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## Occupational therapy intervention approaches for successful employment outcomes for individuals with an intellectual disability

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Dittberner, K. A. M., Janssen, H. L., & Patel, S. U., 2020

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Dittberner, Janssen & Patel, 2020

## CRITICALLY APPRAISED TOPIC

### TITLE

Occupational therapy intervention approaches for successful employment outcomes for individuals with an intellectual disability

### AUTHORS

|                    |  |             |          |
|--------------------|--|-------------|----------|
| <b>Prepared by</b> | Kaitlyne A. M. Dittberner, OTS, Heidi L. Janssen, OTS, & Shivangi U. Patel, OTS, University of North Dakota School of Medicine and Health Sciences | <b>Date</b> | 5/1/2020 |
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### CLINICAL SCENARIO

“Disability is an umbrella term, covering impairments, activity limitations, and participation restrictions. Disability is thus not just a health problem. It is a complex phenomenon, reflecting the interaction between features of a person’s body and features of the society in which he or she lives” (Boyt Schell & Gillen, 2019, pp. 1196). Disability is a natural part of the human experience, and does not inhibit an individual’s ability to successfully contribute to society. “Intellectual disability is a developmental disability that is diagnosed before the age of 18 and expected to last throughout life. It involves significant limitations in intellectual functioning and adaptive behavior” (Johnson & Blaskowitz, 2017, p. 3). According to the US Bureau of Labor Statistics, persons with a disability have significantly lower employment rates than persons without a disability (2020). Disability is a natural part of the human experience, and does not inhibit an individual’s ability to successfully contribute to society. “The unemployment rate for adults with intellectual disability is more than twice as high as those without disabilities, with only 44% of adults with intellectual disability aged 21 to 64 years participating in the labor force (Johnson & Blaskowitz, 2017, p.4). Legislation has been implemented to support individuals with intellectual disabilities including American Disability Act (ADA), Individuals with Disabilities Education Act (IDEA), and Workforce Innovation and Opportunity Act (WIOA) (Cleary & Persch, 2020).

Work provides a sense of meaning and purpose in people’s lives. It produces opportunities for individuals to conceptualize a future-oriented view, pursue goals and dreams, enhance participation in the community, and obtain economic self-sufficiency (Cleary & Persch, 2020). Unfortunately, societal and cultural barriers make employment experiences and opportunities for individuals with intellectual disabilities a challenge. The difference in employment is affected by both person-centered factors and external factors that the person cannot control. Supportive services for individuals with intellectual disabilities regarding employment are warranted under the scope of occupational therapy practice. Enablement skills such as advocacy, education, and coaching can be used to support the transition from school to career (Turpin & Iwama, 2011).

Khayatzadeh-Mahani and colleagues explored barriers and identified the workplace, location, policies, and stigma to be external barriers that inhibit successful employment (2019). Person-centered approaches include vocational training for people with mild impairments that specifically target social skills, motor skills, and processing skills (American Occupational Therapy Association, 2014, p. S25-S26). Change, new tasks, and disruptions in routines after graduation become challenging for individuals with an intellectual disability (Khayatzadeh-Mahani, Wittevrongel, Nicholas & Zwicker, 2019). There is limited evidence regarding occupational therapy intervention approaches that work best for individuals with intellectual disabilities that are transitioning to employment.

Empowering groups of people that frequently experience a power imbalance in society can be achieved through the therapeutic use of enablement skills. The Canadian Model of Occupational Performance and



Engagement (CMOP-E) provides a theoretical foundation for empowering individuals with intellectual disability. This model recognizes the societal aspects that influence occupational performance as well as each person's unique identity and experiences. As such, CMOP-E has been chosen as the theoretical lens for this topic (Turpin & Iwama, 2011).

## **FOCUSED CLINICAL QUESTION**

What are the best person-centered interventions that occupational therapists can use to enable individuals with intellectual disabilities to achieve successful employment outcomes?

