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ORIGINAL ARTICLE

COMBINATION OF SIMULATION AND COMMUNITY BASED INSTRUCTION (CBI) ON THE ACQUISITION OF SHOPPING AND TELEPHONE SKILLS AMONG STUDENTS WITH INTELLECTUAL DISABILITIES

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Abstract

Background: An instructional approach is one important variable to consider when providing community skills training with regards to cost effectiveness. Thus, there is a need for research in examining the effective types of instruction to train primary school children with intellectual disabilities to acquire the functional skills. **Purpose:** This study examined the effectiveness of using a combination simulation instruction and Community Based Instruction (CBI) on acquisition of shopping and telephone skills among children with intellectual disabilities aged 9 to 13 years old. **Methods:** A one group pre-test post-test design was used. Twelve (n=12) children with intellectual disabilities were recruited in this study. Participants were pre tested using task analysis and levels and types of prompting were measured at the beginning of study for a baseline data. After 4 weeks, participants were post tested again using task analysis and levels and types of prompting were measured. **Results:** Results showed that a 4 week combination of simulation instruction and community based instruction (CBI) with a prompting strategy increased the number of steps achieved independently for the shopping and telephone tasks and reduced the number of prompt required for the completed both tasks. **Conclusion:** This research was carried out in a self-funded special education school setting. The study aimed to make a preliminary investigation into the effectiveness of an intervention to enhance occupational therapy service delivery. The lessons learned during the conduct of the research have provided helpful indicators which warrant further investigation and provided pointers to future research design.

Key words: community based instruction, prompting strategy, functional skills

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INTRODUCTION

Intellectual disabilities is defined as the presence of a sub-average general intellectual functioning associated with or resulting in impairments in adaptive behaviour.¹ The level of intellectual disability is classified by intelligence quotient (IQ) scores and ranges from mild to profound. The onset of this disability occurs before the age of 18 and is

considered if the intelligence quotient (IQ) score is 70 or below. In Malaysia, 37% of people with disabilities or 46,140 people fall under the category of intellectual disabilities.²

The instructional approach is one important variable to consider when providing community skills training with regards to cost effectiveness and efficiency. Simulation

instruction is conducted in a classroom setting which involves artificial stimuli such as visual media and pictures of task sequences which are designed to function as simulations of the task.³ There is some evidence of successful learning when instruction is provided only through classroom based simulations.^{4,5} However, decreases in the child's performance were noted later when applied in community settings, therefore there is a need for additional instruction based in the community.⁶

The other type of instruction is Community Based Instruction (CBI), one of the approaches for promoting generalization. CBI is conducted in real settings and generally used to teach community skills such as purchasing skills³, using public phones⁷ and shopping for groceries.⁸ These studies have shown that CBI is effectively used for training children and youth with intellectual disabilities. A few small studies involving acquisition of shopping and telephone tasks have been conducted in communities.^{7,8,9,10} but the literature revealed practical difficulties such as the relative efficacy of simulated and community-based instruction (CBI) and these have been clouded by uncontrolled methodological differences.¹¹ These differences include the condition/characteristics of the participants such as age group and level of disabilities; types of functional tasks trained and the types of prompting strategy used.¹²

Thus, the purpose of this study is to examine the effectiveness of using a combination intervention which incorporates simulation instruction and community based instruction (CBI) by; (a) Exposing student with moderate level of intellectual disabilities ages 9-13 years old with two instructional settings (classroom and natural environment (local shop and school) using the least prompting to most prompting strategy; (b) Across two specific tasks (shopping and telephone tasks); (c) Identifying the level and type of prompting (verbal, physical prompts and physical assistance) required in completing the both tasks. To do this, it was necessary to seek evidence of changes in the specific group of

participants that is primary school children age 9 to 13 years old with moderate level of intellectual disabilities in a way to control the effects of the intervention in specific types of groups.

METHODS

A one group pre-test post-test design was used (See Figure 1.1). The one group pre-test post-test design has been reported to be useful for the purpose of measuring change resulting from experimental treatments.¹³ The measurement of change provides a vehicle for assessing the impact of rehabilitation services, as well as the effects of specific occupational therapy interventions. Furthermore, this design would be more effective and more ethical to have only one group act as a control. In this way all the participants received and could potentially benefit from the intervention. This would also facilitate a larger sample.

