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# Effects of Picture Prompts Delivered by a Video iPod on Pedestrian Navigation

Kelly R. Kelley, Ph.D.

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for Individuals with Intellectual Disabilities  
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## Statement of Problem

- National data indicate individuals with intellectual and developmental disabilities (IDD) have not had the same access to education, employment, independent living, and extracurricular activities (Newman, Wagner, Cameto, & Knokey, 2009)
- One reason is lack of transportation access and training (Myers, 1996; Sohlberg, Fickas, Lemoncello, & Hung, 2009)
- Travel training and pedestrian navigation are critical skills that need to be explicitly taught since they impact how people live, work, and participate in their community (Groce, 1996)



## Limitations in Current Literature

- Most travel training studies were conducted in the 1970s and 1980s in simulated classroom environments with skill generalization to natural environments producing mixed results
- Recently, two studies paired travel training with the latest, age-appropriate technologies to teach students how to navigate by bus or walk to destinations (Mechling & O'Brien, 2010; Mechling & Seid, in press)



## Limitations in Current Literature

- No studies have provided instruction for navigating back to starting locations
- No studies allowed for “independent” travel without the researcher present
- Adult models were placed in pictures and not directional arrows
- Previous Cyrano Communicator technology was expensive (\$1,300) and not universally accessible



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## Purpose

- To investigate the effects of using picture prompts displayed through a video iPod on pedestrian navigation with young adults with IDD (18-26 years old) participating in an inclusive individualized postsecondary program at a 4-year university



## Research Questions

1. What is the effect of pedestrian navigation training using a video iPod (i.e., picture prompts of a series of intermediate on-route and final locations) on travel route completion to and from specified locations for young adults (age 18-26) with IDD?
2. To what extent do young adults (age 18-26) maintain independent use of the video iPod for pedestrian navigation skills?



## Research Questions

3. To what extent do young adults (age 18-26) generalize use of the video iPod to untrained locations?
4. What are participants' perceptions of using the video iPod as a method for independent travel?
5. What are undergraduate special education majors' and minors perceptions of developing materials for video iPod training?



## Participants and Settings

- Participants
  - 4 young adults (18-26 years old) with mild to moderate intellectual and/or developmental disabilities (IDD)
  - 2 males, 2 females (Caucasian)
  - All ambulatory; independently used crosswalks
  - All lived and participated in a fully inclusive postsecondary program
- Setting
  - Rural accredited university located in southeastern United States near the Blue Ridge Mountains





## Dependent Variables

- Correct and independent travel of a route to and from specified locations
- Percentage of correct landmarks reached for each route
- Length of time it took participants to complete the entire travel route (i.e., from point A to point B and back to point A)

Participant: \_\_\_\_\_

Date: \_\_\_\_\_

Completed by: \_\_\_\_\_

Phase (circle/#): BL\_\_\_ INT\_\_\_ R1\_\_\_ R2\_\_\_ R3\_\_\_ GM/MAINT\_\_\_

POINT A TO POINT B Campus Location: _____	Correct 1= either mid or end point reached independently and within time limit; 2= both mid and end points reached independently and within predetermined time limit	Incorrect 0= mid or end point route not reached independently or within predetermined time limit	Time in minutes and seconds (add all times from points and record in last row)
Starting location (Point A) _____	No data recorded	No data recorded	Start:
Picture 2	2 OR 1	0	
Picture 3	2 OR 1	0	
Picture 4	2 OR 1	0	
Picture 5	2 OR 1	0	
Picture 6	2 OR 1	0	
Picture 7	2 OR 1	0	
Picture 8	2 OR 1	0	
Picture 9	2 OR 1	0	
Picture 10	2 OR 1	0	
Picture 11	2 OR 1	0	
Picture 12	2 OR 1	0	
Picture 13	2 OR 1	0	
Destination (Point B) _____	2 OR 1	0	Stop:  Start:

Used the following scale:

0= mid or end point  
route not reached  
independently or within  
predetermined time limit;  
1= either mid or end  
point reached  
independently and within  
time limit; 2= both mid  
and end points reached  
independently and within  
predetermined time limit