## **SUMMARY OF SEARCH**

Bush & Tasse, 2017; Morash-Macneil, Johnson, & Ryan, 2018; Shogren, Burke, Anderson, Antosh, Wehmeyer, LaPlante, & Shaw, 2018 have been analyzed in this review and consist of one non-randomized control trial, one systematic review, and one level IV exploratory study, respectively. The samples included people with intellectual disabilities, their caregivers/guardians, and people who work with individuals with intellectual and developmental disabilities (career counselors, social workers, teachers, etc) [Bush & Tasse, 2017; Morash-Macneil et al., 2018; Shogren et al. 2018]. The authors of the non-randomized control trial (Shogren et al., 2018) and the level IV exploratory study (Bush & Tasse, 2017) investigated person-centered skills such as self-determination and choice-making. Morash-Macneil and colleagues (2018) conducted a systematic review that evaluated the effectiveness of assistive technology for people with intellectual disability in work environments. A limitation that was present among the three articles is the potential for the Hawthorne and Rosenthal effect. Bias may have occurred during the administration of surveys and interviews taking into account that the population being researched is vulnerable. Additionally, the studies did not operationally define "mild", "moderate", and "severe" disabilities in detail. Despite these limitations, the studies had statistically significant positive results supporting the use of person-centered interventions for people with intellectual disability that are entering paid employment [Bush & Tasse, 2017; Morash-Macneil et al., 2018; Shogren et al. 2018].

## **CLINICAL BOTTOM LINE**

Individuals with intellectual disability experience several barriers that make obtaining and maintaining employment a challenge (Khayatzadeh-Mahani et al., 2019). In this scenario, occupational therapists have a unique role as agents of change (Turpin & Iwama, 2011). Occupational therapists should take an approach to intervention that includes enabling self-determination (Shogren et al., 2018) through the use of choice-making opportunities (Bush & Tasse, 2017), enabling adaptive behavior responses (Turpin & Iwama, 2011), and designing a work routine that includes assistive technology to promote the most successful employment outcome for individuals with intellectual disabilities (Morash-Macneil et al., 2018). The integration of individuals with intellectual disability into paid-community employment should be the end goal of intervention, as it contributes to the development of a just society in which all people can participate. [Bush & Tasse, 2017; Morash-Macneil et al., 2018; Shogren et al., 2018; Turpin & Iwama, 2011].

### ***Important note on the limitation of this CAT***

*There is currently a gap in research regarding successful occupational therapy interventions for people with intellectual disability as they transition to paid community employment. There was a limited amount of research that employed rigorous study designs, which is an important consideration when interpreting the results of this critically appraised topic.*



## SEARCH STRATEGY

| Databases and Sites Searched   | Search Terms  | Limits Used                        |
|--|---|------------------------------------|
| CINAHL<br>AJOT<br>ERIC<br>PUBMED   | Intellectual disabilities,<br>transitional programs,<br>work, vocation,<br>developmental disability,<br>occupational therapy,<br>advocacy, job coach,<br>employment for people with<br>intellectual disabilities,<br>assistive technology | English only, published after 2015 |
| <b>Terms used to guide the search strategy</b>   |   |                                    |
| <ul style="list-style-type: none"> <li>• <b>P</b>atient/Client Group: People with intellectual disabilities</li> <li>• <b>I</b>ntervention (or Assessment): Person-centered interventions</li> <li>• <b>C</b>omparison: None</li> <li>• <b>O</b>utcomes: Successful paid employment, community-based employment</li> </ul> |   |                                    |

## INCLUSION and EXCLUSION CRITERIA

| Inclusion Criteria   |
|--|
| <ul style="list-style-type: none"> <li>• <b>Participants with an intellectual disability</b></li> <li>• <b>English</b></li> <li>• <b>Published after 2015</b></li> <li>• <b>Any age</b></li> <li>• <b>Include occupations as a part of intervention</b></li> </ul> |
| Exclusion Criteria   |
| <ul style="list-style-type: none"> <li>• <b>Physical disabilities</b></li> <li>• <b>External factors of limited employment for individuals with intellectual disabilities</b></li> </ul>   |

## RESULTS OF SEARCH

A total of 3 relevant studies were located and categorized based on an adapted version of the American Occupational Therapy Association Literature Review Project for OT outcome research:

| Design Level   | Sample Size Level             |
|--|-------------------------------|
| I= Randomized control trial, <i>systematic review or meta-analysis</i> | A= $n \geq 20$<br>B= $n < 20$ |
| II= Non-randomized control trial, two groups                           |                               |
| III= Non-randomized control trial, one group, pretest-posttest         |                               |
| IV= Single-subject design  |                               |
| NA= Narratives, case studies   |                               |



**Table 1: Summary of Study Designs of Articles Retrieved**

| Study Design/Methodology of Articles Retrieved | Level | Number Located | Author (Year)  |
|--|-------|----------------|--|
| Non-randomized control trial, 2 group          | IIA   | 1              | Shogren, Burkey, Anderson, Antosh, Wehmeyer, LaPlante, & Shaw (2018) |
| Systematic review, 10 studies                  | IB    | 1              | Morash-Macneil, Johnson, & Ryan (2018)                               |
| Exploratory Study                              | IVA   | 1              | Bush & Tasse (2017)  |

## BEST EVIDENCE

The following studies/papers were identified as the ‘best’ evidence and selected for critical appraisal- [Bush & Tasse, 2017; Morash-Macneil, Johnson, & Ryan, 2018; Shogren et al., 2018]. Reasons for selecting these studies were:

- The authors of all three studies examined the effects of interventions that fall within the occupational therapy scope of practice.
- The authors of all three studies focused on person-centered approaches to intervention.