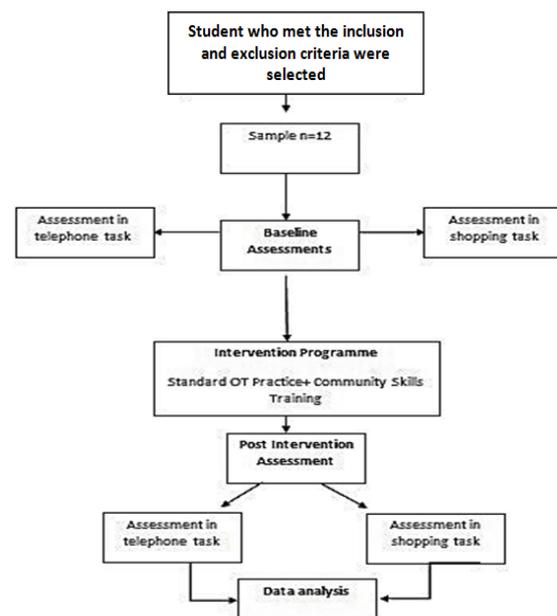


Figure 1.1 Flowchart of Study Design

Ethical issues

This present study was conducted after receiving approval from Brunel University Research Committee; instrumental ethics approval from the Sinar Harapan School authority; had permission letter from shop manager; agreement for the therapists' involvement was also received. A written copy

of the participant information sheet and parental consent form was received from the parents. In relation to research with children; the child or guardian should give fully informed consent. In the case where the participant refused to engage or showed dissatisfaction at any point in conducted this study, their wish was respected and they were removed from the research.

Research Setting

The study was conducted at Sinar Harapan School, Pulau Pinang, Malaysia. Furthermore, the Community Based Instruction (CBI) occurred in a local shop nearby the school. The shop contained 2 aisles and 2 checkout lanes. The simulation instruction training occurred in the occupational therapy room in the school.

Procedure

All nineteen (19) students at age 9 years to 13 years old were invited to participate in the study. Twelve (12) children with intellectual disabilities met the inclusion criteria were recruited in this study. Participants for this study were selected based on following inclusion criteria; (a) Students diagnosed with intellectual disabilities.¹ (b) Aged 9 to 13 years old (c) In the judgment of the therapist or teacher that the children warrant intervention regarding functional skills or community skills (especially shopping and telephone tasks) (d)

Received the primary special education program (e) Received OT intervention programme. These children also had met the following exclusion criteria in that they had no additional condition such as below; (a) Children with neurological illness, physical disabilities, neuromuscular disorder, deaf, blind, low vision, severe speech difficulties and mental health problems. This study focuses on children involved in the types of instruction in community tasks that were affected by their Intelligence Quotient (IQ) level; not because of confounding factors such as physical disabilities or neuromuscular disorders as these have an effect on their level of independence in the community setting (b) Students who do not refer to Occupational Therapy intervention programme. Additionally, there is no screening process as the participants are known to have difficulties in shopping and telephone tasks as identified by their therapist and teacher. The baseline measurement was given as an indication of the skill level of the participants.

The shopping task involved 13 steps consisting of purchasing food and drinks that were selected by the therapist and participants. The telephone task involved 10 steps consisting of making telephone calls and having a telephone conversation⁹ (See Figure 1.2). During the intervention phase, all the participants received a combination of simulation

Step	Shopping Task	Step	Telephone Task
1	Enter shop	1	Picks up receiver
2	Goes to correct section	2	Holds receiver correctly
3	Select item 1	3	Dials number correctly
4	Select item 2	4	Waits for answer
5	Goes to counter	5	Says own name
6	Waits in queue	6	Invite friend to his/her house
7	Sets item on counter	7	States day and time
8	Waits to be told cost	8	States correct address
9	Gives appropriate money	9	Finishes conversation appropriately
10	Waits for change	10	Replaces receiver
11	Puts money in pocket		
12	Collects items		
13	Leaves shop		

Figure 1.2 Task Analysis for Shopping and Telephone Tasks⁹

instruction and community based instruction (CBI) for shopping and telephone tasks given 30 minutes to one hour per session, 4 times per week for 4 consecutive weeks during school days. The intervention sessions were carried out by one qualified occupational therapist that had experience of community skills training in the special education school. The participants were trained in a classroom setting using simulation instruction such as using storyboards and role play and after that underwent CBI while visited the local shop and were involved with genuine telephone conversation in a school setting. This functional task emphasized on money concepts, numbers, sequencing and finding information.

During training the therapist allowed the participants to proceed through tasks at their own pace, interrupting them only to provide assistance when the error occurred. A verbal prompt including any verbal instruction or cue was provided to a participant for performing a step in the sequence. A physical prompts including any gestural cue, such as miming how doing the task, pointing to written or visual signs, or indicating where to find items, and physical facilitation which involved hand over hand guidance to enable the participant to initiate, continue or complete the task.¹¹ Whenever verbal and physical prompts did not facilitate the successful performance of any step in the sequence was resulted the therapist repeated the verbal instruction and graduated physical guidance was provided to assure that the participant performed the step correctly. Then, direct physical assistance was provided where the therapist completed most of the steps for the participant. Descriptive social praise was delivered by the therapist following each correct response, regardless of no prompting occurred.