## Design and General Procedures

- Multiple probe across participants design
- Baseline: campus map with marked Point A and Point B locations
- Video iPod training: training script for how to use device buttons (e.g., forward, backward); less than 10 minutes to complete training
- Maintenance data collected at one and three weeks on trained route
- Generalization measures to an untrained route



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## Video iPod Intervention

- Four 15-30 minute sessions per week
- Participants were given a video iPod with pictured landmarks of entire routes and told, “Use the pictures on the iPod to help you get to XX and then back to here.”
- Three routes trained and then an observer “followed” participant without researcher present after each route was mastered
- Researcher only prompted participant if requested or if they navigated off route for more than 30 seconds



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## Sample Route of Pictured Routes and Directional Arrows





## Additional Results

- Interrater Reliability- collected on 30.1%
  - For correct routes and percentage of landmarks overall interrater reliability was 100%
  - For length of time using total duration overall IOA was 98.6% (range of 91.3% to 100%)
  - For length of time using mean duration per occurrence overall IOA was 96.4% (range of 66.7% to 100%)
- Procedural Fidelity- collected on 55% of sessions and was 100% across all sessions

# Results

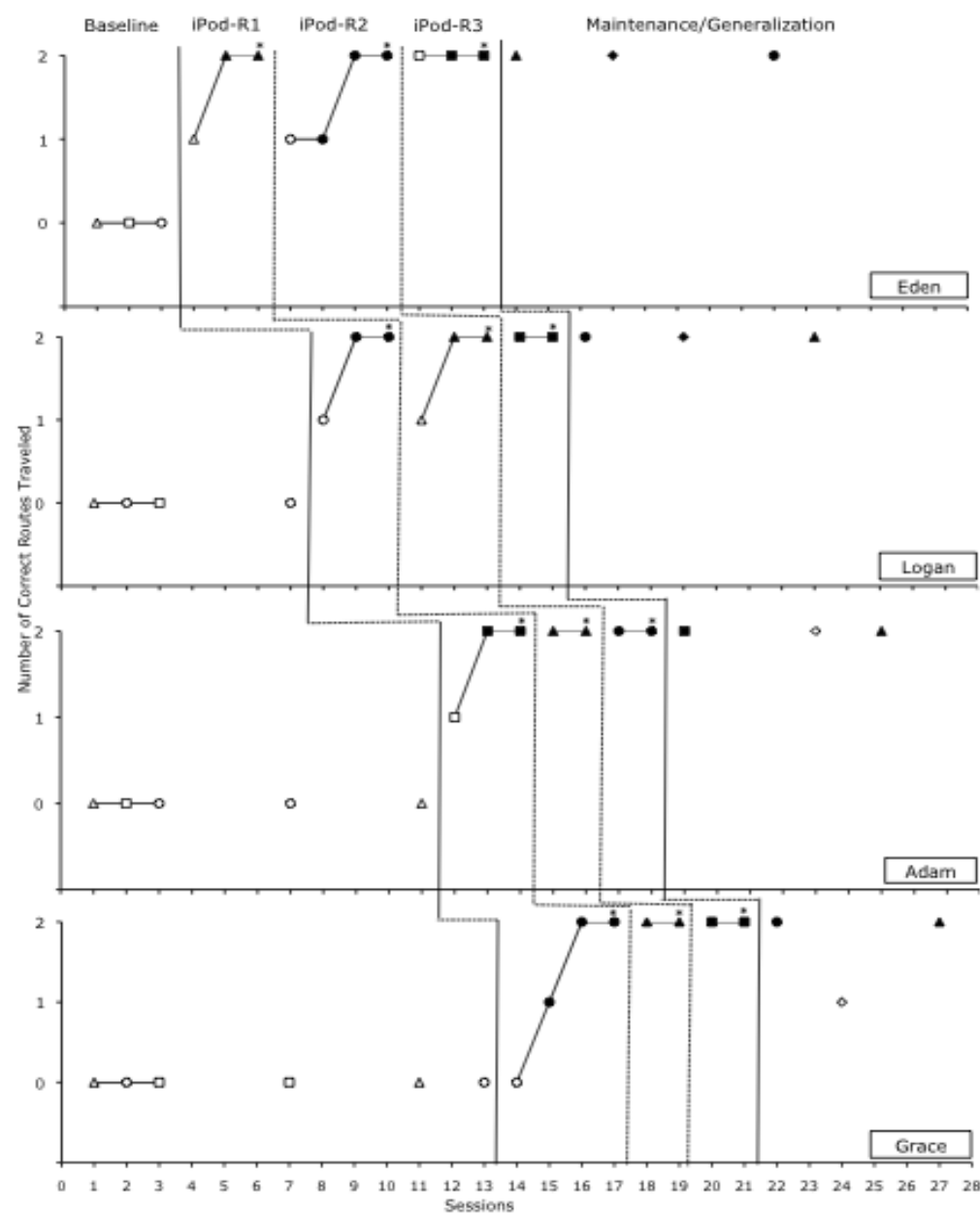


Figure 1. Number of correct routes navigated (to and from destinations) across four participants. Note. Closed data points= navigated route within appropriate time limits; Open data points = navigated route, but not within appropriate time limits; Route 1 =  $\triangle$  to and from Hunter Library and Moore Building; Route 2 =  $\square$  to and from Natural Sciences Building and Student Catholic Center; Route 3 =  $\circ$  to and from Student Recreation Center and Graham Building;  $\diamond$  = Novel untrained route without trainer; \* = routes without researcher present



