The impact of equitable design on workplace outcomes

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INTRODUCTION

The Americans with Disabilities Act mandates that employees with disabilities be provided with workplace accommodations to remove barriers to essential job tasks. The practice of accommodating employees has traditionally focused on this use of assistive technologies and strategies. However, many employees with disabilities are able to do their jobs not only because they use accommodations, but because of supporting environmental designs and social practices that are already in the workplace.

The purpose of this study was to investigate the impact of universal design (UD) principles on the performance and participation of employees with disabilities in the workplace. Universal design is defined as the design of products and environments to be usable by all people to the greatest extent possible without the need for adaptation or specialized design [1]. UD is believed to increase job satisfaction, participation, and a sense of inclusion among all employees. In contrast to specialized AT accommodations that are added into the work environment, UD is everyday design that is integrated into the workplace to facilitate both activity (through increased usability) and participation (through enabling inclusivity).

That later outcome, participation, has been described as the “ultimate aim” of rehabilitation efforts [2]. We have defined workplace participation as an overall sense of inclusion at work that includes: 1) control and autonomy over one’s work, 2) opportunity for professional development, 3) recognition and value of one’s work, 4) a sense of fulfillment in work roles, and 5) being part of a team. Workplace participation supports job functions through the improved execution of work-related tasks, coordination of group activities, transmission of office culture, and team building [3-4]. It also plays an important role in enhancing work outcomes, such as higher individual and office productivity, increased satisfaction with colleagues and their work, and lower rates of employee turnover [5-7].

Our hypothesis is that higher levels of UD accommodation practices are associated with higher levels of work outcomes (activity performance, job performance, participation, and job satisfaction) among employees with disabilities. We tested this hypothesis through a national survey of employees with disabilities.

METHODS

Survey and Study Measures

Surveys were administered to currently-employed people with disabilities who had a variety of occupations and functional limitations. Participants answered questions about the physical and social environment UD features in their workplace, job performance, workplace participation, and job satisfaction. They also reported how their travel to and use of different spaces (e.g., workstation, meeting areas, break rooms) impacted their sense of inclusion and the reasons behind their answers. Most of the participants completed the survey at their own pace through an online survey, but they also had the option to have the questions administered over a phone interview.

Our measure of UD encompassed design features of parking areas, entrances, circulation routes, work stations, meeting spaces, and social gathering areas such as break rooms. Our primary global UD measure focused on the UD principle of Equitable Use, in particular, designs that provide the same means of use for all users and avoid segregating or stigmatizing any users. The measure represented a percentage of possible points depending on the types of UD features present. For example, UD points were awarded if an employee worked in the same location as his or her work group or could sit anywhere in meeting and break rooms. Points were also awarded if the elevators or ramps used to move between building levels were used by all employees, not just the employee with the disability.

Activity performance was measured by whether or not an employee had difficulty performing 15 workplace activities, which included getting to and using different workplace spaces (e.g., workstation, supervisor’s work area, coworker’s work areas, meeting spaces, informal gathering spaces such as breakrooms) and communicating with coworkers face-to-face or remotely. Scores for individual activities were collected, plus a composite score of the number of activities posing difficulties was calculated.

Two self-report measures of job performance were used. Employees rated their job performance on a scale of 0 (the worst job performance anyone could have at the job) to 10 (the performance of a top worker), using an item taken from the World Health Organization Health and Work Performance Questionnaire (WHO-HPQ) Short Form. They were also asked to evaluate their job performance compared to the performance of other workers who have a similar type of job, using a 7-item Likert scale.

Workplace participation was evaluated with the Workplace Participation Survey (WPS), a 10-item survey that asked about the employee's sense of inclusion during professional development activities, social events, and also his or her sense of being recognized as a valued member of a team by other employees and supervisor(s). The items used a 5-item Likert scale metric (1=Strongly agree, 2=Somewhat agree, 3=Somewhat disagree, 4=Strongly disagree, 0=Not Applicable). The WPS previously validated with people with mobility impairments [8]. For this study, the measure showed high internal consistency (Chronbach's alpha = 0.94)

Finally, job satisfaction was measured using the 36-item Job Satisfaction Survey (JSS), previously developed by Paul Spector [9]. The JSS evaluates nine dimensions of job satisfaction and overall job satisfaction. It shows high internal consistency (Chronbach's alpha = alpha 0.91)

Study Sample Description

Participants (N=88) were recruited through snowball sampling, originating from multiple disability-related organizations (e.g., RESNA, Centers for Independent Living, AT Act Projects). To be eligible to participate, employees needed to: 1) have a disability that they had disclosed to their employer, 2) be employed at least 20 hours per week in a physical work setting (e.g., office, retail store, factory), 3) travel to the workplace at least one day a week where they interacted with at least one other employee; and 4) be employed in their current job for at least one year.

Respondents reported a variety of functional difficulties. The majority were blind or had low vision (55.7%). Motor-related difficulties were also strongly represented (35.2% mobility difficulties, 19.3% reach/grasp difficulties). Twenty-six percent had a difficulty with communication (21.6% were deaf or hard of hearing; 10.2% had a speech difficulty). Cognitive difficulties related to executive function, memory, processing information, etc. were reported by 14.8% of the respondents.

Jobs represented included: Professionals (30.6%), Production Operators (30.6%), Clerical & Administrative (10.2%), Officials & Managers (10.2%), Technicians (10.2%), Sales Workers (6.1%), and Service Workers (2.0%).