Participants were pre tested using task analysis and levels and types of prompting were measured at the beginning of study for baseline data. After 4 weeks, participants were post tested again using task analysis and levels and types of prompting were measured to examine the effectiveness combination of

simulation instruction and community based instruction (CBI). Steps will be performed independently if the participants are able to complete each of the steps within one to two minutes after the completion of the previous step and in the absence of any further instruction or assistance. If independent performance is not achieved either within the specified time during an intervention, or within 10 seconds from the last instruction or step during each of evaluation and intervention sessions, assistance was provided. The level and type of prompts each participant required to complete each step was also noted.

The test was administered by a qualified occupational therapist that had experience in community skill training. To minimise bias, the pre-test data was sealed in an envelope and sent to the researcher immediately after the completion of pre-test. This was to reduce the chance of learning the assessment and remembering of referring to the pre-test results that may affect the findings.¹⁴ The researcher does not involve in any of the data collection or intervention procedure.

RESULTS

Statistical Analysis

The data were not normally distributed this was established by using a checking normality assumption function on Statistical Product and Service Solutions (SPSS) version 18.02. Therefore, non-parametric Wilcoxon signed rank tests were used for analysis.¹⁵ A Wilcoxon signed-rank test showed that a 4 week combination of simulation instruction and community based instruction (CBI) with a prompting strategy increased the number of steps achieved independently for a shopping and telephone tasks.

Demographic Data

Twelve (n=12) participants involved in this study. Eight (8) of them were female which accounted two-third of the total number of participants while the others were male (4). With regard to demographic information (See Table 1.1).

Frequency (n) (%)	Gender	Age	Ethnicity	IQ Level	Diagnosis
	- Female n=8(66.7%)	9-10 n=6 (50%)	-Malay n=10 (83.3%)	Moderate n=12 (100%)	Intellectual disabilities n=12 (100%)
	- Male n=4 (33.3%)	11-12 n=4 (33.3%)	-Chinese n= 1 (8.3%)		
		13 n=2 (16.7%)	-Indian n= 1 (8.3%)		

Table 1.1 Demographic Data of Participants

Effect of combination simulations and Community Based Instructions (CBI) on a number of steps achieved independently for shopping and telephone tasks.

A statistically significant change in the number of steps was achieved independently for a shopping task ($Z = -3.097$, $p = 0.002$) and the telephone tasks ($Z = -2.694$, $p = 0.007$). (See Table 1.2)

Levels and Types of Prompting Required in Shopping and Telephone Task

The effect of intervention on a frequency of prompting required for the shopping and telephone task are presented in table 1.2. A Wilcoxon signed-rank test showed that for shopping task there was a highly statistically significant difference for all levels and types of prompting as verbal prompts ($Z = -3.103$, $p =$

0.002); physical prompts ($Z = -2.825$, $p = 0.005$); physical assistance showed that there were statistically significant ($Z = -2.428$, $p = 0.015$). The data were further analysed to examine the total promptings required in completing the task and the results showed that there was a highly significant difference ($Z = -3.062$, $p = 0.002$).

For the telephone task, there was a highly statistically significant difference for all levels and types of prompting as verbal prompts ($Z = -3.064$, $p = 0.002$); physical prompts ($Z = -2.719$, $p = 0.009$); physical assistance showed that there were statistically significant ($Z = -2.694$, $p = 0.007$). The total prompting required in completing the task and the results showed that there was a highly significant difference ($Z = -3.064$, $p = 0.002$).

Variable	Pre intervention Median (IQR)	Post intervention Median (IQR)	Z- statistic	P-value
No of steps achieved independently				
Shopping task	8 (1.75)	10 (2.75)	-3.097	0.002
Telephone task	4 (2.25)	5.5 (3.75)	-2.694	0.007
Level and types of prompting required				
Shopping task				
Verbal prompts	9.5 (4.75)	5.5 (3.75)	-3.103	0.002
Physical prompts	6 (4.75)	2 (3.75)	-2.825	0.005
Physical assistance	1 (2.50)	0 (0.00)	-2.428	0.015
Total score prompting required	18(7.50)	8 (6.00)	-3.062	0.002
Telephone task				
Verbal prompts	15.5 (5.75)	7.5 (5.50)	-3.064	0.002
Physical prompts	5 (1.00)	3 (2.50)	-2.719	0.007
Physical assistance	2.5 (2.00)	0 (1.00)	-2.694	0.007
Total score prompting required	22 (8.50)	11 (7.75)	-3.064	0.002

