements, practice teaching and the assessment of students' practice. *Social Work Education*, 23(4), 465-479.

Gamble, D. N. (2012). Well-Being in A Globalized World: Does Social Work Know How to Make It Happen? *Journal of Social Work Education*, 48(4), 669-689.

Gilson, S. F., & DePoy, E. (2002). Theoretical approaches to disability content in social work education. *Journal of Social Work Education*, 153-165.

Guston, D. (2014). Understanding 'anticipatory governance'. *Social Studies of Science*, 44(2), 218-242. doi: 10.1177/0306312713508669

Hall, W. D., & Lucke, J. C. (2010). The enhancement use of neuropharmaceuticals: more scepticism and caution needed. *Addiction*, 105(12), 2041-2043.

Heenan, D. (2005). Challenging Stereotypes Surrounding Disability and Promoting Anti oppressive Practice: Some Reflections on Teaching Social Work Students in Northern Ireland. *Social Work Education*, 24(5), 495-510.

Heylen, D., van Dijk, B., & Nijholt, A. (2012). Robotic Rabbit Companions: Amusing or a nuisance? *Journal on Multimodal User Interfaces*, 5(1-2), 53-59.

Kachouie, R., Sedighadeli, S., Khosla, R., & Chu, M.-T. (2014). Socially Assistive Robots in Elderly Care: A Mixed-Method Systematic Literature Review. *International Journal of Human-Computer Interaction*, 30(5), 369-393.

Keren, G., & Fridin, M. (2014). Kindergarten Social Assistive Robot (KindSAR) for children's geometric thinking and metacognitive development in preschool education: A pilot study. *Computers in Human Behavior, 35, 400-412.*

Knauth, N., & Mazanova, M. (2014). How social workers assess sexual addiction among adolescents.

Kotchetkov, I. S., Hwang, B. Y., Appelboom, G., Kellner, C. P., & Connolly Jr, E. S. (2010). Brain-computer interfaces: military, neurosurgical, and ethical perspective. *Neurosurgical Fo*cus, 28(5), 25.

Lakatos, G., Janiak, M., Malek, L., Muszynski, R., Konok, V., Tchon, K., & Miklósi, Á. (2014). Sensing sociality in dogs: what may make an interactive robot social? *Animal cognition,* 17(2), 387-397.

Leggett, H. (2009). The next hacking frontier: Your brain. *Wired Magazine*. from http://www.wired.com/2009/07/neurosecurity/

Leite, I., Pereira, A., Castellano, G., Mascarenhas, S., Martinho, C., & Paiva, A. (2012) Modelling empathy in social robotic companions. (7138 LNCS ed., pp. 135-147).

Lucke, J. C. (2012). Empirical research on attitudes toward cognitive enhancement is essential to inform policy and practice

guidelines. *AJOB Primary Re*search, 3(1), 58-60.

Lucke, J. C., Bell, S., Partridge, B., & Hall, W. D. (2011). Deflating the neuroenhancement bubble. *AJOB Neuroscience*, 2(4), 38-43.

Mahajan, V. (1985). *Models for innovation diffusion* (Vol. 48): Sage Publications, Inc.

Mason, S. G., Bashashati, A., Fatourechi, M., Navarro, K. F., & Birch, G. E. (2007). A comprehensive survey of brain interface technology designs. *Annals of Biomedical Engineering*, 35(2), 137-169.

McGarry, D., & Storey, A. (2014). Mental health in the interprofessional context. *Mental Health*, 311.

Mendelsohn, D., Lipsman, N., & Bernstein, M. (2010). Neurosurgeons' perspectives on psychosurgery and neuroenhancement: a qualitative study at one center: Clinical article. *Journal of Neurosurgery*, 113(6), 1212-1218.

Menon, C., de Negueruela, C., Millán, J. R., Tonet, O., Carpi, F., Broschart, M., . . . Sepulveda, F. (2009). Prospects of brain-machine interfaces for space system control. *Acta Astronautica*, 64(4), 448-456.

Moosa-Mitha, M. (2014). Using citizenship theory to challenge nationalist assumptions in the construction of international social work education. *International Social W*ork, 57(3), 201-208.

