2024

BUILDING INDEPENDENCE THROUGH STRUCTURED WORK SYSTEMS FOR STUDENTS WITH MODERATE TO SEVERE DISABILITIES

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Digital Object Identifier: https://doi.org/10.13023/etd.2024.133

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BUILDING INDEPENDENCE THROUGH STRUCTURED WORK SYSTEMS FOR STUDENTS WITH MODERATE TO SEVERE DISABILITIES

THESIS

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science in the
College of Education
at the University of Kentucky

By

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2024

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ABSTRACT OF THESIS

BUILDING INDEPENDENCE THROUGH STRUCTURED WORK SYSTEMS FOR STUDENTS WITH MODERATE TO SEVERE DISABILITIES

Students, especially those with moderate to severe intellectual disabilities oftentimes need support in learning to work independently. This study examined if the use of structured work systems increased student independence during regular scheduled independent worktimes in the general education and MSD special education classrooms. Using a single-case multiple-probe design, this study measured the percentage of steps completed independently when working with academic tasks related to individual IEP goals.

KEYWORDS: Structured Work System, Independence, Moderate Disabilities, Severe Disabilities

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Introduction

It is important for all students, especially those with moderate to severe intellectual disabilities to learn to work independently and to build adaptive skills to support them into adulthood. Structured work systems can help achieve these goals. Structured work systems can be used in a variety of settings and can be designed to meet the needs of all students.

A structured work system in terms of this research and as named in Hume et al. (2012), is defined as an "individual work system" that provides four pieces of information to the student. These pieces of information include "the tasks the student is supposed to do, how much work there is to be completed, how the student knows they are finished, and what to do when they are finished" (Hume et al., 2012, p. 2086). With these four pieces of information provided to the student, the student has been made aware of exactly what is expected of them which can help support work independence and completion. Structured work systems provide the student with a clear understanding of the beginning and end which also are essential to supporting independence and work completion.

Using a multiple-probe-across participants design, Hume et al. (2012) examined two outcomes within their study. Data reported on "the effects of the individual work system as a strategy to increase task accuracy while also supporting student independence and "the effects of the work system as a generalization support" (p. 2086). Three first grade students with a diagnosis of autism were included. Sessions took place in the special education resource classroom with generalization sessions taking place in the general education classroom. Task accuracy was calculated using a task analysis in which

the total number of correctly completed steps was divided by the total number of steps to form a percentage. Teacher prompting occurred and was described as “physical, verbal, gestural, visual, or proximal cues” (p. 2088). For baseline sessions, participants completed the same tasks that took place during the pre-baseline training sessions. During pre-baseline training, students were taught the pre-determined skills to 50% accuracy using a least-to-most prompts hierarchy. Baseline included the initial instruction to begin, and staff were instructed to not prompt accuracy. Baseline did not include the use of an individual work system. During intervention sessions, an individual work system was used. The results of the study found that the intervention of structured work systems increased task accuracy and decreased the need for adult prompting, thus resulting in greater student independence.

Likewise, a study conducted by Hume and Odom (2007), found structured work systems to be “effective in increasing independent work” specifically in students who had been diagnosed with autism (p. 1173). Results indicated that “performance decreased when the work system was withdrawn; and participants subsequently increased independent performance when the work system was implemented again” (p.1173).

In a third study using structured work systems to promote independence, Sreckovic et al. (2020) asked the research question, “Does an independent work system implemented by parents increase independent initiation and completion of daily living skills in home settings for adolescents with ASD?” (p. 242) Participants of the study were between 10 and 19 years old and had an autism diagnosis. The independent work systems focused on household tasks. Sessions took place inside each of the participants' homes along with their caregivers/mothers. During baseline, participants completed the

predetermined task along with their mothers. A task analysis determined "how many steps the individuals initiated and completed on their own, how many steps were skipped (if applicable), and how long the activity took" (Sreckovic, 2020, p. 244) without the use of structured work system as opposed to intervention where a structured work system was implemented, along with parent training. Overall results of the study found that using a structured work system "was effective in increasing task initiation and completion for all three adolescents with ASD" (Sreckovic et al., 2020, p. 250).

Structured work systems can be adapted to fit many types of curriculum to support individualized student needs. For my thesis, I will be replicating Hume, Plavnick, and Odom's (2012) study titled "Promoting Task Accuracy and Independence in Students with Autism Across Educational Setting Through the Use of Individual Work Systems".

Research Question

1. Does the use of structured work systems increase student independence in the resource and general education setting?

METHODS

Participants

This study was conducted with four participants within an elementary MSD resource special education classroom. Participant names and ages were as follows (names have been changed to protect individual's identity and for confidentiality purposes): Samuel (10 years and 10 months), Lucas (8 years and 6 months), Rachel (11 years and 3 months), and Kevin (7 years and 5 months).

Inclusion criteria for this study were as follows: (a) student aged 6-11 years old, (b) received special education services under the category of moderate intellectual disability, and (c had educational goals related to increasing independent work completion. Exclusion criteria for this study were as follows: (a) student had mastered their educational goals related to independent work completion (b) or absent more than 10% of the school year. Race, ethnicity, gender, and sex were not a factor that informed the inclusion or exclusion criteria of this study.

Once IRB approval was obtained from the University of Kentucky, the Primary Investigator (Maggie Smith), identified students who met the inclusion criteria. This was completed based on the teacher's knowledge of her students as well as a review of student records. Once the four participants were identified, Smith placed a consent packet in each student's backpack to take home to their parents. Parent questions were answered accordingly by Smith. Smith conveyed that a student's participation would not alter any of the educational services that participants were already receiving. Given that an inclusion criterion was that a student had an educational need related to independent

work, all partaking students were receiving support on this skill even if their parents chose for them not to participate.