# Results

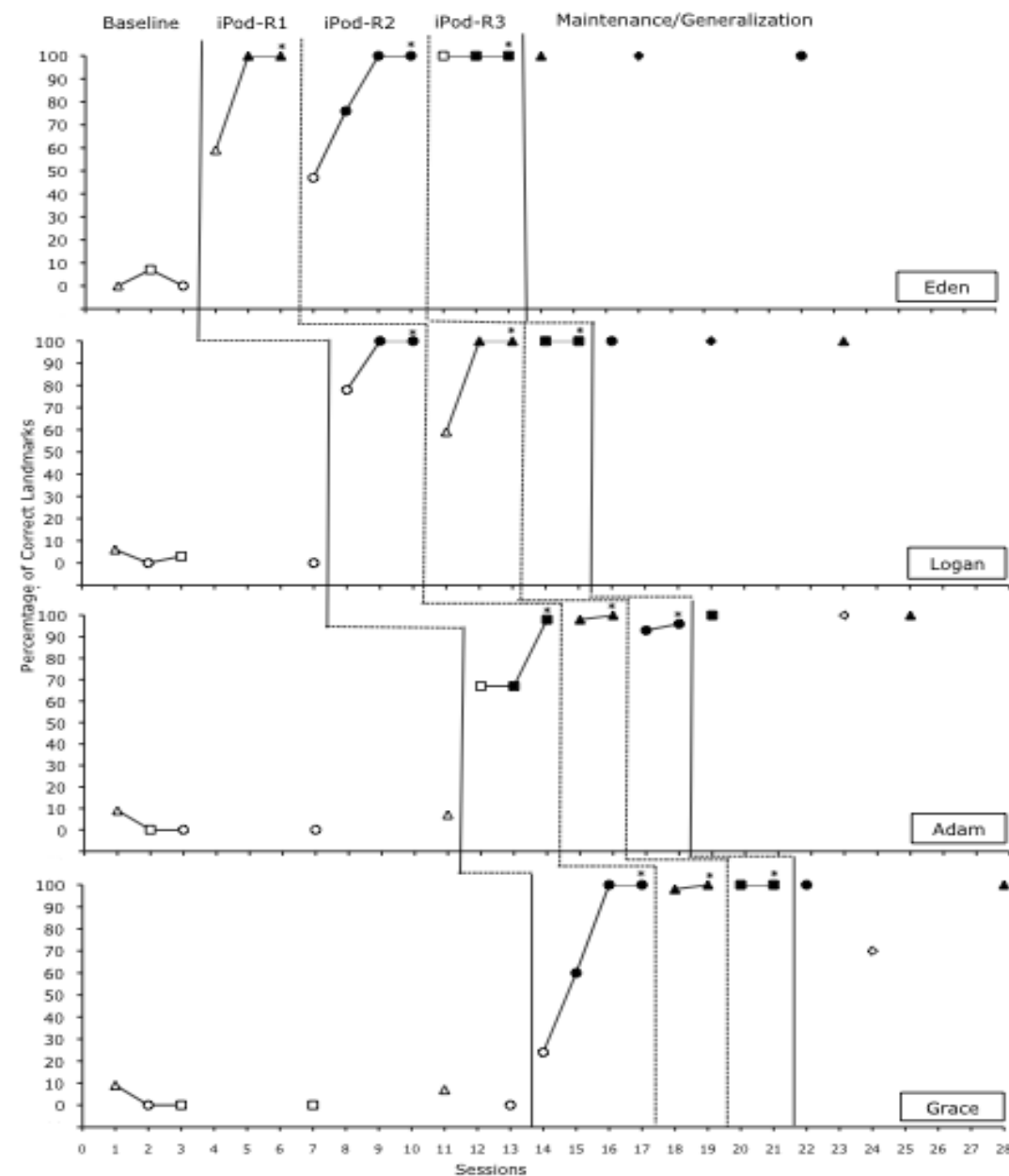


Figure 2. Percentage of correct landmarks (to and from destinations) across four participants. Note. Closed data points= navigated route within appropriate time limits; Open data points = navigated route, but not within appropriate time limits; Route 1 =  $\blacktriangle$  to and from Hunter Library and Moore Building; Route 2 =  $\blacksquare$  to and from Natural Sciences Building and Student Catholic Center; Route 3 =  $\bullet$  to and from Student Recreation Center and Graham Building;  $\diamond$  = Novel untrained route without trainer; \* = routes without researcher present