Table 1.2 Levels and Types of Prompting Required in Shopping and Telephone Task

DISCUSSION

Shopping task

The results indicated that combining simulation instruction and CBI significantly affected participant's acquisition. Participants were taught the shopping skills in the classroom and followed up by applying the skills in a local shop this resulted in significant differences in the steps achieved independently between the pre-test and post-test. The results also indicated that the combination simulation and CBI with least prompting to most prompting strategy were effective in reducing the number of prompts required to complete the steps independently. Fewer prompts were required for the participants when completing each of the steps in the shopping task. These findings are in line with previous investigations that found positive effects in combination of simulation instruction and CBI with a prompting strategy among students with moderate intellectual disabilities when training shopping skills.^{8,11,12,16,17} Moreover, it showed that the development of money concepts remained a significant area for shopping skills that has to be addressed.

Children were familiar with money concepts from as early as age of six or seven years old, but children with intellectual disabilities have on-going difficulties with these concepts.¹⁸ Students who lack money recognition skill may need specific instructional and prompting strategy. This body of research illustrates well how to make these instructions for purchasing skills. For example, in this study, training in money recognition in simulation instructions and the use of role play was applied with their friends in the classroom before applying the skills in the local shop, this proved effective to train shopping skills among children with moderate intellectual disabilities.

Telephone task

The findings indicated an increase in the number of steps achieved independently and with fewer prompts required. In this study, participants had difficulties in dialling the number correctly, engaging in the phone

conversation and ending the calls. The primary reason for these findings appeared to be as the participants had a lack of experience in using a telephone and due to the literacy challenges faced by many of the participants in the study. Some participants have difficulty in understanding the instructions, reading the telephone number and communicated in the telephone call. Furthermore, it seemed some of the participants were confused whether a number had been dialled or whether a call had ended.

In this study used a basic telephone model with no specific adaptation applied was to give the participants experience of operating a basic telephone model. Even though, there was no adaptation applied at the phone models, there was a card cues used in training session as to prompt the participants in dialling the phone number correctly. It is noted that the change was from no participants able to dial numbers correctly before training; this increased to four participants who achieved the step independently. This might due to the participants were involved in a role play and were required to make phone calls in simulation instruction session before applying the skills to having a genuine phone conversation in the CBI sessions. The simulation instruction increased opportunities for training trials during one session.

Limitations of the study

There were some difficulties in the use of task analysis as an outcome measure. Even though there was an alternative method used here, there is a point of concern with task analysis as an outcome measure specifically, that the task analysis should consider the varying ability of the participants. Here when the participants were trained in the telephone task; some participants said they did not have friends to contact so the occupational therapist had to explain and adapt some steps in order to able the participants acquire the skills. In relation to the participant's preferences the task analysis has to be adapted according to participant's condition and situations. This may have affected the

results of the study. Then, the generalization cannot be done due to time constraints, and practical barriers including cost and resource availability. It is identified that there was a testing threat that may affect measured changes because of the number of times the participant was tested. The test itself may add to the participant's knowledge or change their attitudes.

Furthermore, there was a statistical regression threat in this study when participants who scored really high or really low on the test will have a more moderate score the next time they are tested. A study with small sample size will have more of an effect since with less participants, one person's score has a greater effect on the average score.

Future research

Future research should incorporate larger sample sizes allowing more definite conclusions to be drawn. It is needed to examine various types of instructional simulations in combination with CBI across different populations and tasks. It is suggested to use more than one standardized assessment that focuses on functional skills for primary school children in conjunction with the task analysis.

CONCLUSION

The findings from this study support previous findings that combination simulation instruction and CBI with a prompting strategy can be effective in improving the functional skills of children with intellectual disabilities. Children with moderate intellectual disabilities appeared to be benefiting from this combination approach which can be identified by the increasing number of steps achieved independently and the reduction in the level and types of prompting required.

This study supports that this combination approach can be successfully extended to a younger population (9-13 years old). The outcomes were significant for both tasks (shopping and telephone tasks). This combination approach is clearly an effective

practice and appears to be valuable in occupational therapy practice specialised in the special education area. Shopping and telephone tasks have been chosen as important functional skills for promoting the independence of children with intellectual disabilities who begin at an early age, as they need more time in acquiring the skills. These findings also indicated that the combination simulation instruction and CBI with prompting strategy were effective in acquisition of shopping and telephone skills, which could have important implications for staffing and resources. However, the sample sizes were small, limiting the validity of the outcomes.

This research was carried out in a self-funded special education school setting. The study aimed to make a preliminary investigation into the effectiveness of an intervention to enhance occupational therapy service delivery. It also sought to test the suitability of the study design and measures to see whether a larger study was justified. Both of these aims were achieved. Additionally, the lessons learned during the conduct of the research have provided helpful indicators which warrant further investigation and provided pointers to future research designs.

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