Samuel, a 5th grade student qualified for special education under the category of Functional Mental Disability. He was also diagnosed with an Anxiety disorder. His intellectual functioning was assessed during his 3rd grade year using the Wechsler Intelligence Scale for Children - Fifth Edition (WISC-V). Results of the WISC-V indicated significant deficits in Samuel's overall cognitive functioning. He obtained a Full-Scale IQ standard score of 43 (Extremely Low, <0.1 percentile).

Samuel's teacher provided information on his current performance with independent skills. She shared he was able to follow single step directions but needed additional prompting to follow multi-step directions. He required time to process information and prompts to keep focus. He demonstrated distractibility and impulsivity across all school settings. Verbal cues and reminders helped Samuel stay focused. He was easily redirectable and worked hard at school each day.

Lucas, a 3rd grade student qualified for special education services under the primary disability of Autism. He was prescribed Guanfacine. On the WISC-5 he achieved a standard score of 53, falling three standard deviations below the mean.

An individualized reinforcement system was used with Lucas. He was provided with a tangible reinforcer for the completion of his work.

Rachel, also a 5th grade student at the time of the study qualified for special education services under the category of Functional Mental Disability. Rachel had a diagnosis of Kleefstra syndrome, monoalleic mutation of EHMT1 gene, Noonan syndrome associated with mutation in PTPN11 gene, coloboma of eye, hyperopic

astigmatism of right eye, high myopia of left eye, low muscle tone, and speech/language impairment. The Kaufman Assessment Battery for Children-Second Edition (KABC-11) was used to assess her general cognitive functioning. Her overall intelligence as measured by the Nonverbal Index (NVI) was in the Lower Extreme range (Standard Score=46, <0.1 percentile) as compared to same-aged peers.

Information taken from Rachel's most current IEP showed that she lacked motivation to complete tasks unless 1:1 attention was given along with frequent verbal prompting.

Kevin, a 1st grade student qualified for special education services under the category of Autism. He was also diagnosed with ADHD. He was currently taking L-methylfolate 15mg Daily. Formal assessment data was not able to be obtained at the time of eligibility determination. Classroom observations and parent input reported cognitive abilities significantly below those his age as observed in the home and community setting.

Kevin's teacher shared he became very upset when he is prompted to sit. He required 1:1 support to stay seated and to complete academic work tasks. Occasionally, Kevin would cry during work sessions. In terms of this study, crying was not considered a sign of dissent. Examples of dissent for Kevin would be falling to the floor or hitting classroom furniture/objects with his fists.

Due to Kevin's challenging behaviors, a behavior intervention plan (BIP) was designed and implemented to help support him during his time at school. Components of the BIP included noncontingent fixed interval reinforcement of edibles and fixed ratio reinforcement for work completion. During probe and intervention sessions, Kevin was

receiving fixed ratio reinforcement on a FR-1 schedule upon completion of a work task. During each session during the study, after completion of one work task (e.g., writes first name), Kevin would receive a small cup of juice or fruit snack gummy dependent on his previously determined choice made at the beginning of the session.

All participants received special education services in the resource setting in the following areas: reading, writing, math, and adaptive skills. All students received occupational and speech/language therapy services within the school setting. Occupational and speech/language therapy services were received in a 1:1 setting outside of the MSD resource classroom in a 1:1 therapy room.

Each participant's inclusion within the general education setting differed spending 40%-80% of their school day in general education programs. When in the general education setting, Kevin and Lucas were accompanied by a paraeducator for 100% of their time in the general education classroom. Rachel and Samuel attended specials, lunch, and recess with their general education homeroom class independently. When in the general education classroom for social studies, they were accompanied by a paraeducator (1:3 paraeducator to student ratio). Samuel also attended a general education writing class and was provided support by an LBD (learning and behavior disorders) special education teacher within this setting.

All participants had been exposed to structured work systems in the past, but they were the systems were not implemented systematically and did not use them to fidelity. Previous to the study, students had been using "**ShoeboxTasks®"**. "**ShoeboxTasks®** are designed primarily for children on the autism spectrum but may also be appropriate for other students (Center on Children, 2018). Students used a variety of tasks from the

advanced curriculum. Students were required to work in a left to right direction with a predetermined number of tasks.

The skills and content of the provided tasks were familiar to each participant as these are related to goals on their individualized education program.

Setting(s) and Materials

All probe sessions took place in the MSD resource special education classroom. Intervention sessions took place in either the MSD resource special education classroom or in each student's general education/homeroom classroom. All participants of the study were provided services within the same special education classroom. This classroom served 12 students with a range of disabilities, specifically serving students with an IQ of 55 and below. Staff in this classroom included a special education teacher (experimenter), two full-time paraeducators, and one half-time paraeducator.

In the general education setting, Samuel and Rachel attended a 5th grade social studies classroom with 20 students with one certified teacher. Luke attended a 3rd grade math classroom with 25 students with one certified teacher. Kevin attended a 1st grade math classroom with 23 students and one certified teacher. A paraeducator assisted each student while in the general education setting due to IEP needs. Tasks were completed at sets of desks ranging from 4-6 students. The same tasks completed during probe sessions were completed during intervention sessions.

Tasks were created specifically focusing on skills related to students' IEP goal(s). Each task was individualized for each participant. Specific materials for each task can be found in the probe session tasks analyses below labeled Tables 4-7.

Additional materials include pencil and paper to collect data, a 3-drawer plastic container, a finished basket, a choice board, and visuals of preferred items. Students used the classroom reinforcement system of making a choice from a choice board that displayed the available reinforcers in the classroom.

Implementer

The primary investigator for this study was a 30-year-old, white non-Hispanic female. At the time of the study she held the position of elementary MSD teacher (grades 1-5) in the classroom where the study was conducted. The experimenter had held this position for six years. The experimenter had known some of the participants for several years before conducting this research study. Previously to her work as an MSD teacher, the experimenter taught 2nd and 3rd grade LBD reading, a position she held for two years.