Mordoch, E., Osterreicher, A., Guse, L., Roger, K., & Thompson, G. (2012). Use of social commitment robots in the care of elderly people with dementia: A literature review. *Maturitas*.

Moriarty, J., & Manthorpe, J. (2014). Controversy in the curriculum: what do we know about the content of the social work qualifying curriculum in England? *Social Work Education*, 33(1), 77-90.

Neurogaming conference. (2013). NeuroGaming Conference and Expo. from http://www.neurogamingconf.com/

Nicolelis, M. A. L. (2001). Actions from thoughts. *Nature*, 409(6818), 403-408.

Overboe, J. (2007). Vitalism: Subjectivity Exceeding Racism, Sexism, and (Psychiatric)

Ableism. *Wagadu: A Journal of Transnational Women's and Gender Studies*, 4(2), 23-34.

Parsons, R. J. (1991). Empowerment: Purpose and practice principle in social work. *Social Work with Groups*, 14(2), 7-21.

Partridge, B. J., Bell, S. K., Lucke, J., C., Yeates, S., & Hall, W. D. (2011). Smart Drugs "As Common As Coffee": Media Hype about Neuroenhancement. *Plos One*, 6(11), e28416. doi: doi:10.1371/journal.pone.0028416

Partridge, B. J., Bell, S. K., Lucke, J. C., Yeates, S., & Hall, W. D. (2011). Smart Drugs "As Common As Coffee": Media Hype about Neuroenhancement. *PloS one*, 6(11), e28416.

Patil, P. G., & Turner, D. A. (2008). The development of brain-machine interface neuroprosthetic devices. *Neurotherapeutics,* 5 (1), 137-146.

Prado, J. A., Simplicio, C., Lori, N. F., & Dias, J. (2012). Visuo-auditory Multimodal Emotional Structure to Improve Human-Robot-Interaction. *International journal of social robotics*, 4(1), 29-51.

Rees, J., & Raithby, M. (2012). Increasingly Strange Bedfellows? An Examination of the Inclusion of Disability Issues in University-and Agency-based Social Work Education in a Welsh Context. *Social Work Education*, 31(2), 184-201.

Reisch, M. (2013). Social Work Education and the Neo-Liberal Challenge: The US Response to Increasing Global Inequality. *Social Work Education*, 32(6), 715-733.

Rimmer, C., YoungIndependentPeoplePresentingEducational Entertainment, Annette, & Harwood, K. (2004). Citizen participation in the education and training of social workers. *Social Work Education,* 23(3), 309-323.

Rock, L. F. (2013). The Role of Social Work Education in Advancing Social Development in the English-speaking Caribbean. *Social Work Education*, 32(6), 734-747.

Sharkey, P. (2000). Running hard to stand still: communication and information technology within social work training. *Social Work Education*, 19(5), 513-520.

Soydan, H., & Sundell, K. (2011). Outcome Studies of Social, Behavioral, and Educational Interventions Emerging Issues and Challenges. *Research on Social Work Pr*actice, 21(6), 617-618.

Sparrow, R., & Sparrow, L. (2006). In the hands of machines? The future of aged care. *Minds and Machines*, 16(2), 141-161.

Srivastava, N., & Anand, M. (2013). Nanotechnology in India: A Case for Multi-level Governance. *Capabilities and Governance of Nanotechnology in the Developing World*, 209.

Stafford, R. Q., MacDonald, B. A., Li, X., & Broadbent, E. (2014). Older People's Prior Robot Attitudes Influence Evaluations of a Conversational Robot. *International journal of social robotics*, 6(2), 281-297.

Takagi, M. (2012). Safety and Neuroethical Consideration of Deep Brain Stimulation as Psychiatric or Dementia Treatment. *Asian Bioethics Review*, 4(1), 48-64.

van den Brule, R., Dotsch, R., Bijlstra, G., Wigboldus, D. H., & Haselager, P. (2014). Do Robot Performance and Behavioral Style affect Human Trust? *International journal of social robotics*, 1-13.

Wainer, J., Dautenhahn, K., Robins, B., & Amirabdollahian, F. (2014). A pilot study with a novel setup for collaborative play of the humanoid robot KASPAR with children with autism. *International journal of social robotics*, 6(1), 45-65.

