Teaching Cooking Skills to Young Women with Mild Intellectual Disability: The Effectiveness of Internet Websites

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The purpose of this preliminary study was to evaluate the effectiveness of using streaming video websites to improve, maintain, and generalize the cooking (meal-making) skills of four young women (18-22 years old) diagnosed with intellectual disabilities. A pre-experimental design was used to evaluate the effectiveness of a web-based multimedia program. Instruction consisted of supported viewing and imitation of cooking videos available online, with students searching for a video of the desired recipe, viewing it, and then imitating the video's sequence of steps to complete the cooking task. Results were assessed by means of a questionnaire administered to each participant's primary caregivers, and indicated that the structured use of the websites was effective in improving students' meal-making skills. Implications and suggestions for future research are also discussed.

Keywords: cooking, video modeling, intellectual disabilities, websites, life skills

Curriculum for students with intellectual disabilities should emphasize skills that are both functional and useful, leading to the greatest possible levels of self-reliance and self-determination. Given the increasing presence of digital technology in the lives of many children, including computers, smart phones, Internet websites and chat rooms, electronic toys, and learning games (Parette, Horcade, Boeckman, & Blum, 2008; Alqahtani, 2013), it is becoming increasingly necessary that skills acquisition take into account the complexities of navigating a technology-rich world.

One skill that has been identified as especially important to independent daily living is that of meal preparation, or cooking (Arnold-Reid, Schloss, & Alper, 1997; Graves, Collins, Schuster, & Kleinert, 2005; Mechling, Gast & Field, 2008; Sigafoos et al., 2005). In addition to the more obvious benefits of being able to

prepare one's own meals, these skills can be an important aspect of self-independence. According to the National Longitudinal Transition Study-2, the most common work-study jobs for secondary students with disabilities were in food service related positions (Cameto, Marder, Wagner, & Cardoso, 2003). Cooking can also provide important exposure to a variety academic and functional skills, such as reading, budgeting, shopping and food purchasing, item identification, measurement, and sequencing, as well as choice making, self-determination, and other skills necessary to independent living (Madaus et al., 2010; Mechling, 2008; Morse & Schuster, 2000). Within the context of a cultural setting or country that places value on a young woman's skill in providing nourishing meals to her family, the ability to participate in meal preparation can take on even greater importance.

The use of video and multimedia has been a

natural partner in teaching meal preparation skills to individuals with intellectual and other disabilities. Sturmy (2003) described video technology as "a novel and expanding technology for providing positive behavior support" to this population. More specifically, video modeling has been found to be particularly effective in teaching independent performance of multistep tasks to persons with disabilities (Delano, 2007; McCoy & Hermansen, 2007; Mechling et al., 2008; Mechling et al., 2009; Mechling & Gustafson, 2008). Using video modeling, a student watches another person perform a complete chain of steps and then imitates the behavior. A person may also watch a video made from the participant's point of view as if he/she were performing task, or watch a task being performed, step by step, and complete each step in sequence before moving onto the next video clip. As technology has progressed, video modeling has increasingly utilized computers and personal digital devices to become interactive in nature, permitting flexibility and personalization to fit individual student needs. This interactive form of video modeling has been shown to be effective in supporting such diverse activities as independent completion of job-related tasks (e.g., Furniss et al., 2001; Van Laarhoven et al., 2009), long-term maintenance of vocational skills (e.g., Cihak, Kessler, & Alberto, 2007), and a variety of social, communication, and daily living skills. (Ayres & Langone, 2005; Bellini & Akullian, 2007; Metchling, 2004; Mechling & Gustafson, 2008; Murzynski & Bourret, 2007; Sigafoos et al., 2005).

Multimedia video modeling has been found to be effective in regard to food preparation skills. In a study combining multimedia and a system of least prompts (SLP), Mechling et al. (2008) utilized a portable DVD player within the kitchen environment to teach multi-step cooking tasks to youth with intellectual disabilities. Similarly, Metchling and Gustafson (2008) compared the efficacy of static picture to video prompts in teaching cooking related tasks to students with developmental disabilities, and found that participants who utilized video prompts exhibited a greater degree of independence in task completion. However, while such studies demonstrate the efficacy of utilizing multimedia in cooking instruction, they do not address an important aspect of meal preparation – namely, the ability to independently prepare new, or novel, foods, that were not explicitly addressed in the structured curriculum.

One of the limitations of pre-packaged cooking instruction is that the cooking repertoire of participants is limited to recipes chosen, task-analyzed, and turned into video footage by support personnel. While certainly an important step forward from being unable to cook at all, this strategy provides only limited self-determination, since the student cannot explore or choose dishes outside those videotaped for them. To best foster individual independence, therefore, meal preparation must be considered to consist not just of mastery of a predetermined list of specific dishes, but rather, of the ability to successfully prepare new dishes on one's own.