The experimenter held a Bachelor of Arts in Education, Learning and Behavior Disorders (P-12) from the University of Kentucky. She obtained her master's degree in Moderate and Severe Disabilities, Grades Primary Through 12 with an Endorsement in Teacher Leadership from Georgetown College. She was also a current graduate student at the University of Kentucky obtaining a Master of Science Degree in Interdisciplinary Early Childhood Education.

Data Collection Procedures

Data of the dependent variable was collected via direct observation. A task analysis was created including all work tasks to be completed during the session. A task-analysis is a step-by-step breakdown of how to complete an activity or task. With the task

analysis, the teacher was able to score each step that the child completed independently or with adult help (prompted). By taking the total number of steps completed independently, dividing it by the total number of steps, and multiplying it by 100, a percentage was calculated. The percentage reflected the number of steps completed independently by the student.

Experimental Design and Analysis

The implementor used a single-case research design that answers the research question: Does the use of structured work systems increase student independence in the resource and general education setting? A single-case multiple-probe design was used. Prior to the introduction of the structured work system, a pre-intervention condition was implemented without the presence of the structured work system, across at least three points in time. Data under the pre-intervention condition was measured and compared to the intervention condition. The independent variable was only applied to one participant of the study at a time. The remaining participants did not receive the intervention until a prior participant received the intervention across a minimum of three sessions. By staggering the introduction of the IV across each participant, the design allowed for greater control of threats to internal validity. The structured work systems intervention will be effective if the children's ability to complete tasks independently improves only when the structured work system intervention is introduced.

Data will be visually analyzed between conditions. Stability during probe sessions will be necessary before the introduction of the intervention. During intervention sessions, data should show a clear change in level trending in the therapeutic direction

during at least 3 data sessions to determine if a functional relation exists between the independent and dependent variables.

Procedures

One to two sessions per day was conducted for each participant each day school was in session. Sessions took place in a variety of settings (resource and general education classroom) and varied in time of day as appropriate for each participant's daily schedule. The length of each session did not exceed 15 minutes in length.

Probe Procedures

The experimenter identified tasks/skills related to each participant's IEP goals. Skills selected for Samuel included building numbers within 100 and counting sets of hundreds between 100-900. Skills selected for Rachel included building numbers within 1000 and counting sets of hundreds between 100-900. Kevin's tasks were related to building and writing his first and last name and matching lowercase letters to uppercase letters of the alphabet. Lucas's tasks were related to counting with 1:1 correspondence for numbers 1-10, matching number to number for numerals 1-10, and writing numbers 1-10.

Teaching of each task occurred in a 1:1 setting in the MSD resource classroom. The experimenter considered the following information from the Hume et al. (2012) study when selecting and designing tasks:

> "Consistent with the recommendation that skills should be trained to at least 50% accuracy in order to improve with independent practice (Chapman et al. 2005),

the investigator used a least-to-most prompt hierarchy to teach participants to independently complete each task with 50% accuracy." (p. 2089)

Probe sessions took place in the MSD resource special education setting during normal independent work times and in the general education setting. During probe sessions, a structured work system was not used. First, the teacher directed each student to their work area using a visual cue such as gesturing towards the workstation or selecting a "table work" icon on a student AAC device. The initial instruction of "Time for work!" was given prior to starting the tasks. No prompts were given for task accuracy. The goal was for the participant to complete the given tasks as independently as possible despite correctness. After the initial task direction was given, students were expected to begin each task within 5 seconds. A three-step hierarchy of prompts was used: independent, verbal/gesture, physical/controlling. If 5 seconds passed and the child did not begin a step in their task analysis, the teacher proceeded through the prompting hierarchy. As the student progressed through the tasks, the experimenter recorded if the task steps were completed independently by the student or with prompting from the experimenter. In the event, a participant was to show signs of dissent, the session did not occur and was documented as such. Signs of dissent included: falling to the floor and/or hitting classroom objects.

Intervention Procedures

Intervention sessions were conducted in the MSD resource special education classroom during independent work times and in the general education setting. Due to participant's daily schedules differing from one another, independent work times and

work times in the general education classroom occurred at various times throughout the school day.

A structured work system was created for each of the participants using IEP related skills. As mentioned, a task analysis was created to determine the percentage of steps completed independently by each participant. Task analyses can be found below in figures 8-11 below. Participants used a structured work system during intervention sessions as opposed to probe sessions.

Each independent workstation was set up the same for each participant. The structured work system required the students to work in a left to right direction. Tasks were placed in a 6-drawer plastic container, labeled with numbers 1-6 found to the left of the student. A finished basket sat to the student's right on the floor for finished tasks when completed. In the top right corner, a visual of a preferred item was present. Preferred items were determined prior to beginning the tasks using a classroom choice board of available reinforcers. An example visual of the workstation is found below labeled, Figure *1 Independent Workstation.*

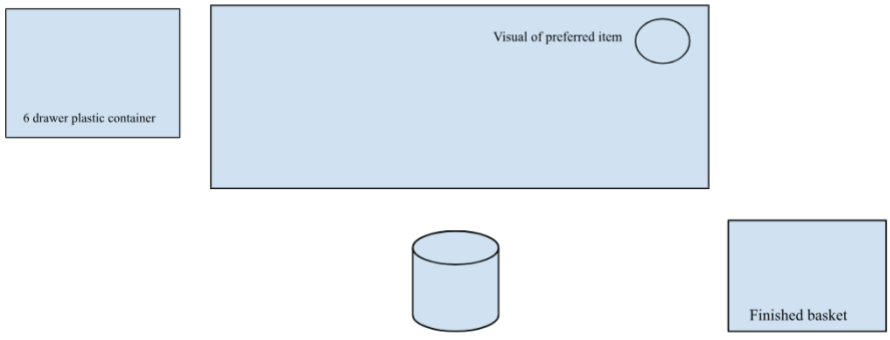

Figure 1 *Independent Workstation*

Students were first given a visual cue that it was time for work at the workstation just as they were during baseline sessions. Prompting protocols continued the same as they were in probe sessions. Students were instructed to begin the given tasks after the initial instruction of "Time for work!" was given. Students were expected to begin each task within 5 seconds. Students began with the first task, found in the drawer labeled 1. When one task was completed, the student placed the completed task in the finished basket to the right of them. Students worked their way through the numbered tasks until all were completed and placed in the finished basket. When finished, students were provided their preferred item immediately after task completion.