## SUMMARY OF BEST EVIDENCE

The following article was paraphrased from a non-randomized control trial by Shogren, Burke, Anderson, Antosh, Wehmeyer, LaPlante, & Shaw (2018).

|   |
|---|
| <b>Aim/Objective of the Study:</b>  |
| The researchers of the study investigated the correlation between self-determination and employment outcomes by focusing on the impact of self-determination instruction and outcomes while students were still in school.  |
| <b>Study Design:</b>  |
| The study consisted of a non-randomized control trial in which researchers selected schools with transition-aged students under the educational classification of intellectual disability.  |
| <b>Setting:</b>   |
| This study was completed in 17 school districts across the state of Rhode Island.   |
| <b>Participants:</b>  |
| Three hundred forty students that were served under the educational classification of intellectual disability in the transitional age range of 10-21 years old from Rhode Island were included in the study. Mild, moderate, severe, and profound impairments were requested for the study from teacher’s perspectives. A total of 64 special education teachers implemented the intervention with students and the average time the teachers knew the student was 2.98 years.  |
| <b>Intervention Investigated:</b>   |
| The control and experimental groups received a one-and-a-half-day training from University of Kansas researchers on the Self-Determined Learning Model of Instruction (SDLMI) to be implemented for one year. They received ongoing coaching from trained district coaches. The SDLMI is a teaching model based on self-determination to enhance self-regulated goal setting of students with and without disabilities. The model is goal directed and supports students when creating goals and obtaining them in any content area including transition to employment. Three phases are implemented that include setting a goal, taking action, and adjusting the goal or plan. Teachers help students with a range of support needs to create goals targeting interests, career options, and resources when developing goals that are related to transitioning to employment. |



*Control* (N= 8 districts, 27 teachers, 173 students)

The control group received the above intervention for the second year of the longitudinal study.

*Experimental* (N= 9 districts, 31 teachers, 167 students)

The experimental group received the (Whose Future Is It?) WF curriculum along with the above intervention for the second year of the longitudinal study. The WF curriculum is organized into three sections that include getting to know your IEP, decisions and goals, and your IEP meeting. Teachers use an Instructor's Guide to engage students with the Student Reader that delivers the content. Teachers were required to work through all chapters of the workbook over the school year (45 minutes at least three times a week).

### **Outcome Measures: (Primary and Secondary)**

A pilot version of the Self-Determination Inventory: Student-Report (SDI:SR) and Parent/Teacher-Report (SDI:PTR) was used to assess self-determination. The pilot version had 21 items that were included in the final measure including an additional 30 items from the pilot version. The SDI:SR has satisfactory reliability that scored characteristics in Causal Agency Theory including volitional action, agentic action, and action-control beliefs. Responses ranged from 0-99 with a slider scale ranging from disagreement to agreement (Shogren, Forber-Pratt, Little, & Seo, 2017).

The Goal Attainment Scale (GAS) is used to measure goal attainment (Kiresuk, Smith, & Cardillo, 1994). The teacher records the student's goal and establishes outcomes that may come about from striving to reach the goal which can be quantified such as a percentage or less quantified such as social cues. Teachers submit GAS data 3 times throughout the school year. A five-point scale is used where -2 is least favorable, -1 is less favorable, 0 is acceptable, +1 is favorable, and +2 is most favorable. Raw GAS scores are converted to standard T-scores with a mean of 50 and a standard deviation of 10. A mean of 50 exhibits an appropriate outcome score but scores of 40 or less recommend less favorable outcomes with 60 and above indicating more favorable outcomes (Kiresuk, et al., 1994).

### **Main Findings:**

Growth across all domains from the student and teacher perspectives showed in the RAW scores of the SDI:SR and SDI:PTR from the baseline to the end of the year ( $p < .05$ ). A factor structure with a single factor at the baseline and end of the school year suggested that there are no differences between the SDLMI-only and SDLMI+WF groups ( $p < .05$ ). The control group demonstrated a significant positive slope that indicated a change in GAS scores from the baseline to the end of the school year. No significant changes were observed in the experimental group. The only significant path was the effect of the SDI:SR from the beginning of the school year to the end of the year in the SDLMI-only group but there was a similar effect in the SDLMI+WF group for the SDI:PTR. The SDI:PTR in the SDLMI-only group observed a significant impact of the GAS at the end of the intervention year.