# Results

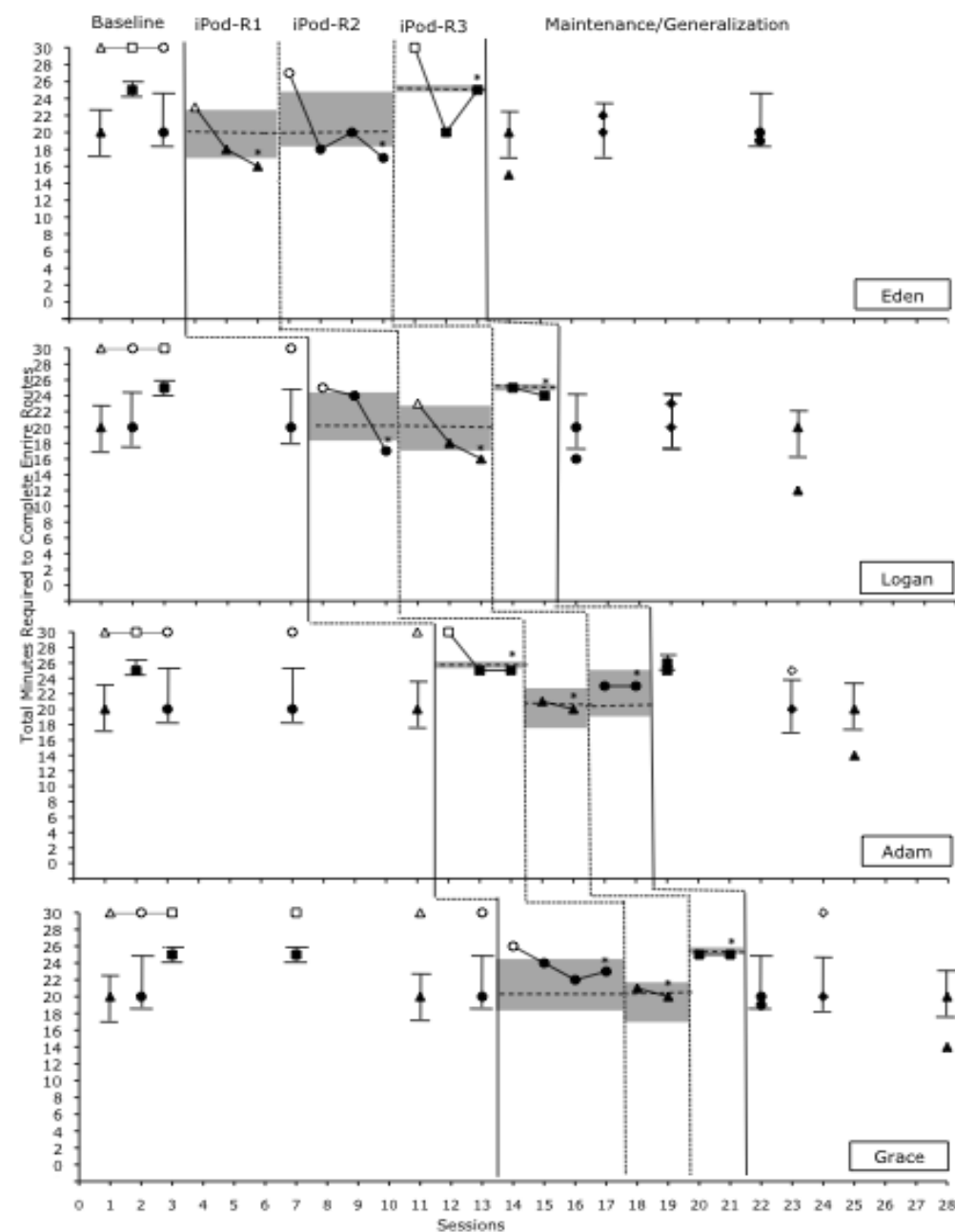


Figure 3. Number of minutes required to complete routes (to and from destinations) across four participants. Note. Closed data points= navigated route within appropriate time limits; Open data points = navigated route, but not within appropriate time limits; Route 1 = △ to and from Hunter Library and Moore Building; Route 2 = □ to and from Natural Sciences Building and Student Catholic Center; Route 3 = ○ to and from Student Recreation Center and Graham Building; ◇ = Novel untrained route without trainer; \* = routes without researcher present



## Social Validity

- Participants agreed or strongly agreed that:
  - iPod helped them travel with more confidence
  - Picture prompts were easy to use
  - iPod helped them learn how to get to other places on campus
  - They would tell their friends about how to use the iPod to use pictures on the iPod to travel
  - They felt their navigation skills had improved because they learned how to use the iPod to help them travel



## Social Validity

- Undergraduate agreed or strongly agreed that:
  - Developing routes seemed easy and practical
  - Felt more confident they could create the materials
  - Would use the iPod to teach travel training in future teaching experiences
  - They could use the iPod device to teach other independent living tasks
  - Training should be shared with future teachers and students to help individuals with disabilities
  - They felt comfortable using technology to teach with



## Discussion

- Findings support using picture prompts displayed on the video iPod to teach pedestrian navigation skills to and from various campus locations
- Maintenance data indicated all four participants were able to navigate successfully using the iPod for up to 28 days