In the event, a participant was to show signs of dissent during the initial prompt of being directed to the work area the session did not occur and was documented as such. Signs of dissent included: falling to the floor and/or hitting classroom objects.

Reliability

Inter-observer agreement (IOA) was expected to be collected for at least 20% of all sessions in each condition (i.e., probe and intervention) of the study (per guidelines from What Works Clearinghouse). The secondary observers (i.e., Pallie Gullett, Amanda Duncan) were trained in data collection by the experimenter. Training occurred prior to any study session that occurred for which reliability data was collected. To calculate IOA, percentage agreement was used specifically point-by-point agreement. To do this, the number of agreements was divided by the number of agreements plus the number of disagreements. This number was then multiplied by 100 for a percentage.

Procedural Fidelity data was meant to be collected utilizing event-based recording for at least 20% of sessions in each condition. Procedural fidelity data allowed for

research personnel to determine if all intended procedures were followed during probe and intervention sessions (e.g., task direction to transition to independent work time provided by the classroom teacher, structured work system in place for the presented task). Example procedural fidelity data sheets for probe and intervention sessions can be found in Figures 12 and 13.

It is important to note that the secondary observers' schedules and the time frame in which data were collected affected the amount of IOA and procedural fidelity data that was able to be obtained. IOA and procedural fidelity were collected for 13% of sessions for participant Kevin during the probe condition. Intervention did not take place for Kevin due to his data trending in the therapeutic direction during the probe condition which is later discussed in the results section. IOA and procedural fidelity data were collected for 14% of Lucas's sessions within the probe condition. Lucas was in the beginning stages of intervention, so no IOA nor fidelity data had yet to be collected. IOA and procedural fidelity were collected for 25% of Rachel's sessions within the probe condition with no data collection occurring during the intervention condition. IOA and fidelity data occurred for 17% of Samuel's probe sessions and again no data collection occurring during the intervention condition. Lack of IOA and procedural fidelity is discussed in the limitations section of this paper.

In looking at the IOA data using point-by-point agreement that was able to be collected, 100% reliability was obtained for each participant of the study during the probe condition only. Procedural fidelity as recorded by Pallie Gullet was at 100% for each participant during the probe condition only.

Results

Rachel participated in four probe sessions and nine intervention sessions. All probe sessions took place in the MSD special education resource classroom. Intervention sessions took place in both MSD special education resource (seven sessions) and general education (two sessions) classrooms. Rachel was the first participant to receive intervention. Visual analysis of data shows representation of moderate levels during probe conditions. Data was zero-celerating with variability of one data point during session three of probe conditions. During intervention, data was represented at higher levels trending in the accelerating, therapeutic direction, with low levels of variability. Stability of data was reached during sessions 7-13 where "predictability and consistency of data values" was present (Ledford J.R. & Gast D.L., 2018, pg. 189). While the immediacy of change was not abrupt at first, a clear change was observed. Overlap of data between probe and intervention conditions was not present. For Rachel, a demonstration of effect was observed between baseline and intervention conditions.

Lucas participated in seven probe sessions and one intervention session. He took part in six sessions in the MSD special education resource room and one session in his general education classroom. One intervention session took place in his general education classroom. Lucas was absent two days during the probe condition. Visual analysis can only be made for the probe condition. Lucas was the third participant to receive intervention. It is expected that Lucas will continue the intervention. Visual analysis of data shows representation of low to moderate levels during probe conditions. Data during probe sessions was somewhat variable for Lucas. Specifically, during sessions 1-3, data

was trending in the decelerating direction. Overlap of data is already present between conditions.

Graphed data can be found below labeled, **Figure 2** *Rachel and Lucas Results.*

