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Increasing Completion of Classroom Routines Through the Use of Picture Activity Schedules

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Abstract Teachers spend the first few days of school teaching routines to children that will help transitions in the classroom between different activities. When children have difficulty, they move more slowly and/or require teacher prompting. A picture activity schedule intervention (Breitfelder in Teach Except Child Plus 4(5):2–15, 2008; Bryan and Gast in J Autism Dev Disord 30(6):553–567, 2000) was used to assist a 5-year-old boy in completing three routines within the kindergarten classroom. Results indicated that the picture activity schedule increased the child's independent completion of each of the three routines, while also decreasing the need for teacher prompting.

Keywords Kindergarten · Transitions · Classroom routines · Picture activity schedules

Introduction

Many people participate in some form of daily routine whether it's subconsciously or consciously. Routines are defined as a repeated set of sequenced actions that occur every day (Salmon 2010). *Subconscious* routines refer to automaticity of performance—doing without thinking, such as waking and bedtime activities (Wildenger et al. 2008). Other routines that are infrequently performed, or are newly established routines, are deliberately taught and rehearsed (Chang 2004). Many teachers spend the first few days of school thoroughly explaining and modeling different routines that they expect their students to be able to complete throughout the school year.

Routines organize student and teacher behavior and "provide children with consistency, confidence, security, trust, and a sense of safety because the routines allow them to identify patterns that help them predict what is going to happen next" (Salmon 2010, p. 132). The predictability generated by the use of routines reduces stress and anxiety helping to regulate child behavior (Wildenger et al. 2008). When routines are explicitly taught, modeled, and rehearsed, they become automatic for students, thus freeing up cognitive processing space (Leinhardt et al. 1987); establishing routines provides teachers with more meaningful instructional time (Chang 2004). Within the early childhood environment, there are routines that help children transition to different activities within the school day, such as the transition upon arrival (morning routine), transition to lunch (mealtime routine), and the transition at departure (afternoon routine). For example, during the morning transition, children learn where to put away their possessions, and what materials are needed to begin their first activity of the day.

Although teachers may explicitly teach routines and provide multiple opportunities for practice, some students have difficulty following established routines with multiple steps. When students are not able to independently complete the routine accurately, it impacts their level of independence because they become dependent on the teacher to aid them in the completion of the routine; furthermore, this difficulty indicates the student's ability to independently complete activities across environments throughout the school day (Banda et al. 2009; Wildenger et al. 2008). In addition, not being able to follow a routine can affect students' academic progress and socialization, which

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sometimes leads to behavior issues in the classroom (Banda et al. 2009). If the majority of students have difficulty following a routine, the teacher should reflect on the problem to create viable solutions (Hayes and Creange 2001). However, if it is only a few students who are having difficulty, then an adaption and/or accommodation needs to be put in place (Breitfelder 2008).

Research has suggest that visual activity schedules are beneficial for assisting students in following routines and transitioning between activities (Banda et al. 2009; Breitfelder 2008; Breslin and Rudisill 2011; Bryan and Gast 2000; Lequia et al. 2012; Milley and Machalicek 2012; Sartini et al. 2013; Vedora et al. 2008). An activity schedule is a "… visual support system that combines photographs, images, or drawings in a sequential format to represent a targeted sequence …" (Banda et al., p. 17). Specifically, picture activity schedules have demonstrated effectiveness in assisting students with Autism Spectrum Disorder (ASD) to complete transition behaviors, such as progressing successfully between activities or between steps in activity (Banda et al. 2009), academics, such as increased on-task behavior, (Vedora et al. 2008) and inappropriate behaviors, such as reducing tantrums (Banda et al. 2009). Picture activity schedules have been demonstrated in the literature to be effective because the visual input students receive increases comprehension, the step-by-step sequencing of pictures helps children to understand expectations of the activity, and the use of the picture activity schedule increases students' independence.