- Generalization data indicated all four participants were able to navigate successfully to trained routes without prompting and one participant only needed one prompt to navigate to untrained novel routes



## Limitations

- Small number of participants limits generality
- Lack of long-term maintenance data
- Study did not address indoor travel training
- Hard to determine if participants continued to rely on iPod or learned routes
- Walking times were not as accurate since researcher had to follow further behind participants
- Weather could have impacted iPod function (e.g., rain getting device wet, sun disrupting picture display)



## Suggestions for Future Research

- Conduct future studies with varied student populations and geographic locations
- Collect maintenance data at 1, 3, and 6 months
- Examine levels of fear and anxiety for traveling alone
- Combine indoor and outdoor travel training
- Take the iPod device away to see if participants have mastered the route without iPod support
- Find ways to collect time data without being close to the participants
- Consider weather related issues and find ways to maximize iPod use in rain and sun



## Implications for Practice

- Find ways to modify or adapt devices to unique needs of individuals
- Know and research technology before using it
- Consider behaviors being taught to maximize alertness and safety
- Consider stimuli when taking pictures and adding directional arrows
- Picture prompts can be used to teach concepts with and without technology to individuals with IDD



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## Questions? Contact Information

**Kelly R. Kelley Ph.D., UP Program**

**Coordinator Western Carolina University University**

**Participant Program 152D Cordelia Camp**

**Building Cullowhee, NC**

**28723 [kkelley@email.wcu.edu](mailto:kkelley@email.wcu.edu) Office: 828-227-**

**[3298](http://up.wcu.edu) WCU UP Program Website: <http://up.wcu.edu>**