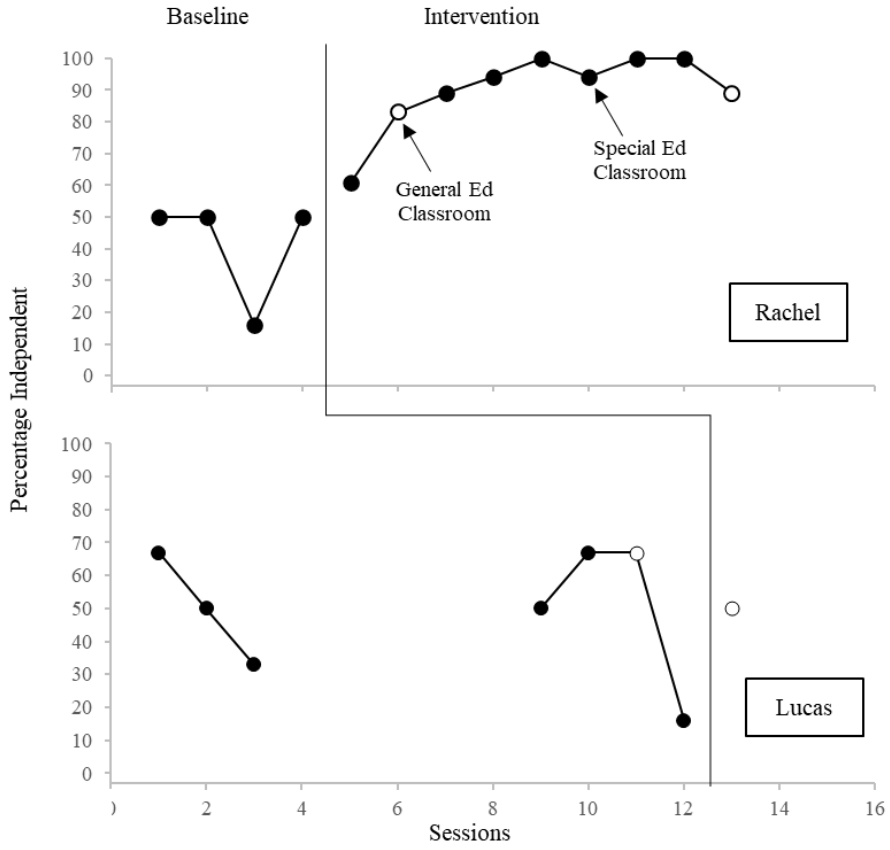

Figure 2 ***Rachel and Lucas Results***

Samuel received intervention after Rachel. Samuel participated in six probe sessions in the MSD resource special education classroom and five intervention sessions in total. Two of these sessions took place in the general education classroom and three sessions took place in the MSD resource special education classroom. Visual analysis of probe session data shows a representation of variability in levels. In sessions 2-4 within the probe condition, Samuel's data began to show an accelerating trend eventually becoming more stable in sessions 4-6, intervention was then introduced. Analysis of

Samuel's intervention data shows representation of moderate levels trending in the accelerating, therapeutic direction. Samuel's intervention data is stable at this time. It is expected that intervention will continue for Samuel in hopes that he will reach a higher level of independence when using a structured work system. Immediacy of change between conditions is not observed. Overlap of data occurred for all intervention sessions. Data ranged from 55%-67% within the intervention condition and 16%-83% in the probe condition. A demonstration of effect has not yet been observed for Samuel.

The last participant, Kevin, did not receive intervention. Visual data analysis can only be done for the probe condition. Kevin participated in nine probe sessions, six of these occurring in the MSD resource special education classroom and the remaining three in his general education reading classroom. Data shows a representation of variable levels (33%-83%), trending in the accelerating direction. Due to Kevin's data not showing evidence of stability, intervention was not introduced. Kevin's data may have started improving in the therapeutic direction due to a threat to internal validity known as a history effect. "History refers to the events that occur *during* an experiment, but that are not related to planned procedural changes, that may influence the outcome." (Ledford & Gast, 2018, p. 19) In Kevin's case, he began to recognize the specific materials the experimenter was using and would immediately walk to the workstation at the sight of his materials. Kevin was considered a routine oriented individual and caught on to the structure and expectation of the work tasks without the use of a structured work system. Repeating the same tasks each day could have been attributed to this too.

Graphed data for both Kevin and Samuel can be found below labeled, **Figure 3** *Samuel and Kevin Results.*