Walker, S., & Beckett, C. (2011). *Social work assessment and intervention*: Russell House Publishing.

Welch, K. C., Lahiri, U., Warren, Z., & Sarkar, N. (2010). An approach to the design of socially acceptable robots for children with autism spectrum disorders. *International journal of social robotics*, 2(4), 391-403.

Williams, A. E. (2006). Good, Better, Best: The Human Quest for Enhancement Summary Report of an Invitational Workshop Convened by the Scientific Freedom, Responsibility and Law Program *American Association for the Advancement of Science* June 1-2, 2006. AmericanAssociation for the Advancement of Science (AAAS). from http://www.aaas.org/

sites/default/files/migrate/uploads/ HESummaryReport1.pdf

Wolbring, G. (2003). Disability rights approach towards bioethics. *J of Disability Studies*, 14 (3), 154-180.

Wolbring, G. (2005). HTA Initiative #23 The triangle of enhancement medicine, disabled people, and the concept of health: a new challenge for HTA, health research, and health policy. Alberta Heritage Foundation for Medical Research (AHFMR) webpage: Alberta Heritage Foundation for Medical Research (AHFMR).

Wolbring, G. (2006). The unenhanced underclass. In J. M. Wilsdon, P (Ed.), *Better Humans? The politics of human enhancement*: Demos Institute.

Wolbring, G. (2008a). Ableism, Enhancement Medicine and the techno poor disabled. In P. Healey & S. Rayner (Eds.), *Unnatural Selection: The Challenges of Engineering Tomorrow's People*: Earthscan.

Wolbring, G. (2008b). "Is there an end to out-able? Is there an end to the rat race for abilities?". *Journal: Media and Culture*, 11(3).

Wolbring, G. (2008c). The Politics of Ableism. *Development*, 51(2), 252-258.

Wolbring, G. (2008d). Why NBIC? Why Human Performance Enhancement? Innovation; *The European Journal of Social Science Research*, 21(1), 25-40. doi: 10.1080/13511610802002189

Wolbring, G. (2010a). Ableism and Favoritism for Abilities Governance, Ethics and Studies: New Tools for Nanoscale and Nanoscale enabled Science and Technology Governance. In S. Cozzens & J. M.Wetmore (Eds.), *The Yearbook of Nanotechnology in Society*, vol. II: The Challenges of Equity and Equality (pp. 89-104). New York: Springer.

Wolbring, G. (2010b). Nanotechnology and the Transhumanization of Health, Medicine, and Rehabilitation. In D. Lee Kleinmann, J. Delborne, K. Cloud-Hansen & J. Handelsman (Eds.), (pp. 290-303). New Rochelle, NY: Mary Ann Liebert.

Wolbring, G. (2012a). Ethical Theories and Discourses through an Ability Expectations and

Ableism Lens: The Case of Enhancement and Global Regulation. *Asian Bioethics Review*, 4 (4), 293-309.

Wolbring, G. (2012b). Expanding Ableism: Taking down the Ghettoization of Impact of Disability Studies Scholars. *Societies,* 2(3), 75-83. doi: 10.3390/soc2030075

Wolbring, G. (2014). Ability Privilege: A needed addition to privilege studies. *Journal for Critical Animal Studies*, 12(2), 118-141.

Wolbring, G., & Yumakulov, S. (2014). Social Robots: Views of Staff of a Disability Service Organization. *International journal of social robotics*, Online First, 1-12.

Wu, Y.-H., Fassert, C., & Rigaud, A.-S. (2012). Designing robots for the elderly: Appearance issue and beyond. *Archives of gerontology and geriatrics*, 54(1), 121-126.

Yoo, S.-S., Kim, H., Filandrianos, E., Taghados, S. J., & Park, S. (2013). Non-Invasive Brain-to-Brain Interface (BBI): Establishing Functional Links between Two Brains. *Plos One*, 8(4), e60410.

Yumakulov, S., Yergens, D., & Wolbring, G. (2012). Imagery of people with disabilities within social robotics research. *Proc.ICSR, LNAI, 7621*, 168-177. doi: 10.1007/978-3-642-34103-8_17