Visual supports are known to benefit all students, especially with regard to processing language, by communicating what activity or routine needs to be completed (Breitfelder 2008; Bryan and Gast 2000). The visuals serve as a prompt that directs students through the order of the routine, thus aiding comprehension (Breitfelder 2008; Breslin and Rudisill 2011). Breitfelder (2008) noted that activity schedules provide students with a clear beginning and ending of an activity. Therefore, confusion on what to do is reduced because routines are arranged in the exact sequence that the activity should be performed.

Because language can be processed differently, expectations can be interpreted differently. Picture activity schedules depict step-by-step visual cues, and students begin to learn what is expected of them (Bryan and Gast 2000; Lequia et al. 2012). Breslin and Rudisill (2011) remarked that activity schedules "…display the abstract constructs of the tasks in concrete ways…" (p. 344). Activity schedules transform the abstract constructs into a concrete reference tool for students, thus further clarifying expectations (Bryan and Gast 2000; Lequia et al. 2012). The guessing game is eliminated through the use of activity schedules because visual activity schedules are designed to explicitly reflect the teacher's expectations.

As students are engaged in completing the tasks according to the activity schedule, their independence is simultaneously being fostered (Milley and Machalicek 2012; Vedora et al. 2008). When students are engaged with their activity schedule, the need for prompting is lessened because they begin to independently transition between activities (Milley and Machalicek 2012; Vedora et al. 2008). Therefore, the adult does not have to repeat directions or provide a physical prompt because the child has a decreased reliance on others (Duttlinger et al. 2013; Koyama and Wang 2011). Once students begin to progress successfully through the activity schedule, the need for adult support becomes minimal because of the order and predictability that is provided.

Picture activity schedules have been documented in the literature to increase independence and completion of multi-step activities (Banda et al. 2009; Breitfelder 2008; Breslin and Rudisill 2011; Bryan and Gast 2000; Sartini et al. 2013; Vedora et al. 2008). General education teachers often use anchor charts to make thinking visible (Newman 2010); therefore, it seems reasonable that a picture activity schedule would fit within the context of an early childhood environment. The current study is unique in that it sought to determine if a commonly-used intervention for children with ASD, the use of picture activity schedules, could be incorporated within the context of a general education kindergarten classroom. Specifically, this study sought to determine if a picture activity schedule could be incorporated into the naturally-occurring routine of the kindergarten classroom to increase the independent completion of daily routines in a kindergarten-aged boy.

Method

Setting

This study was conducted in a 5 day a week, public kindergarten school located in a suburban area. This class was comprised of 22 students, 10 boys and 12 girls, ranging in age from 5 through 7 years of age. All children were functioning within normal limits for their age, according to the Developing Skills Checklist (DSC, Mc-Graw Hill 2013) and Dynamic Indicators of Basic Early Literacy Skills [DIBELS, University of Oregon Center on Teaching and Learning (2013)]. The classroom was staffed with one highly qualified teacher, who also served as the researcher, with 5 years of experience (meaning the teacher had a bachelor's degree in early childhood education (pre-kindergarten through third grade) and state certification (U.S. Department of Education 2004). Students enrolled in

the kindergarten class were required to complete a variety of housekeeping tasks throughout the school day in order to allow the teacher to maximize instructional time in the classroom; without these routines, valuable instructional time would have been lost throughout the day.

Participant

The target child was Alexander, a black male, who at start of this investigation was a 5 year 11 month old and had been attending kindergarten for 7 months and was not receiving any intervention services. Alexander had difficulty following established multi-step daily routines. Inclusion criteria of this investigation included: (1) function within normal limits according to Kindergarten assessments—DSC (Mc-Graw Hill 2013) and DIBELS (University of Oregon Center on Teaching and Learning 2013); (2) had difficulty following established multi-step routines. Daily routines were taught at the beginning of the school year, and after 7 months of schooling, the target child was still unable to independently complete all tasks associated within each of the daily routines; therefore, the child was selected as the participant of this single subject research. At the onset of the present study, the kindergarten students were able to complete each of the daily routines at an estimated average of 2.5 min, whereas the target child needed up to 5 min and assistance from the classroom teacher.