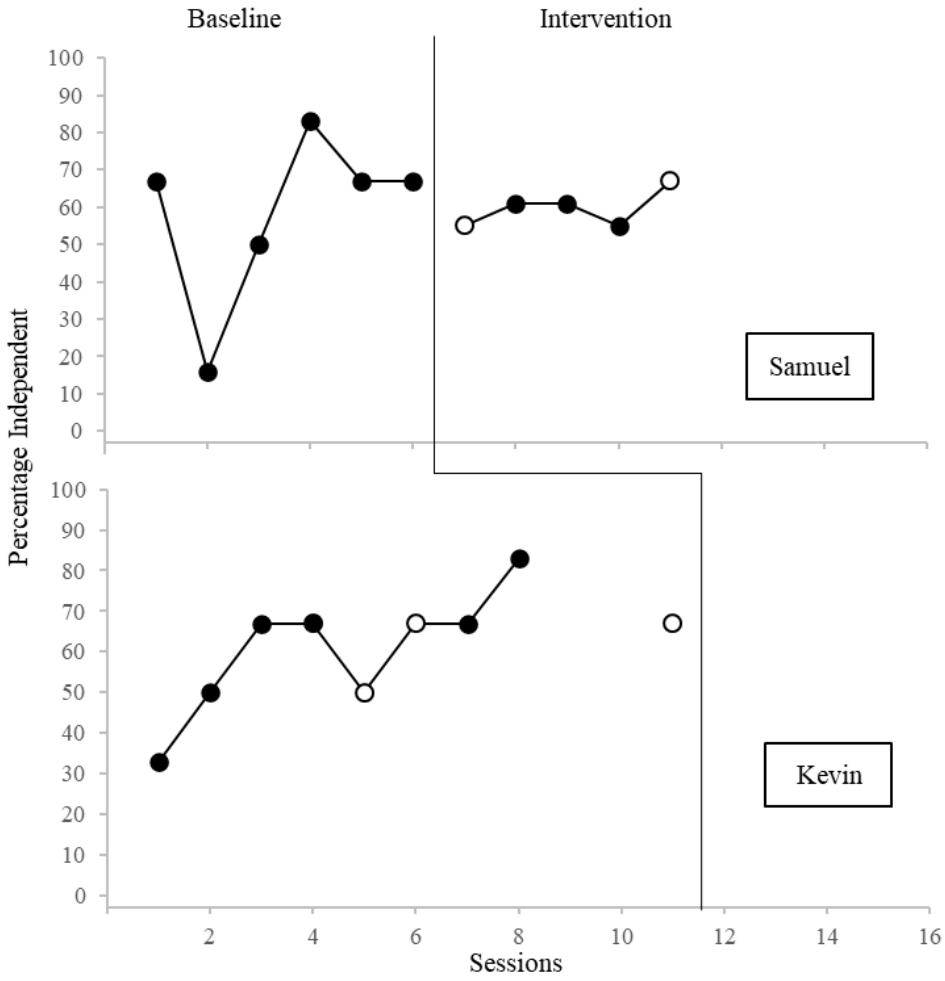

Figure 3 ***Samuel and Kevin Results***

Discussion

It is important for all students, especially those with moderate to severe intellectual disabilities, to learn to work independently and to build adaptive skills to support them into adulthood. Building independent skills can be challenging, and it is important to have strategies and interventions in place to help support learners achieve a skill so vital to their life. The experimenter of this research set out to replicate Hume et al. (2012) study titled "Promoting Task Accuracy and Independence in Students with Autism Across Educational Setting Through the Use of Individual Work Systems". Hume

et al. (2012) evaluated “the effects of the individual work system as a strategy to increase task accuracy while also supporting student independence and “the effects of the work system as a generalization support” (p. 2086). In terms of this research, the experimenter evaluated if the use of structured work systems increased levels of independence for students with moderate to severe disabilities in the MSD special education resource and general education classrooms. The research question was as follows: Does the use of structured work systems increase student independence in the resource and general education setting?

More work is needed to determine if this study was like other studies that focused on structured work systems. Hume et al. (2018) was able to determine that “the increases/decreases in the dependent variables occurred when the intervention was introduced at

three different points in time.” (p. 2091) The researchers were able to determine a functional relation based on these findings. Similarly, in Sreckovic et al. (2020) a functional relation was “demonstrated between the implementation of the work system and steps initiated independently” (p. 250).

Findings for Rachel were the most similar to what other studies have found. For Rachel, a demonstration of effect was observed between baseline and intervention conditions. Findings of this research have yet to determine if a demonstration of effect was observed for participants Lucas and Samuel. No functional relation was found in terms of this study.

The findings do not mean that this study was not an effective use of time. This study was conducted authentically, in the hearts of an elementary MSD resource special

education classroom and various grade level general education classrooms too. The classrooms were busy with all their many distractions, transitions, behaviors, and learning happening all at once. When implementing structured work systems as teachers, it is important to realize that materials must be organized and well kept. The structured work system should be taught and used to fidelity to capitalize on its purpose. Learning structured work systems takes time for students. It is important to establish a prompting hierarchy and provide prompts as needed to ensure they are learning as independently as possible. Last, teach the use of structured work systems to the general education teacher. Independent skills are crucial in the general education setting in that oftentimes less support is provided outside of the resource room. Benefits of structured work systems are observed across a variety of settings.

Limitations

Several limitations can be discussed for this study. As noted, inter-observer agreement and procedural fidelity data were lacking for both probe and intervention conditions for all participants. Since IOA and procedural fidelity were not conducted for the suggested percentage of sessions across conditions, this makes it difficult to know if procedures were implemented correctly for each participant and if data were collected correctly for observed participant behaviors. This greatly affects the reliability of this study. Unfortunately, due to scheduling and the time frame in which data were collected, this was the outcome. If this study was to be conducted again, this is something that the experimenter must plan to change and better prepare for.

Another limitation of this study was the potential threat to internal validity based on Kevin's baseline data accelerating in a therapeutic direction. It was previously noted

that Kevin's data could have been an outcome of a history effect. "History refers to the events that occur *during* an experiment, but that are not related to planned procedural changes, that may influence the outcome." (Ledford & Gast, 2018, p. 19) Kevin began to recognize the specific materials the experimenter was using and would immediately walk to the workstation at the sight of his materials. Kevin was considered a routine oriented individual and caught on to the structure and expectation of the work tasks without intervention.

Repeating the same tasks each day may have been attributed to Kevin's response during probe sessions. In terms of threats to internal validity, this is called "testing". Testing refers to "a threat in any study that requires participants to respond to the same test repeatedly especially during a baseline or probe condition: it is the likelihood that the repeated assessment will result in participant behavior change." (Ledford & Gast, (2018), p. 20). Did this occur to Kevin? Did he become too familiar with the tasks? Considering this moving forward, if this study were to be conducted again it might be beneficial to alternate tasks/materials so that participants don't become too familiar.

Another limitation to this study was the lack of data collected in the general education setting for both Rachel and Samuel. If this study were to be conducted again, it might be beneficial to alternate between settings more consistently to build greater reliability between settings. This could have potentially changed the way participants performed during each session as well.

Conclusion

More work is needed to determine if the findings of this study are those of Hume et al. (2018) and similar studies. The findings of this study provided readers with one

demonstration of effect out of four potential participants. Structured work systems have been proven to be an effective intervention at building independence for students with the most significant of disabilities. Researchers and teachers alike should continue to provide and assess if the use of structured work systems can benefit their learners in building one of the most important skills they can teach and encourage, which is independence.