### **Original Author's Conclusions:**

The focus of SDLMI for transitioning from school to integrated employment enhanced goal attainment after planning. Self-determination was influenced from the student's perspective and the actual goal attainment from the teacher's perspective. Focusing on one standardized curriculum allowed teachers and students to focus on individual goals and obtaining success through the SDLMI.

### **Critical Appraisal:**

#### **Validity:**



#### Threats to internal validity:

- Data collection began after implementation of mandated change from the Consent Decree
- Small sample size
- Missing data on several outcome variables
- Levels of intellectual disabilities not defined

#### Threats to external validity:

- Not generalizable (population included residents from Rhode Island)
- Data was collected from a real world context with multiple change initiatives
- Bias due to convenience sample

#### Aspects of study which strengthen validity:

- Fidelity of interactions with students in every school were accounted for
- Clear statement about purpose of the study
- Concepts were defined
- Patient demographic information given (gender, race/ethnicity, and additional disability label)
- Multiple outcome measures
- Training procedures included
- Multiple imputation used to address missing data
- Variety of intellectual disabilities
- Higher level of evidence using a control trial in the control and experimental group

### **Interpretation of Results:**

Growth in all domains were represented in the SDI:SR and SDI:PTR from the RAW scores obtained from the baseline to the end of the year. The results exhibited significant outcomes in the SDI:SR and SDI:PTR for the SDLMI-only group with no differences in the experimental group. A positive slope demonstrated a notable difference from baseline scores to the end of the year for the GAS in the SDLMI-only group. No significant changes in the GAS were prominent in the SDLMI+WF group. The validity of this study is supported by higher level of evidence using control, maintaining fidelity across control and experimental groups, and including a variety of intellectual disabilities. This acknowledges the benefits of implementing the SDLMI into schools for transition-aged students to increase self-determination for goal-attainment to transition to employment.

### **Summary/Conclusion:**

The authors from the study found the incorporation of the SDLMI into schools increased the attainment of goals by encouraging self-determination in transition-aged students. Creating individualized plans into three phases enabled students with a variety of intellectual disabilities to set a goal, take action, and adjust the goal or plan to the needs of the person. Enablement of students creates a base for self-determination to be implemented into successful transitional employment following the completion of high school (Turpin & Iwama, 2011).





The following article was paraphrased from a Level IV Exploratory Design by Bush & Tasse (2017), unless direct quotations with page numbers were provided.

### **Aim/Objective of the Study:**

The aim of this study was to examine the extent to which choice-making behaviors are correlated with successful employment outcomes for people with intellectual disabilities.

### **Study Design:**

Data from the National Core Indicators (NCI) Adult Consumer Survey from the years 2011-2013 were extracted. The NCI Adult Consumer Survey is, “a quality analysis survey that measures state developmental disabilities systems on several indicators, including: employment, choices, rights, service planning, community inclusion, and health and safety” (Bush & Tasse, 2017, p. 25). A multiple regression and factor analysis was used to predict the relationship between choice-making variables and successful employment outcomes (paid-community-based jobs, paid-facility-based jobs, or not participating in any paid jobs).

The NCI Adult Consumer Survey has three parts to it; Background Information, Section 1, and Section 2 (Bush & Tasse, 2017). Section 1 of the survey consisted of an interview with the consumer and had questions related to subjective experiences regarding work, home, friends and family, etc. Section 2 of the survey includes questions that address community inclusion, access to services, choice-making variables, and several others.

### **Setting:**

The NCI Adult Consumer Survey was conducted in 28 states within the US during the time period of 2011-2013.

### **Participants:**

The NCI Adult Consumer Survey randomly selects 400 individuals who are receiving state-funded services for their developmental disability. Individuals over the age of 18 that have a diagnosis of idiopathic Intellectual Disability (ID), Autism Spectrum Disorder (ASD), or Down Syndrome (DS) are eligible to receive benefits. The individuals included in the survey were required to have a case manager and needed to be receiving at least one additional service. Exclusion criteria included comorbid diagnoses (i.e. comorbid DS and ASD), cases with missing information regarding employment, and outlier cases that were 4 standard deviations above or below the mean. The total number of respondents was 19,880 participants. There were 2,174 individuals with ASD, 1,857 individuals with DS, and 15,845 individuals with idiopathic ID. The mean age among the three groups was 40.06. Severity of ID was categorized as being either mild, moderate, severe, or profound.