Unlike the more static nature of researcher-created video modeling materials, the Internet provides a wealth of cooking instruction via streaming video, that is created by other internet users and uploaded to constantly evolving collections such as YouTube and Google Videos. These online collections come with their own set of instructional difficulties, however, for not only do they vary widely in format, vocabulary, and quality, but before they can be used they must be successfully located using standard Internet searching protocols. As such, individuals with disabilities who might utilize online content for video modeling of meal preparation must master two sets of skills instead of one: first, they must master the basic cooking tasks (e.g., measuring, cutting, mixing) that may appear in a given recipe, and second, they must be able to independently search for streaming video that can serve as video models for recipes they might want to prepare.

The development of skills does not happen in a vacuum. Rather, it takes place within a social and cultural context that determines what interventions are appropriate, what individuals should be involved in teaching and learning, and who within a family should be turned to for information. All these variables, and more, provided the context for this study, strengthening it in some ways, and requiring methodological compromises in others. The study was conducted in an Arabic-speaking location, and all participant interactions, curriculum, websites, and measures were originally in that language. Parents and guardians were deeply involved in both intervention and measurement of progress, as appropriate to the surrounding family structures, but at the same time harming the degree to which internal validity can be assumed. The resulting methodology is pre-experimental in nature, but nonetheless provides a valuable glimpse into both the effectiveness of a particular intervention, and the ways in which intervention can be incorporated into the family lives of young women with intellectual disabilities in Saudi Arabia.

This preliminary study builds on current understanding of the effectiveness of video modeling in teaching cooking skills by addressing the following question:

> *Does training in finding and using online cooking videos (e.g., YouTube content) as video models for meal preparation increase participant independence in subsequent meal preparation?*

To address this question, the study provided instruction in searching for, finding, and following models provided in YouTube cooking videos, and measured participants' cooking-related skills before and after the instruction occurred.

Method

Utilizing a pre-experimental one group pre-test post-test design, this study examined the degree to which training in the use of websites with cooking related multimedia content would affect autonomy in subsequent cooking activities. Four participants were provided with one-on-one daily training in the use of YouTube to locate video tutorials on the preparation of family-selected dishes, and in using the videos as a model to prepare the dish themselves. A questionnaire regarding cooking-related skills was administered to each participant's mother before and after the training, and the results compared to evaluate participant progress.

Data Collection

A 17-item questionnaire regarding cooking-related skills was created by the researcher, in collaboration with the participant's classroom teachers. This questionnaire was administered to each participant's mother before and after the training, and the results compared to evaluate participant progress.

Participants and Setting

Students. Participants were four young women with mild intellectual disabilities, who were attending public school in Tabuk, in the Kingdom of Saudi Arabia (KSA). Participants were selected informally from among female students in the school's program for young adults with intellectual disabilities, aged 18-22, whose vision and hearing were within the typical range and whose educational objectives (e.g., life skills, cooking skills) were compatible with the skills that would be taught during the study. Participants also met the following prerequisite criteria, as indicated by their educational files:

a) ability to read simple words and short sentences
b) no identified attentional deficits
c) emerging or established basic computer skills (e.g., pointing and clicking with a mouse, keyboarding) in keeping with their literacy abilities
d) previous experience with computer-based and multimedia instruction.

All students had previously participated in rudimentary meal preparation training as part of their education, which included preparing specific food items, cleaning vegetables, and identifying ingredients in a recipe. Individual characteristics are shown in Table 1.

Table 1
Participant Characteristics

Participant	Age	IQ[a]	Disability	Strengths Identified in Educational Records	Areas of Need
A	20	65	Down Syndrome	Counts up to 50 Reads approximately 120 words Speaks in full sentences Very social	Cannot prepare meal independently Cannot use money independently Cannot tell time
B	22	70	Intellectual	Counts up to 100 Reads approximately 250 words. Good money and cleaning skills	Cannot prepare meal independently Cannot create a menu Cannot tell time
C	19	75	Intellectual	Reads on a 4th grade level Spells on 2nd grade level Can tell time Can count money	Cannot use money independently Needs assistance in kitchen.
D	20	68	Intellectual	Reading on a 3rd grade level Spells on a 2nd grade level Can identify basic foods	Short attention span Cannot tell time

Note: Participant characteristics were taken from the students' educational files.
[a] Reported IQ scores are as measured by testing conducted by the participants' school as part of the special education process.