Behavior Definitions

Child Behavior

The target child's behavior of interest was the number of tasks he could independently complete within each of the daily routines. *Tasks* were defined as the component steps that comprised each of the targeted daily routines. *Independently completed tasks* were defined as component steps completed by the target child as indicated on the daily routine checklist (see Table 1) without any additional prompting from the teacher within a 5-min time period. If the task was defined as independently completed, those tasks received a check under the *yes* column. Any tasks that were left incomplete after the 5-min period received a check under the *no* column. Any assistance provided by the teacher to complete a task was also recorded (see *Teacher behavior* below).

Teacher Behavior

Using a watch, the teacher allowed the target child 5 min to complete the tasks of the daily routine. Within this 5-min period, the target child was allowed to complete the tasks in any order. If the target child was unable to complete one or more tasks within the daily routine within a 5-min period, the teacher provided a prompt to assist the target child in completing the task(s). If any steps were skipped, a

Table 1 Sample morning routine checklist

Day: _____ Date:_____

Morning Routine Tasks Circle one: NO Intervention Applied or Intervention Applied			
Were the following tasks completed:	Yes	No	If No, which prompt was used V (verbal) or P (physical)
1. Greet the teacher			
2. Go to assigned seat			
3. Place jacket (if necessary) on the back of chair			
4. Take out green folder and place it in chair sack			
5. Begin independent reading			
6. Give the teacher any notes that are found on the "return to school side" when the teacher approaches the table			
7. After teacher leaves the table, hang up book sack, place lunchbox on top of table, and return to table			
8. Continue independent reading until the morning song starts			
# of Independently Complete tasks within 5 minutes without any additional prompting: _____ out of 8; _____% completion			

prompt was not given until the 5 min had passed. A *teacher prompt* was defined as a verbal or physical cue to remind the student of a task(s) that was incomplete. A *verbal prompt* was defined as the teacher communicating to the student a signal word or directive statement. An example would be, the teacher telling the child, "(Student's name), your lunchbox," or "(Student's name), I still see your book sack is on the floor." A *physical prompt* was defined as the teacher picking up or touching the student's items as a reminder of an incomplete task or physically assisting the student to finish the task. An example would be, the teacher picking up the target child's lunchbox or book sack and bringing it to his eye level.

Observation Procedures

The target child was observed during all three identified naturally occurring routines during the school day, specifically– the morning (arrival) routine, the mealtime routine, and the afternoon (dismissal). The teacher served as the primary observer and recorded whether the child had completed all steps in each of the routines (see Table 1).

Data Collection

For this study, a routine checklist was constructed for daily data collection for the three targeted routines (morning, mealtime, and afternoon). The target child was observed for a 5-min period to record which tasks within each of the routines were independently completed by the child, using the definitions stated above (see *Child behavior* and *Teacher behavior*). Following the 5-min observation period, the teacher researcher determined the independent completion for that routine by dividing the number of tasks independently completed by the total number of tasks and multiplying by 100 to generate the percentage of independent completion. Data were collected for each activity once per day across baseline and intervention sessions across a period of 3 weeks.

The observers included the teacher, who was the primary researcher, and a reliability observer, who was a certified teacher. The reliability observer was trained through review of verbal and written instructions, and practice sessions until an 80 % agreement was reached between the two observers (Kazdin 2011).

Baseline

The target child was observed during morning, mealtime, and afternoon routines. The teacher provided the target child with the naturally occurring prompt, which is given to the entire class each day at the beginning of each routine (i.e., "Time to get ready for lunch"). The target child was observed for a 5-min period to identify how many tasks were independently completed. After the 5-min period, observation continued to record the teacher prompts (see *Teacher behavior*) given to the target child to aid in completion of the daily routines.