### **Outcome Measures: (Primary and Secondary)**

A multiple regression and factor analysis was conducted for the three disability groups. The independent variables in this study were: “age, severity level of ID, number of mental and behavioral health conditions that necessitate taking medication, support needs for behavior problems, short-term choices and long-term choices” (Bush & Tasse, 2017, p.26). The dependent variable in this study was employment status (paid-community-based job, paid facility-based-job, or not participating in any paid job).

### **Main Findings:**

#### **Results**

##### *1. Demographic characteristics*



Individuals with idiopathic ID were the least cognitively impaired across the three disability groups. Individuals with ASD required the most support for behavioral problems and had the greatest need for medication targeting mental and behavioral health.

## 2. *Analysis on job statistics*

Among the three disability groups, adults with DS had the highest rates of employment, followed by adults with idiopathic ID, and lastly adults with ASD. Age trends for paid community work and paid facility work were examined across all three groups. Paid community-based work had an inverse relationship with age, that is, as age increased, employment rates decreased.

### **Discussion**

The authors of this study found that in this sample of individuals with developmental disabilities, 16% of individuals with DS, 14% of individuals with idiopathic ID, and 10% of individuals with ASD were employed in the community.

#### 1. *Group Comparisons and Predictors of Employment*

The authors found that rates of paid facility work were higher than rates of paid community work. This is a troubling finding because paid facility work is a form of sheltered employment, which has been shown to be negatively associated with successful work outcomes. Sheltered employment consists of a warehouse setting where individuals with intellectual disabilities work for a training allowance to manufacture products at a significantly lower wage than community employment (McConkey, Kelly, Craig, & Keogh, 2017). Paid-community work is recognized as the best possible employment outcome because it is an integrative approach that supports diversity and inclusion in society.

Decreased disability severity level was associated with an increased probability of paid community employment. The authors suggested that intellectual functioning and adaptive skill levels are highly correlated with successful employment outcomes. Additionally, the type of disability is statistically related to employment status.

#### 2. *The Effect of Choice-making on Employment*

Choice-making skills were the second highest predictor of successful community-based employment, second to ID severity level. Choice-making skills were exercised the most among individuals with idiopathic ID, followed by individuals with DS, and lastly individuals with ASD.

### **Critical Appraisal:**

#### **Validity:**

Threats to internal validity:

- The NCI Adult Consumer Survey was conducted at a single point in time, thus, age trends should be interpreted with caution.
- Choice-making variables only applied to individuals who had the opportunity to exercise choice-making skills. Individuals who did not have the opportunity to make choices may be underrepresented in this study.



- The Hawthorne effect and Rosenthal effect may have been present during the interview portions of the NCI Adult Consumer Survey.

Threats to external validity:

- Individuals who were eligible for state DD services were selected for this study, which may lead to an underrepresentation of individuals with mild DD who did not qualify for services.
- Only three types of disabilities were examined in this study, which limits the generalizability of the results.

### **Interpretation of Results:**

The results of this study have significant implications for clinical practice. The sample size was strong enough to contribute positively to the overall statistical power.

### **Summary/Conclusion:**

The authors of the study outlined a strong correlation between the use of choice-making skills and successful paid employment outcomes. Choice-making skills are strongly correlated with self-determination, which has a significant impact on a person's overall health and well-being. The empirical data from this research study provided strong evidence that supports the incorporation of choice-making skills into occupational therapy intervention.

Additionally, the authors highlighted the importance of prioritizing community-based employment as an end goal of vocational services, rather than facility-based employment. Community-based employment outcomes empower individuals with an intellectual disability to contribute to society, which fosters positive health and wellbeing.

The following article was paraphrased from a systematic review by Morash-Macneil, Johnson, & Ryan, (2018).

### **Aim/Objective of the Study:**

The aim of this study is to investigate the efficacy of assistive technology support in improving the ability to complete work-related tasks independently and efficiently as well as other employment skills for individuals with intellectual disabilities (ID).

### **Study Design:**

A systematic review has been used in effort to locate all relevant research studies targeting the effectiveness and impact of various types of assistive technology (AT) in improving performance of work-related tasks independently and efficiently for individuals with ID. There were 10 studies that met the criteria to be implemented in this systematic review.

### **Setting:**

All 10 studies have been conducted across a variety of settings. Three studies (30%) were performed in special education classrooms, three (30%) studies were in general education classrooms, and four (40%) studies were conducted in postsecondary education programs.