Figure 4 *Task Analysis for Samuel (Probe Session)*

Steps	Child response I = independent P= prompted		Teacher provides correct level of prompting (i.e., Independent, Verbal/Gesture, Physical/Controlling)	
1. Count sets of hundreds blocks (100-300)	I	P	Yes	No
2. Count sets of hundreds blocks (400-600)	I	P	Yes	No
3. Count sets of hundreds blocks (700-900)	I	P	Yes	No
4. Build number within 100 using base 10 blocks	I	P	Yes	No
5. Build number within 100 using base 10 blocks	I	P	Yes	No
6. Build number within 100 using base 10 blocks	I	P	Yes	No

Figure 5 *Task Analysis for Lucas (Probe Session)*

Steps	Child response I = independent P= prompted		Teacher provides correct level of prompting (i.e., Independent, Verbal/Gesture, Physical/Controlling)	
1. Copy numbers 1-5	I	P	Yes	No
2. Copy numbers 6-10	I	P	Yes	No
3. Match numbers 1-5	I	P	Yes	No
4. Match numbers 6-10	I	P	Yes	No
5. Count and clip numbers 1-5	I	P	Yes	No
6. Count and clip numbers 6-10	I	P	Yes	No

Figure 6 Task Analysis for Rachel (Probe Sessions)

Steps	Child response I = independent P= prompted		Teacher provides correct level of prompting (i.e., Independent, Verbal/Gesture, Physical/Controlling)	
1. Count sets of hundreds blocks (100-300)	I	P	Yes	No
2. Count sets of hundreds blocks (400-600)	I	P	Yes	No
3. Count sets of hundreds blocks (700-900)	I	P	Yes	No
4. Build number within 1000 using base 10 blocks	I	P	Yes	No
5. Build number within 1000 using base 10 blocks	I	P	Yes	No
6. Build number within 1000 using base 10 blocks	I	P	Yes	No

Figure 6 *Task Analysis for Kevin (Probe Session)*

Steps	Child response I = independent P= prompted		Teacher provides correct level of prompting (i.e., Independent, Verbal/Gesture, Physical/Controlling)	
1. Match letter to letter for first name	I	P	Yes	No
2. Match letter to letter for last name	I	P	Yes	No
3. Trace first name	I	P	Yes	No
4. Trace last name	I	P	Yes	No
5. Match uppercase letters to lowercase letters for letters a-l	I	P	Yes	No
6. Match uppercase letters to lowercase letters for letters m-z	I	P	Yes	No

Figure 7 *Task Analysis for Samuel (Intervention Session)*

Steps	Child response I = independent P= prompted	Teacher provides correct level of prompting (i.e., Independent, Verbal/Gesture, Physical/Controlling)
1. Get materials from plastic 3-drawer container labeled 1	I P	Yes No
2. Count sets of ~~hundreds~~ blocks (100-300)	I P	Yes No
3. Put completed clip cards in finished basket	I P	Yes No
4. Get materials from plastic 3-drawer container labeled 2	I P	Yes No
5. Count sets of ~~hundreds~~ blocks (400-600)	I P	Yes No
6. Put completed clip cards in finished basket	I P	Yes No
7. Get materials from plastic 3-drawer container labeled 3	I P	Yes No
8. Count sets of ~~hundreds~~ blocks (700-900)	I P	Yes No
9. Put completed clip cards in finished basket	I P	Yes No
10. Get materials from plastic 3-drawer container labeled 4	I P	Yes No
11. Build number within 100	I P	Yes No
12. Put completed tray in finished basket	I P	Yes No
13. Get materials from plastic 3-drawer container labeled 5	I P	Yes No
14. Build number within 100	I P	Yes No
15. Put completed tray in finished basket	I P	Yes No
16. Get materials from plastic 3-drawer container labeled 6	I P	Yes No
17. Build number within 100	I P	Yes No
18. Put completed tray in finished basket	I P	Yes No

Figure 8 *Task Analysis for Lucas (Intervention Session)*

Steps	Child response I = independent P= prompted		Teacher provides correct level of prompting (i.e., Independent, Verbal/Gesture, Physical/Controlling)	
1. Get materials from plastic 3-drawer container labeled 1	I	P	Yes	No
2. Count numbers 1-5	I	P	Yes	No
3. Put completed clip cards in finished basket	I	P	Yes	No
4. Get materials from plastic 3-drawer container labeled 2	I	P	Yes	No
5. Count numbers 6-10	I	P	Yes	No
6. Put completed clip cards in finished basket	I	P	Yes	No
7. Get materials from plastic 3-drawer container labeled 3	I	P	Yes	No
8. Match numbers 1-5	I	P	Yes	No
9. Put completed file folder in finished basket	I	P	Yes	No
10. Get materials from plastic 3-drawer container labeled 4	I	P	Yes	No
11. Match numbers 6-10	I	P	Yes	No
12. Put completed file folder in finished basket	I	P	Yes	No
13. Get materials from plastic 3-drawer container labeled 5	I	P	Yes	No
14. Copy numbers 1-5	I	P	Yes	No
15. Put completed worksheet in finished basket	I	P	Yes	No
16. Get materials from plastic 3-drawer container labeled 6	I	P	Yes	No
17. Copy numbers 6-10	I	P	Yes	No
18. Put completed worksheet in finished basket	I	P	Yes	No

Figure 9 *Task Analysis for Rachel (Intervention Sessions)*

Steps	Child response I = independent P= prompted	Teacher provides correct level of prompting (i.e., Independent, Verbal/Gesture, Physical/Controlling)
1. Get materials from plastic 3-drawer container labeled 1	I P	Yes No
2. Count sets of hundreds blocks (100-300)	I P	Yes No
3. Put completed clip cards in finished basket	I P	Yes No
4. Get materials from plastic 3-drawer container labeled 2	I P	Yes No
5. Count sets of hundreds blocks (400-600)	I P	Yes No
6. Put completed clip cards in finished basket	I P	Yes No
7. Get materials from plastic 3-drawer container labeled 3	I P	Yes No
8. Count sets of hundreds blocks (700-900)	I P	Yes No
9. Put completed clip cards in finished basket	I P	Yes No
10. Get materials from plastic 3-drawer container labeled 4	I P	Yes No
11. Build number within 1000	I P	Yes No
12. Put completed tray in finished basket	I P	Yes No
13. Get materials from plastic 3-drawer container labeled 5	I P	Yes No
14. Build number within 1000	I P	Yes No
15. Put completed tray in finished basket	I P	Yes No
16. Get materials from plastic 3-drawer container labeled 6	I P	Yes No
17. Build number within 1000	I P	Yes No
18. Put completed tray in finished basket	I P	Yes No