Table 2
Sample Course Options Provided By Participants' Families

Main Course	Soup	Drink	Dessert
Kabsa	Vegetable	Apple/ Orange juice	Caramel
Potato Kubbeh	Bean	Ice tea	Jelly
Okra stew, Bamiah	Lentil	Watermelon	Ice cream
Rice, pasta, potato	Island	Lemon with mint	Knafa
Chicken, meat, fish	Carrot	Fruit Cocktail	Basbosa

Setting. Instruction took place individually, twice per day and 5 days per week, in the kitchen in each participant's home. A laptop computer with the necessary capabilities (keyboard, external mouse, speakers, and high-speed internet access) was positioned on the kitchen table directly in front of the student. The instructor sat to the right of the participant. Kitchen contents varied, but all included a stove, oven, refrigerator, and basic cooking tools (i.e. bowls, cutting boards and knives, cooking pots, and measuring utensils) as appropriate to the participant's family.

At the start of the study, each participant's family was asked to supply a list of five food selections in each of four course categories – a main course, soup, beverage, and dessert – that were appropriate to their tastes and eating habits. (See Table 2 for an example of a week's menu.) The researcher then searched YouTube to ensure that videos of each dish being prepared could be found using a keyword search. The resulting individualized lists of courses were then used during the intervention phase.

Staff. The intervention was conducted by classroom teachers who held Bachelor degrees in special education, and had at least three years experience in the classroom. The mothers of the four students also participated in supporting roles, as their schedules allowed.

Intervention

Once the menus had been set, participants then practiced towards mastery of a meal each day, with the modeling and guidance of an instructor. Each day's meal preparation activities followed a set sequence. With the guidance of the instructor, the participant would:

1) Select courses from the supplied list
2) Prepare a shopping list of the needed ingredients
3) Use the supplied laptop to visit the YouTube website, search for, find, and watch a video of the dish being prepared
4) Gather the needed cooking utensils
5) Prepare the meal

The modeling and support was unscripted, with instructional choices and interactions made based on the expertise of each instructor.

Results

Overall, parent report of participant meal preparation skills, as measured by the 17-item questionnaire, increased from a mean of 1 skill (5.9%) to a mean of 11.75 skills (68.8%). Figure 1 provides a comparison of pre- and post-intervention questionnaire responses. See Tables 3 and 4 for a list of included questions and summary of results.

At the start of the study, Participant A was rated as exhibiting mastery of none of the skills in the questionnaire. She was unable to prepare a meal, use money, or tell time independently. After the intervention, Participant A's areas of competency had risen from 0 to 13. She was rated as able to shop for ingredients, and to complete many of the steps of independent meal preparation, unaided. She remained unable to tell time.

Participant B was familiar with YouTube as a cooking resource prior to the intervention, and had good money skills; however, she was unable to shop unaccompanied, to put together a menu, or to complete most cooking tasks unassisted. After the intervention she remained unable to shop independently or to tell time, but exhibited an increase of independence working on food preparation tasks.

Like Participant A, Participant C was rated initially as exhibiting of none of the skills in the questionnaire. She was unable to prepare a meal, use money, or tell time independently. After the intervention, Participant A's areas of competency had risen from 0 to 13. She was rated as able to go food shopping, and complete many of the steps of independent meal preparation unaided. She remained unable to tell time.

At the start of the study, Participant D had good money skills, and was able to search YouTube for cooking videos. She was rated as unable to complete any of the other questionnaire tasks. After the intervention, Participant D's areas of competency had risen from 2 to 9. She remained unable to tell time.
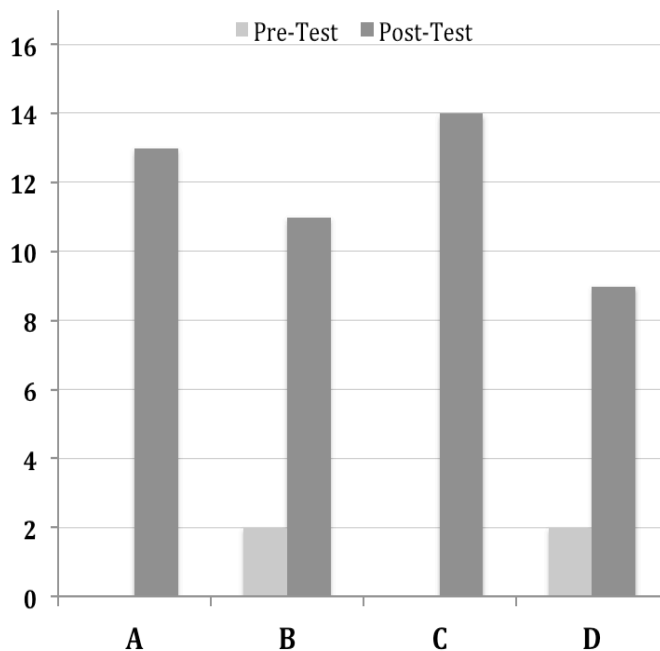

Figure 1. Number of items selected as 'yes' on pre- and post-intervention skills questionnaires completed by the participants' parents.