### **Participants:**

From nine of the studies, participants were eligible for this study if they had reported disability status under the Individuals with Disabilities Education Act (IDEA) criteria and standard intelligence tests (Wechsler Abbreviated Scale of Intelligence, Wechsler Intelligence Scale for Children third and fourth edition, Stanford Binet fourth edition, and Reynolds Intellectual Assessment Scale). The researchers of one study did not report disability or risk status of the participants in their study. Of the 31 students in the studies, 19 (61%) were male



and 12 (39%) were female. IQ scores were reported for 29 (94%) of participants and the authors reported that participants experienced cognitive impairments. IQ scores of participants ranged from 36 to 65 with 13 (42%) falling within the mild (50–70 IQ) range, while 16 (52%) of the participants were in the moderate (35–49 IQ) range.

### **Intervention Investigated:**

#### **Handheld computers.**

Handheld computers are portable devices that are capable of inputting information and have the capability of being functional when holding the device. These computers have the potential to assist individuals with ID by enhancing their organizational abilities and enables them to complete their work independently (Turpin & Iwama, 2011). “These devices improve employee autonomy and decrease dependency on teachers, job coaches, coworkers, and peers” (Morash-Macneil et. al, 2018, p.16).

#### **Wearable technology.**

Wearable technology has been providing constant, portable, and hands-free access. It has been a recent innovation in technology that utilizes smart sensors. The smartwatch is an example of wearable technology that can benefit people with ID (Fichten, Asuncion, & Scapin, 2014). Smartwatches exchange data with other devices without requiring any human intervention. The use of smartwatches have allowed users to independently access a multitude of apps to support productivity as well as the ability for employers to monitor efficiency. Vibrating watches are another simple form of wearable AT that require minimal skills and are highly effective in providing notifications to the wearer regarding daily events and routines (Green et al., 2011).

#### **Portable electronic devices.**

Portable electronic devices such as the iPod and iPhone are devices that can store, process, and transmit information. Due to their portability, these devices have the capability of delivering different types of prompts (audio, video & picture) to assist individuals with ID to complete a task without assistance. Portable devices offer individuals with ID to successfully perform work-related tasks independently to enable efficiency and self-efficacy in the workplace (Turpin & Iwama, 2011).

### **Outcome Measures: (Primary and Secondary)**

The dependent variable in this study were individuals that demonstrated specific employment skills; six studies met this criterion. This was considered to be met if the outcomes were socially important to individuals with ID, the measurements of the dependent variable were defined and described in the studies, the effects of the intervention outcomes were reported, the frequency and timing of the outcomes measure were appropriate, evidence of internal reliability, interobserver reliability and test-retest reliability were noted. All 10 studies related to AT interventions in the workplace; authors measured a variety of outcomes reported to AT utilization in the workplace and reported the effects of interventions. Reliability for data collection was reported for seven of the studies, the overall reliability was between 91-100% across the studies. Social validity was reported for the seven studies using questionnaires (n=3), surveys (n=2) and interviews (n=2). Interobserver reliability and social validity were not reported in four of the studies due to insufficient data collection.

### **Main Findings:**

Various types of handheld systems, portable electronic devices, and wearable technologies have been used as a prompting system to enable individuals to perform tasks independently relating to their employment. Prompts in all of the studies have consisted of using video, audio, verbal communication, pictorials, gestures, tactile or



even a combination of two or more types of prompts. Seven of the 10 studies utilized AT to perform work-related tasks, two studies were used to make navigation decisions to the workplace, and one study used AT as an intervention to measure time management skills.

AT has shown the largest effective size on focusing to improve work task completion. Studies that have used AT to help individuals with ID independently navigate a potential employment setting have shown smaller medium to large effect size gain. The studies have reported how participants have made independent navigation decisions using an augmented reality navigation tool and reached various locations without assistance.

### **Discussion**

When examining the studies on utilizing AT supports for improving employment skills for individuals with ID, several notable findings have shown positive outcomes of using AT for employment as well as a shift in technology trends. The use of AT for increasing employment outcomes for individuals with ID have facilitated positive changes in performance in all tasks. The outcomes that have been analyzed were the type of AT used such as handheld computers, wearable technology, and portable electronic devices, tasks completed, and meaningful skills achieved. The variety of work tasks where technology was used show the potential that it has in supporting employment and vocational skills. There has been a shift in the type of AT over the past few decades from handheld computer and portable devices to iPods, iPads and the use of applications on smartphones. There is a high demand to have more advanced technology used in this area of research for individuals with ID.