Figure 10 *Task Analysis for Kevin (Intervention Sessions)*

Steps	Child response I = independent P= prompted	Teacher provides correct level of prompting (i.e., Independent, Verbal/Gesture, Physical/Controlling)
1. Get materials from plastic 3-drawer container labeled 1	I P	Yes No
2. Match letter to letter for first name	I P	Yes No
3. Put completed file tray in finished basket	I P	Yes No
4. Get materials from plastic 3-drawer container labeled 2	I P	Yes No
5. Match letter to letter for last name	I P	Yes No
6. Put completed tray in finished basket	I P	Yes No
7. Get materials from plastic 3-drawer container labeled 3	I P	Yes No
8. Trace first name	I P	Yes No
9. Put completed worksheet in finished basket	I P	Yes No
10. Get materials from plastic 3-drawer container labeled 4	I P	Yes No
11. Trace last name	I P	Yes No
12. Put completed worksheet in finished basket	I P	Yes No
13. Get materials from plastic 3-drawer container labeled 5	I P	Yes No
14. Match lowercase letters to uppercase letters (a-l)	I P	Yes No
15. Put completed tray in finished basket	I P	Yes No
16. Get materials from plastic 3-drawer container labeled 6	I P	Yes No
17. Match lowercase letters to uppercase letters (m-z)	I P	Yes No
18. Put completed tray in finished basket	I P	Yes No

Figure 11 *Task Analysis for Procedural Fidelity Data Sheet Example (Probe Sessions)*

Task Analysis for Samuel Date: _____ Time: _____ Data Collector: _____

Teacher setups up environment correctly: Yes No

Teacher directs student to work area: Yes No

Teacher allows child to select a preferred item they are "working for": Yes No

Teacher presents task direction to start work: Yes No

Steps	Child response I = independent P= prompted	Teacher provides correct level of prompting (i.e., Independent, Verbal/Gesture, Physical/Controlling)
1. Count sets of hundreds blocks (100-300)	I P	Yes No
2. Count sets of hundreds blocks (400-600)	I P	Yes No
3. Count sets of hundreds blocks (700-900)	I P	Yes No
4. Build number within 100 using base 10 blocks	I P	Yes No
5. Build number within 100 using base 10 blocks	I P	Yes No
6. Build number within 100 using base 10 blocks	I P	Yes No

Did child engage in signs of dissent resulting in stop to session (e.g., drops to floor, property destruction): Yes No

Teacher provides preferred item upon completion of final step in TA: Yes No

Number of steps prompted: _____

Number of steps independent: _____

Percentage of steps independent: _____

Percentage of steps completed: _____

Figure 12 *Task Analysis and Procedural Fidelity Data Sheet Example (Intervention Sessions)*

Task Analysis for Samuel Date: _____ Time: _____ Data Collector: _____

Teacher setups up environment correctly: Yes No

Teacher directs student to work area: Yes No

Teacher allows child to select a preferred item they are "working for": Yes No

Teacher presents task direction to start work: Yes No

Steps	Child response I = independent P= prompted	Teacher provides correct level of prompting (i.e., Independent, Verbal/Gesture, Physical/Controlling)
1. Get materials from plastic 3-drawer container labeled 1	I P	Yes No
2. Count sets of ~~hundreds~~ blocks (100-300)	I P	Yes No
3. Put completed clip cards in finished basket	I P	Yes No
4. Get materials from plastic 3-drawer container labeled 2	I P	Yes No
5. Count sets of ~~hundreds~~ blocks (400-600)	I P	Yes No
6. Put completed clip cards in finished basket	I P	Yes No
7. Get materials from plastic 3-drawer container labeled 3	I P	Yes No
8. Count sets of ~~hundreds~~ blocks (700-900)	I P	Yes No
9. Put completed clip cards in finished basket	I P	Yes No
10. Get materials from plastic 3-drawer container labeled 4	I P	Yes No
11. Build number within 100	I P	Yes No
12. Put completed tray in finished basket	I P	Yes No
13. Get materials from plastic 3-drawer container labeled 5	I P	Yes No
14. Put completed tray in finished basket	I P	Yes No
15. Get materials from plastic 3-drawer container labeled 6	I P	Yes No
16. Build number within 100	I P	Yes No
17. Put completed tray in finished basket	I P	Yes No

Did child engage in signs of dissent resulting in stop to session (e.g., drops to floor, property destruction): Yes No

Teacher provides preferred item upon completion of final step in TA: Yes No

Number of steps prompted: _____

Number of steps independent: _____

Percentage of steps independent: _____

Percentage of steps completed: _____

References

Centering on Children. (2018). Welcome to Shoebox Tasks®. https://www.shoeboxtasks.com/

Hume K. & Odom S.L. (2007). Effects of an individual work system on the independent functioning of students with autism. *Journal of Autism and Developmental Disorders. 37*, 1166–1180. 10.1007/s10803-006-0260-5

Hume K., Plavnick J., & Odom S.L. (2012). Promoting task accuracy and independence in students with autism across educational setting through the use of structured work systems. *Journal of Autism and Developmental Disorders. 42*, 2084–2099. doi: 10.1007/s10803-012-1457-4

Ledford, J.R., & Gast, D.L. (Eds.). (2018). Single case research methodology: Applications in special education and behavioral sciences (3rd ed.). New York, NY: Routledge.

Sreckovic, M.A., Hume, K.A., & Regan, T.E. (2020), Use of work systems to increase the independence of adolescents with autism spectrum disorder. Career Development and Transition for Exceptional Individuals. *43(4),* 240–256. doi:10.1177/2165143420948766

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