Table 3
Pre-intervention Questionnaire and Results

		Participant			
Item		A	B	C	D
1	Can go to the supermarket unaccompanied	x	x	x	x
2	Can use money	x	yes	x	yes
3	Can buy groceries without help	x	x	x	x
4	Can put together a menu without help	x	x	x	x
5	Can select recipes without help	x	x	x	x
6	Can clean vegetables without help	x	x	x	x
7	Can prepare food quantities without help	x	x	x	x
8	Can prepare the meat for cooking without help	x	x	x	x
9	Can use cookbooks without help	x	x	x	x
10	Can use cooking websites without help	x	x	x	x
11	Utilizes YouTube for cooking	x	yes	x	yes
12	Can choose between multiple recipes without help	x	x	x	x
13	Can cook what she sees on YouTube without help	x	x	x	x
14	Can follow modeled instructions	x	x	x	x
15	Can tell time	x	x	x	x
16	Can use a clock	x	x	x	x
17	Can use a kitchen timer	x	x	x	x
	Total Yes	0	2	0	2

Table 4
Post-Intervention Questionnaire and Results

Item		Participant			
		A	B	C	D
1	Can go to the supermarket unaccompanied	yes	x	x	yes
2	Can use money	x	yes	yes	yes
3	Can buy groceries without help	yes	x	x	x
4	Can put together a menu without help	yes	yes	yes	yes
5	Can select recipes without help	yes	yes	yes	yes
6	Can clean vegetables without help	yes	yes	yes	yes
7	Can prepare food quantities without help	yes	yes	yes	yes
8	Can prepare the meat for cooking without help	yes	yes	yes	x
9	Can use cookbooks without help	yes	x	yes	x
10	Can use cooking websites without help	yes	yes	yes	yes
11	Utilizes YouTube for cooking	yes	yes	yes	yes
12	Can choose between multiple recipes without help	yes	yes	yes	x
13	Can cook what she sees on YouTube without help	yes	yes	yes	x
14	Can follow modeled instructions	yes	yes	yes	yes
15	Can tell time	x	x	yes	x
16	Can use a clock	x	x	yes	x
17	Can use a kitchen timer	x	x	x	x
	Total Yes	13	11	14	9

Discussion

This study explored the degree to which the ability to access online cooking videos would affect participant's overall ability to prepare meals independently. All four participants exhibited an increase in their ability to independently select menu items and to prepare them. After the completion of the intervention, participants' parents rated them as more successfully completing a variety of independent tasks related to cooking, including shopping, recipe selection, and food preparation. There was no change in participant mastery of skills that were unrelated to the cooking intervention, such as clock use or time-telling skills.

While the experimental design dictates that only limited conclusions be drawn, the data are promising. Participants demonstrated a greater degree of freedom to choose and complete self-selected meals than they had in the past, along with an increase in general cooking skills. This suggests that online videos can be successfully utilized for video modeling purposes, freeing both participants and educators from the limitations of locally created video materials and providing a degree of self-determination that has not been possible in the past.

Limitations

This study presents a number of important limitations. First, practical and socio-cultural considerations (e.g., choice of participants, selecting acceptable skills, the need to provide training n a way that met the school schedule) made it necessary to use a pre-experimental design, which can provide only weak internal validity. As such, the improvement in cooking skills may potentially have resulted from unidentified co-occurring variables. Second, the data are drawn entirely from parental report, with the same parent completing pre- and post- checklists for a given participant, and in some cases, aiding in the intervention. Lastly, the items on the questionnaire were operationally defined to those who completed it, and so it is unlikely that all responders shared similar definitions of phrases such as 'without help' or 'use a cookbook'. These limitations are not insignificant; however, given the precedent for the use of high quality quasi-experimental and pre-experimental designs within special education (Gersten et al., 2005), the results nonetheless provide information that is of value to the wider body of intervention literature. Future studies might focus on implementing a more robust experimental design, examine additional skill sets where online videos might be utilized to support video modeling instructional techniques, or explore the ways in which internet skills are generalized by participants into other areas of their lives. Future research might also gather more specific information about how the videos were found and utilized (e.g., if the participants were able to type in related search terms, if they selected the most relevant videos, and so forth), that might be used to increase the effectiveness of the intervention.

Conclusions

When providing instruction to individuals with intellectual and developmental disabilities, discreet skill acquisition must be paired with instruction on using those

skills to enhance the independence, dignity, and self-determination of the individual with disabilities. The widespread availability of online streaming video has made possible a new step in the evolution of video modeling as an instructional tool. With the ability to access streaming video that can be used as a video modeling tool, individuals with intellectual disabilities can be freed from the constraints of materials provided to them by researchers, educators, or organizations, and take personal ownership of another important area of independent living – that of selecting and preparing one's own meals.

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