### **Critical Appraisal:**

#### **Validity:**

Threats to Internal Validity:

- Nine out of the ten studies addressed internal validity
- Study conducted by Van Larrhoven, Johnson, Van Laarhoven-Meyer, Grider, and Grider (2009) did not collect sufficient baseline points for two of the three tasks with only 1-3 points

### **Interpretation of Results:**

All of the studies were limited due to small sample sizes. Even though the studies have shown positive effects of AT on an individual's ability to work independently, it has been difficult to generalize across all of the studies in the systematic review. The length of the studies have been on a short-term basis and participants that have been involved in the program for a brief period of time did not have a change to demonstrate long-term skills that have been gained. The power in the findings would be stronger if studies were extended in order to determine the longitudinal effects of AT.

### **Summary/Conclusion:**

The biggest challenge for individuals with ID is the ability to acquire and maintain employment. This systematic review has demonstrated the positive effects of promoting AT on an individual's ability to independently perform in an employment setting. This positive effect was illustrated across a range of employment settings and through various modes of technology. The use of portable devices, handheld computers, and wearable technology increased independence, participation in employment, accuracy, and building on workplace skills efficient for individuals with ID. Enabling people with ID to utilize assistive technology is essential to their success whether at work, home or school (Turpin & Iwama, 2011). In guiding



individuals through employment, this area needs to be a primary research focus on how AT can provide the support needed to facilitate this process.

**Table 5:** Characteristics of included studies

|                                  | <b>Study 1</b>   | <b>Study 2</b>  | <b>Study 3</b>   |
|----------------------------------|--|---|--|
| <b>Intervention investigated</b> | The Self-Determined Learning Model of Instruction (SDLMI)  | Choice-making skills  | Handheld computers, wearable technology, portable electronic devices   |
| <b>Comparison intervention</b>   | Whose Future Is It? (WF)   | None  | None   |
| <b>Outcomes used</b>             | Self-determination from goal attainment  | Employment status   | Effectiveness of assistive technology and determining the efficacy of AT supports for employment   |
| <b>Findings</b>                  | This study found the incorporation of the SDLMI into schools increased the attainment of goals by encouraging self-determination in transition-aged students | Choice-making skills were strongly correlated with positive employment outcomes | The use of assistive technology was effective for individuals with ID to complete work related tasks independently and efficiently as well as gaining skills in employment |

## IMPLICATIONS FOR PRACTICE, EDUCATION and FUTURE RESEARCH

According to the compiled evidence, person-centered interventions have been empirically supported as being effective interventions for people with intellectual disabilities as they prioritize successful employment.

The study conducted by Shogren, Burke, Anderson, Antosh, Wehmeyer, LaPlante, and Shaw (2018) supported the use of the SDLMI in schools by encouraging self-determination skills to attain goals. The internal and external validity of this study was limited due to small sample size, missing data, and lack of generalizability. Self-determination has shown to have an important effect on employment success and goal attainment.

The study conducted by Bush and Tasse (2017) gives the best example of a person-centered skill that positively affects employment outcomes. Choice-making skills enable individuals to exercise personal autonomy, which in turn can foster positive experiences in the workplace (Turpin & Iwama, 2011). Despite the strong statistical power in this study, generalizability may be limited due to a narrowed focus on only three types of intellectual disability. This study has important implications for occupational therapy intervention.

Morash-Macneil, Johnson, and Ryan (2018) synthesized evidence regarding the use of assistive technology for people with intellectual disability in the workplace (2018). Not all of the studies addressed internal validity, which may have an effect on the interpretation of the results. The use of assistive technology has been empirically supported as an intervention that can enable individuals to independently complete complete work-related tasks and further develop skills needed for employment (Turpin &



Iwama, 2011).

Given this evidence, an occupational therapist can be a change agent for people with intellectual disability by collaborating with clients to set their own work-related goals [Turpin & Iwama, 2011; Shogren et al., 2018]. Additionally, choice-making opportunities will support the personal autonomy of clients, which in turn will improve their employment experience (Bush & Tasse, 2017). An occupational therapist can also design a work routine that integrates the use of AT in order to promote independence among people with intellectual disability in the work environment (Morash-Macneil et al., 2018). Khayatzadel-Mahani and colleagues (2019) outlined the top 3 person-centered barriers to employment for people with intellectual disability as being (1) relationship and social skills, (2) verbal and nonverbal communication, and (3) inflexibility with change/transition (Khayatzadel-Mahani et al., 2019). The incorporation of person-centered interventions such as self-determination programs, choice-making and assistive technology have been shown to increase adaptive behaviors, social skills, and personal autonomy in people with intellectual disability [Bush & Tasse, 2017; Morash-Macneil et al., 2018; Shogren et al., 2018]. The enablement skills that are most frequently used in conjunction with these interventions are adapt, advocate, coach, collaborate, design, educate, and engage (Turpin & Iwama, 2011).