Daily Routines

Morning Routine As students entered the class in the morning, they were prompted with, "Let me see who knows how to start off our morning". After this whole class prompt, students were expected to complete the following steps without additional prompting: (1) Greet the teacher; (2) Go to assigned seat; (3) Take out one's green folder and place it in one's chair sack; (4) Place jacket (if necessary) on the back of chair; (5) Begin independent reading; (6) When the teacher comes to one's table, give the teacher any notes that are found on the "return to school side" of one's green folder; (7) After the teacher leaves the table, hang up one's book sack in assigned cubby, place lunchbox on top of cubbies, and return to table; (8) Continue independent reading until the morning song begins, which signals to pack up books and return to carpet.

Mealtime Routine Once students entered the cafeteria, students were told, "Wash your hands and proceed to the lunch line." After this whole class prompt, students were expected to complete the following steps without additional prompting: (1) Place lunchbox (if necessary) at the end of table 10, which is the table across from the water trough; (2) Wash hands and proceed to the lunch line or retrieve lunchbox from table 10; (3) Eat without talking until the teacher flips to the yellow buddy talk sign; (4) At the end of lunch, check area for any trash and/or crumbs on the table and floor, and place all trash and/or crumbs on plate or gather into napkin if one has a lunchbox; (5) Proceed to the window to dump lunch tray, or proceed to the trashcan to throw away lunch from one's lunchbox; (6) Join the class in line at the front of the cafeteria by lining up behind the person in front of you.

Afternoon Routine During the afternoon dismissal routine, students were prompted with, "It is dismissal time. Let's get ready to go home". After this whole-class prompt, students were expected to complete the following steps without additional prompting: (1) Put away early finisher work or throw away snack when the timer rang; (2) Pull out one's green folder and turn to the behavior calendar; (3) Color the date on the behavior calendar the color indicated by the teacher; (4) Close folder and put one's head down on their folder; (5) When the teacher calls one's table, get one's book sack, a book for independent reading, and lunchbox from one's assigned cubby; (6)

Place green folder, library book, lunch box, and jacket (if necessary) in one's book sack; (7) Choose an early finisher activity from one's chair sack to complete until the teacher turns the lights off, which indicates to clean up because it is time for dismissal.

Picture Activity Schedule Intervention

Picture Activity Schedule

The three picture activity schedules for each routine were adapted from the story strip model with labeled pictures design used for high functioning students with ASD (Banda et al. 2009; see Fig. 1 for sample picture schedule). Because the teacher researcher did not have access to picture software, such as Boardmaker®, Google images were utilized; some images were clipart, and others were photographs.

To create each picture activity schedule, the routine was written out step by step, identifying each component task within the routine. For each step, the teacher researcher (first author) selected a picture represent each component task in the routine. Using Google images, keywords were inputted that yielded images similar to the ideas recorded for that step.

Training

The picture activity schedule depicted each step of the targeted housekeeping routine through the use of visual cues and imperative sentences. Each time a new activity schedule was introduced, the teacher provided the target child with verbal assistance during one full routine to ensure that the child understood which task within the routine the picture represented. No data were collected during this training session.

Implementation

During the intervention condition, data collection procedures were identical to baseline. The target child was observed for a 5-min period to record how many tasks were independently completed and any prompting provided by the teacher was recorded.

Interobserver Reliability

Interobserver agreement is defined as the extent to which observers agree in their scoring of behavior (Kazdin 2011). It is recommended that interobserver agreement should be conducted in each phase of the study on at least 20 % of the observation sessions (Cooper et al. 1987; Kazdin 2011) with agreement of at least 80 % or higher (Kazdin 2011).