RESULTS

Accommodation Use

Most employees used a combination of workplace accommodations and UD features. Employees reported using accommodations for using their workstation (55.3%) and communicating remotely (52.4%). Fewer (about 12-21%) used accommodations for moving around the workplace. Most respondents said their accommodations were very (45.7%) or somewhat effective (27.2%). Only 5.5% said they were somewhat or very ineffective. Surprisingly, 21.7% said that they did not use accommodations – though that does not eliminate their use of UD features. Accommodation effectiveness was significantly correlated with all of our employment outcome measures: activity performance, job performance compared to coworkers, workplace participation, and job satisfaction (to a 0.01 level); and with the self-rating of job performance (to a 0.05 level).

UD Equitable Use Score

Overall, the respondents' workplaces had UD Equitable Use scores that ranged from 0.52 to 1.00 (possible range 0 to 1), with a mean of 0.86 +/- 0.09. The scores for different aspects of the workplace are shown in Table 1.

Generally, the participants reported that their workplaces were designed to promote equitable use. Some areas that scored lower, suggesting that employees needed to perform in a way different from their coworkers included the entrance (e.g., not all entrances or paths to the entrance accessible), travel between floors (e.g., needing to take ramps or elevators instead of stairs), and meeting spaces and cafeteria. Citing several examples used earlier to describe the measure, 11% of the employees said that they worked in a different location than their work group. In addition, 84% reported that they had access to a meeting room where they could sit anywhere; 23% reported that their workplace included least one meeting area where they could only sit in a specific area, sometimes separate from the group.

Our hypothesis was that higher levels of UD accommodation practices would be associated with higher levels of work outcomes (activity performance, job performance, participation, and job satisfaction). Overall, this was proven for the UD principle of Equitable Use. The level of universal design in the workplace was significantly correlated (to a 0.01 level) with activity performance, workplace participation, and job satisfaction. It was also correlated (to a 0.05 level) with job performance compared to coworkers.

However, significant correlations to work outcomes varied depending on the aspect of the workplace, as also shown in Table 1. Activity performance was not measured for all aspects of the workplace, but showed a significant correlation with the design and use of the entrance, circulation routes, meeting spaces, and cafeterias. Overall job performance did not show significance with the exception of the equitable design of the person's workspace. However, job performance compared to coworkers was significantly correlated to the equitable use measure for the entrance, restrooms, break room, and cafeteria. Both participation and job satisfaction were correlated with the equitable use measure for the entrance and break room. In addition, significance correlation with participation was found for the entrance, travel between floors, restroom, break room, and cafeteria. Significant correlation with job satisfaction was found for the entrance, travel between floors, meeting spaces, and break room. Looking across the various aspects of the workplace, the design for equitable use of the entrance, travel between floors, meeting spaces, break room, and cafeteria had the most significant impact on performance, participation, and job satisfaction outcomes.

Table 1. Equitable Use Scores / Correlations to Work Outcomes for Different Aspects of the Workplace

	N	UD Score for Equitable Use (% possible total)		Pearson Correlation Coefficient				
		Mean	Median	Difficulty with activity performance	Job performance self-report	Performance compared to coworkers	Participation	Job satisfaction
Overall		0.86 (+/- 0.09)	0.87	**-0.545****	0.165	**0.392***	**0.386****	**0.291****
Parking	32	0.73 (+/- 0.36)	1.00	n/a	-0.74	-0.087	0.009	0.068
Entrance	86	0.78 (+/- 0.21)	0.80	**-0.407****	0.188	**0.425****	**0.357****	**0.276***
Circulation routes	85	0.91 (+/- 0.09)	0.92	**-0.391****	0.026	0.177	0.100	0.105
Travel between floors	84	0.72 (+/- 0.27)	0.71	-0.129	0.014	0.143	**0.347****	**0.280***
Work space	84	0.91 (+/- 0.23)	1.00	-0.140	**0.416***	0.195	0.178	0.092
Restrooms	86	0.93 (+/- 0.18)	1.00	n/a	0.243	0.278	**0.213***	0.183
Meeting spaces	69	0.80 (+/- 0.19)	0.800	**-0.269***	0.106	**0.336***	0.195	**0.254***
Break room	72	0.87 (+/- 0.18)	0.958	-0.184	0.241	**0.387***	**0.391****	**0.241***
Cafeteria	24	0.76 (+/- 0.27)	0.800	**-0.506***	0.359	**0.673***	**0.475***	0.018

**. Pearson correlation is significant at the 0.01 level (2-tailed).

*. Pearson correlation is significant at the 0.05 level (2-tailed).

DISCUSSION AND CONCLUSIONS

This is the first study to demonstrate the positive impact of universal design on work outcomes. Most significantly, it demonstrates that job satisfaction is highly correlated with universal design features, which are based on both a sense of inclusion (i.e., workplace participation) and task performance (i.e. work activities), in contrast to typical job accommodations, which are based task performance alone.

We did not see as strong a relationship between the presence of universal design features and job performance as we had expected. We inadvertently forgot to include both job performance questions in the initial launch of the survey, and as a result, we were missing data for about a third of the sample. In addition, the self-reports of job performance were compressed in the upper part of the scale (range 5-10, median = 9). The comparative measure to the job performance of other workers provided a greater range of responses and was more likely to show correlation.

As noted, the design for equitable use of the entrance, travel between floors, meeting spaces, and informal social gathering spaces (break room, cafeteria) had the most significant impact on performance, participation, and job satisfaction outcomes. This is significant in that traditionally workplace accommodation has focused on essential job tasks performed at the employee's workstation. Accessibility of common areas such as meeting spaces and break rooms are often overlooked, but are important for full participation in the workplace.

The analysis of our findings continues. This paper describes the impact of the overarching UD principle of Equitable Use, but we will also be exploring the impact of the other UD principles, such as Perceptible Information and Low Physical Effort.

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