Future implications for research include investigating the cause and effect relationship of choice-making strategies in a rigorous design. ID severity levels should be isolated in order to gain a deeper understanding of the specific needs of each population. There are limited experimental research designs related to intellectual disability and work, which was a major limitation of our research.

While external barriers to employment exist for this population, it may be more feasible for occupational therapists to focus on skill development within the person [Bush & Tasse, 2017; Khayatzadeh-Mahani et al., 2019; Morash-Macneil et al., 2018; Shogren et al., 2018]. Occupational therapy practitioners can bring forth a unique perspective when acting as a change agent for people with intellectual disability (Turpin & Iwama, 2011).



## REFERENCES

- American Occupational Therapy Association (2014). Occupational therapy practice framework: Domain and process (3rd ed). *American Journal of Occupational Therapy* 68 (Supplement 1), S1-S48.
- Bush, K. L., & Tasse, M. J. (2017). Employment and choice-making for adults with intellectual disability, autism, and down syndrome. *Research in Developmental Disabilities*, 65, 23-34. doi: <http://dx.doi.org/10.1016/j.ridd.2017.04.004>
- Cleary, D. & Persch, A. (2020). Transition services. In J. Clifford O'Brien & H. Kuhaneck, (Eds.), *Case-Smith's Occupational Therapy for Children and Adolescents*, (8<sup>th</sup> ed. / pp. 659-663). St. Louis, MI: Elsevier.
- Fichten, C. S., Asuncion, J., & Scapin, R. (2014). Digital technology, learning, and postsecondary students with disabilities: Where we've been and where we're going. *Journal of Postsecondary Education and Disability*, 27, 369–379. Retrieved from <https://eric.ed.gov/?id=EJ1059994>
- Johnson, K. R., Blaskowitz, M., & Mahoney, W. J. (2019). Occupational therapy practice with adults with intellectual disability: what more can we do?. *The Open Journal of Occupational Therapy*, 7(2). <https://doi.org/10.15453/2168-6408.1573>
- Khayatzadeh-Mahani, A., Wittevrongel, K., Nicholas, D. B., & Zwicker, J. D. (2019). Prioritizing barriers and solutions to improve employment for persons with developmental disabilities. *Disability and Rehabilitation*. pp. 1-11. doi: 10.1080/09638288.2019.1570356
- Kiresuk, T. J., Smith, A., & Cardillo, J. (1994). *Goal attainment scaling: Applications, theory, and measurement*. Hillsdale, NJ: Lawrence Erlbaum. doi: 10.1007/s10803-012-1446-7
- McConkey, R., Kelly, F., Craig, S., & Keogh, F. (2017). A longitudinal study of post-school provision for Irish school-leavers with intellectual disability. *British Journal of Learning Disabilities*, 45(3), 166-171. Retrieved from: <https://doi-org.exproxylr.med.und.edu/10.1111/bld.12190>





- Morash-Macneil, V., Johnson, F., & Ryan, J. (2018). A systematic review of assistive technology for individuals with intellectual disability in the workplace. *Journal of Special Education Technology, 33*, 15-26. <https://doi.org/10.1177/0162643417729166>
- Puchalski, C., Ferrel, B., Virani, R., Otis-Green, S., Baird, P., Bull, J., & Sulmasy, D. (2009). Improving the quality of spiritual care as a dimension of palliative care: The report of the Consensus Conference. *Journal of Palliative Medicine, 12*, 885-904. <http://dx.doi.org/10.1089/jpm.2009.0142>
- Shogren, K. A., Wehmeyer, M. L., Palmer, S. B., Forber-Pratt, A. J., Little, T. J., & Seo, H. (2017). Preliminary validity and reliability of scores on the Self-Determination Inventory: Student report version. *Career Development and Transition for Exceptional Individuals, 40*, 92-103. [doi:10.1177/2165143415594335](https://doi.org/10.1177/2165143415594335)
- Shogren, K. A., Burke, K. M., Anderson, M. H., Antosh, A. A., Wehmeyer, M. L., LaPlante, T., & Shaw, L. A. (2018). Evaluating the differential impact of interventions to promote self-determination and goal attainment for transition-age youth with intellectual disability. *Research and Practice for Persons with Severe Disabilities, 43*(3), 165-180.
- Turpin, M., & Iwama, M. K. (2011). The Canadian model of occupational performance and engagement. *Using occupational therapy models in practice* (pp. 117-136). Elsevier Ltd.
- World Health Organization (2020). *Health topics: Disabilities*. Retrieved from <https://www.who.int/topics/disabilities/en/>