Interobserver agreement checks were assessed during 20 % (N = 36) of all observations across baseline and intervention conditions. A frequency ratio was utilized to compare the totals of the two observers and calculate a percentage of agreement (Kazdin 2011). To calculate the percentage of agreement, the smaller percentage was divided by the larger percentage and multiplied by 100 (Kazdin). Although frequency ratio is criticized because agreement within this method does not reflect which behaviors observers agreed upon (Kazdin), the design of the housekeeping routines checklist did not allow observers to score on a task-by-task basis. For the mealtime housekeeping routine (N = 12), overall agreement averaged 94 % (range 83–100 %). For the afternoon housekeeping routine (N = 12), overall agreement averaged 93 % (range

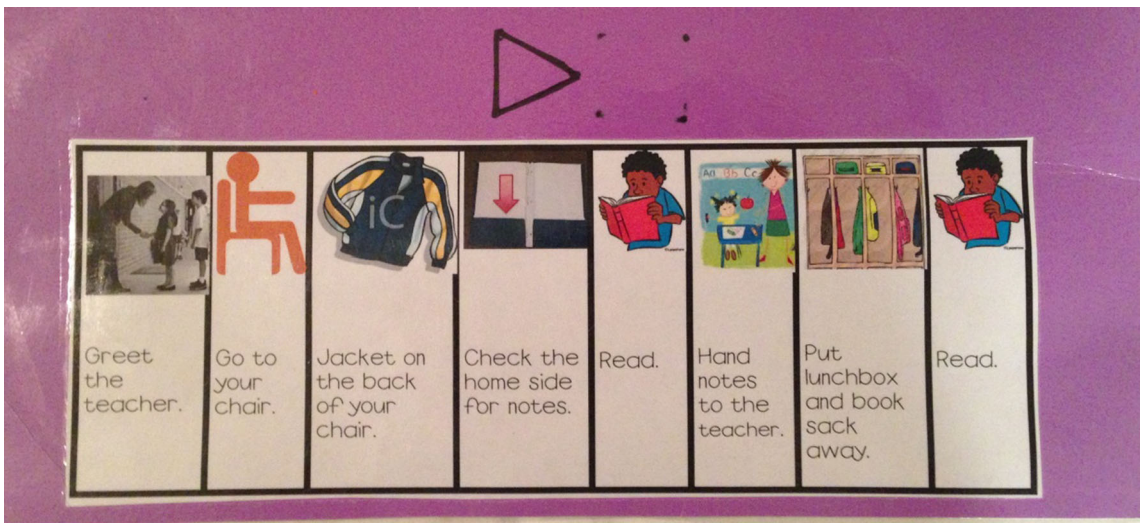

Fig. 1 Morning picture activity card

80–100 %). For morning housekeeping routine (N = 12), overall agreement averaged 94 % (range 83–100 %).

Experimental Design

A single-subject multiple baseline research design was used to record the target child's on-task behavior across the three routines (morning, mealtime and afternoon). A single-subject design evaluates the behavior of individuals before and during an intervention (Kazdin 2011). The strength in this design comes from the staggered application of the intervention across each routine; because the intervention is started at different points in time, we can conclude that changes in behavior are due to the intervention (see Kazdin 2011). In this study, the target child was examined before and during the picture activity schedule intervention, and the target child's baseline percentage of independent completion was compared to the percentage of independent completion once the picture activity schedule intervention was implemented.

Results

This study examined whether picture activity schedules, typically used for students with ASD, could assist a kindergarten-aged boy in the independent completion of multistep housekeeping routines within the context of a kindergarten classroom. Results indicate that once the picture activity schedule intervention was implemented, the target child increased his independent completion of tasks within each of the routines, while also reducing the need for teacher prompting. Results are presented for each routine across baseline and intervention as shown in Fig. 2.

Child Completion

During baseline for the mealtime routine, the target child's percentage of completion averaged 67 % (range 50–83 %). During the picture activity schedule intervention, the target child's percentage of completion averaged 95 % (range 83–100 %). This represents an increase of 29 %.

During baseline for the afternoon routine, the target child's percentage of completion averaged 59 % (range 43–71 %). During the picture activity schedule intervention, the target child's percentage of completion averaged 82 % (range 71–100 %). This represents an increase of 23 %.

During baseline for the morning routine, the target child's percentage of completion averaged 68 % (range 63–75 %). During the picture activity schedule intervention, the target child's percentage of completion averaged 88 % (range 75–100 %). This represents an increase of 15 %.

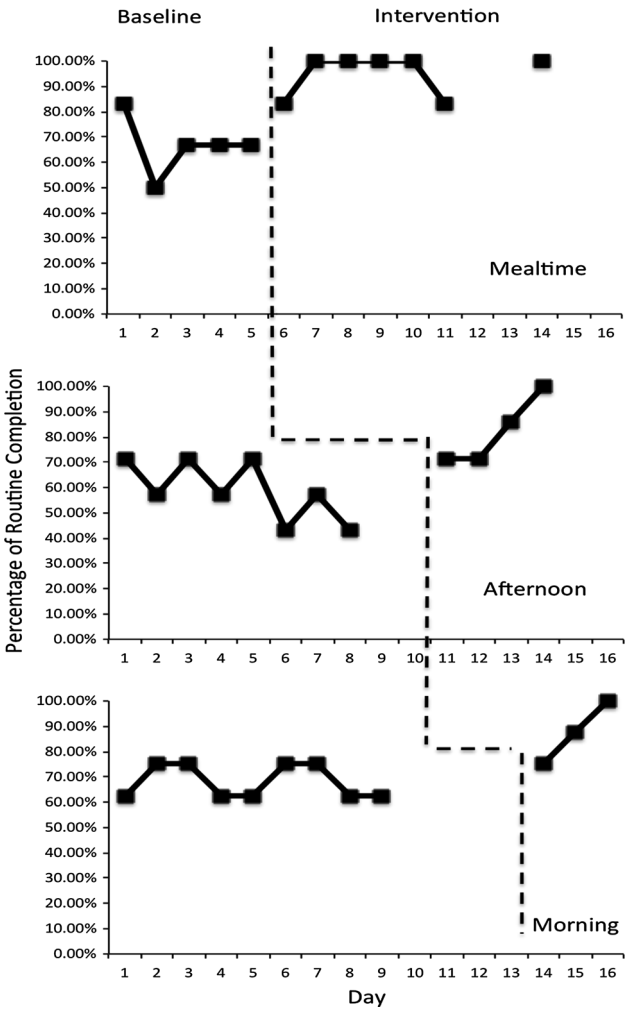

Fig. 2 Percentage of routine completion across the three housekeeping routines

Teacher Prompting

Additionally, the teacher engaged in less prompting across the routines once the picture activity schedule intervention was applied. During baseline for the mealtime routine, the teacher prompted 25 % (range 13–38 %); this consisted of verbal prompting 18 % (range 0–38 %) and physical prompting 8 % (range 0–13 %). When the picture activity intervention was applied, the teacher prompted 3 % (range 0–13 %); this consisted of verbal prompting 3 % (range 0–13 %). No physical prompts were necessary. This represents a 22 % decrease in teacher prompting.

During baseline for the afternoon housekeeping routine, the teacher prompted 36 % (range 25–50 %); this consisted of verbal prompting 25 % (range 13–50 %) and physical prompting 11 % (range 0–38 %). When the picture activity intervention was applied, the teacher prompted 16 % (range 0–25 %); this consisted of verbal prompting 3 % (range 0–13 %) and physical prompting 13 % (range

0–25 %). This represents a 20 % decrease in teacher prompting.

During baseline for the morning housekeeping routine, the teacher prompted 32 % (range 25–38 %); this consisted of verbal prompting 21 % (range 0–38 %) and physical prompting 11 % (range 0–25 %). When the picture activity intervention was applied, the teacher prompted 13 % (range 0–25 %); this consisted of verbal prompting 4 % (range 0–13 %) and physical prompting 9 % (range 0-13 %). This represents a 19 % decrease in teacher prompting.

Discussion

Routines are a necessary part of the school day. It is expected that routines that are completed repeatedly will become subconscious, and will be completed accurately and automatically. Daily routines within a school day are necessary to ensure that children are prepared for instruction, and are able to move efficiently during transitions to maximize instructional time in the classroom. When children have difficulty completing housekeeping routines it takes away from instructional time in the classroom.

Picture activity schedules have been documented in the literature to assist individuals with ASD in completing multi-step sequences across the school day and within routine activities (Bryan and Gast 2000; Koyama and Wang 2011; Duttlinger et al. 2013). Results from the present study are consistent with previous research and suggest that picture activity schedules are effective in increasing completion of classroom routines within a general education kindergarten classroom. Even more impressive is that the results showed that, by the 3rd time of using the intervention, an increase was seen. However, in two of routines, increase of completion was seen by the 2nd time the intervention was used. Only the afternoon routines took up to the three times of usage of the intervention before an increase was seen; based on the instability of the routine completion before the intervention, the results aligned with the thought that it would take the target child longer to reach 100 % for this particular routine. Perhaps, the most robust finding is that the results demonstrate how effective this intervention can be because of the steady increment shown. There was only one time when the progression dropped from 100 %, and the drop was only to 83 % completion (missed one task).

Limitations

One limitation of the present study was that no latency or duration measures were recorded. The amount of time the child took to initiate a response to the teacher's initial transition announcement was not recorded. Additionally, no data were collected on the duration each step in the task analysis took to be completed. From the data collected, it cannot be determined if the child had difficulty completing the fine motor aspects of the task, cognitively remembering the sequence of the steps or if he had difficulty maintaining his attention to the routine.

Clinical Implications

Teachers are continually looking for strategies to maximize instructional time. Consistent with previous research (Banda et al. 2009; Breitfelder 2008; Breslin and Rudisill 2011; Bryan and Gast 2000; Sartini et al. 2013; Vedora et al. 2008), the use of a picture activity schedule increased the student's independence with routines in the classroom, but also minimizing the amount of prompting from the teacher. Teachers can use this intervention to reduce confusion on task completion by assisting students in the exact sequence that the activity should be performed (Breitfelder 2008). Additionally, the visual nature of this intervention aids students in oral comprehension. This intervention is an easy, low-cost intervention that can be used quickly to assist both teachers and students in maximizing learning during the school day.

Furthermore, the teaching of how to use a picture activity schedule is similar to the teaching of how to use an anchor chart, which is a teaching strategy used in many early childhood classrooms. Therefore, when students are introduced to a picture activity schedule, the concept will not be foreign to them because they would have had experience in reading pictures using an anchor chart.

When deciding if a picture activity schedule is right for one of your students, think about students who frequently lag behind peers in task completion. These students could be prime candidates for this intervention. Also, you may want to consider students who tend to be forgetful. Likewise, this intervention can be used with new students to your classroom; this intervention can be used to help the new student adjust.

Lastly, it is important to consider that this intervention should be used as a scaffold, and should be removed once the target child demonstrates consistency. The implications from this study outline that the goal of a picture activity schedule is to foster the child's independence by having the child rely on herself or himself to complete the tasks of the routine instead of relying on teacher aide and support. Therefore, once independence has been established on a constant basis, the visual support should be able to be removed without it affecting the results.

Future Research

Future research should investigate the applicability of picture schedules for other routines within the school day,

such as academic or social tasks. This study did not examine the effects of the intervention after the study period; it would be interesting to determine if the effects of the study persisted in the absence of the picture activity schedule or how long the picture activity schedule was required before the student learned the routine in the absence of the picture activity schedule. Future research could examine the use of this technology with other routines within the context of the early childhood classroom environment, or with other populations, such as students learning English as a Second Language, or beginning readers. It is not clear if the target child responded to the novelty of the picture activity schedule; future research should extend the data collection to determine if effects of the intervention would persist.

The use of picture schedules has been well-documented in the literature (Banda et al. 2009; Breitfelder 2008; Breslin and Rudisill 2011; Bryan and Gast 2000; Lequia et al. 2012; Milley and Machalicek 2012; Sartini et al. 2013; Vedora et al. 2008), particularly in the disability population. However, results of the present study suggest that this intervention can be used successfully within the regular education population with minimal effort on the part of the teacher and readily incorporated into daily classroom routines.

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