

Cognitive Strategies for Children with Special Needs in Educational Settings

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Abstract

The purpose of this study was to explore the cognitive strategies used by Thai occupational therapists for children with special needs in various educational settings. The participants consisted of 55 occupational therapists, using purposive sampling. This study utilized a survey questionnaire, which was examined for content validity by five experts. Data collection was from 55 participants, of which 34 replied. Descriptive statistical analysis was used. The results showed that a sensory cue was used mostly in children with Autism Spectrum Disorder (ASD). Children with intellectual disabilities and ASD had the highest use of cognitive strategies among all disabilities. The therapists used the sensory cue in similar percentages for children with visual and hearing impairment. Various cognitive strategies for those with intellectual disabilities were similarity, including rehearsal technique, rote scripts, association, task simplification, attention to doing, and finger pointing. In addition, attention to doing, was the strategy most preferred among the therapists. On the other hand, task simplification was mostly chosen for children with learning disabilities. Stimuli reduction, organization, and finger pointing were the three strategies most selected for children with speech and language disabilities. The therapists employed self-coaching, task simplification, and finger pointing as the highest strategies for children with behavioral and emotional problems. Moreover, task simplification and the sensory cue were mostly selected for children with multiple disabilities. In conclusion, the occupational therapists used different cognitive strategies for children with special needs in relation to their cognitive problems, to encourage participation in daily routines and schooling tasks.

Keywords: Cognitive Strategies, Children with Special Needs, Educational Settings, Occupational Therapists

Introduction

Cognitive strategies are mental plans of action used in helping a person learn how to solve problems, and increase efficiency and accuracy in occupational performance (Westwood, 2006; Walsh & Anderson, 2009). They can be provided by others or internally generated by the persons themselves, and also used differently or in multiple ways, depending on the problems,

goals, and client factors (Toglia, Rodger, & Polatajko, 2012; Walsh & Anderson, 2009; Singer & Chen, 1994). Cognitive strategies are important tools that can be used to encourage or help a child to learn and solve problems, as well as respond successfully to different situations (Westwood, 2006; Lowe, 2010; Toglia et al., 2012). They are divided into many types, such as, sensory cue, rehearsal, mnemonic technique, rote scripts,

association, elaboration, imagery, anticipation, translation, self-coaching, self-questioning, stimuli reduction, organization, task simplification, lists, pacing strategies, and attention to doing and finger pointing (Toglia et al., 2012). All of these strategies are related closely to occupational performance, depending on appropriate selection (Nott & Chapparo, 2008). Several previous studies stated that implementing effective cognitive strategies for children with special needs could support their learning abilities and contribute to their participation in activities of daily living and school functions in educational settings (Shiran & Breznitz, 2011; Swanson, Lussier, & Orosco, 2015; Cook, Richardson-Gibbs, & Dotson, 2016; Algahtani, 2017). The Ministry of Education in Thailand has divided children with special needs into nine types, including those with visual, hearing and physical impairment, speech and language, learning, intellectual and multiple disabilities, as well as behavioral and emotional problems and ASD. Most of the children exhibited cognitive problems involving the processes of thinking, planning, attention, memory, problem solving, decision making and learning, which affected the everyday life functions of each child (Wolf & Baum, 2011; Clark, & Schlabach, 2013). However, each type of child with special needs has different cognitive problems. Occupational therapists in Thailand work with children who have special needs in educational settings, such as, regular, inclusive and special schools, or special education centers. They play important roles in encouraging and supporting the children to participate in everyday life activities (American Occupational Therapy Association, 2014). Cognitive strategy is an important tool for children with cognitive difficulties, for instance, providing cognitive strategies in math problem solving for children with learning disabilities (Montague, Enders, & Dietz, 2011), increasing reading comprehension for children with hearing impairment (Benedict, Rivera, & Antia, 2015), or improving learning performance for children with intellectual disabilities (Algahtani, 2017). Therapists provide cognitive strategies based on clinical reasoning

and select them appropriately for each client (Toglia et al., 2012). According to reviews of previous literature, the use of effective cognitive strategies could enhance occupational performance in children. However, there is no evidence of research about using cognitive strategies by occupational therapists in Thailand. Therefore, this study surveyed information on cognitive strategies, used by occupational therapists for each type of child with special needs in educational settings in Thailand.

Objectives

The aim of this study was to explore the use of cognitive strategies by occupational therapists in order to enable and promote an effective strategy for children with special needs in various educational settings in Thailand.

Methods

Study Design

This study utilized a survey research design through a questionnaire aimed at exploring cognitive strategies used by occupational therapists in their interventions for children with special needs in educational settings. Ethical approval for this study was obtained from the research ethics committee, Faculty of Associated Medical Sciences, Chiang Mai University, Thailand.

Participants

The participants of this study were occupational therapists, who were members of the Thai Occupational Therapy in Educational Settings Association. In 2018, 101 occupational therapists were working in educational settings in Thailand, under the Bureau of Special Education Administration, Ministry of Education, Thailand. The participants for this study were selected through a purposive selection process. The inclusion criteria included (a) holder of a license in occupational therapy, (b) had worked for over 4 months in educational settings, and (c) consented to participate in this study. A sample of 55 occupational therapists qualified to

participate in this study, of whom 34 completed and returned the questionnaire. Data was missing from 21 participants, who did not return the questionnaire after the follow-up stage.

Instruments

The survey questionnaire, which was the data collection tool developed and designed by researchers, focused on the types of cognitive strategies used by occupational therapists in their interventions. The questionnaire was examined by five experts for content validity on cognitive disabilities in children, and cognitive function treatment. All of the experts were licensed occupational therapists who had been working with special needs children. The experts included an occupational therapy lecturer, an occupational therapist working in private practice, an occupational therapist working in an inclusive school, and two occupational therapists working in special schools. The Index of Item–Objective Congruence (IOC) was 0.79. After the IOC process, some items of the questionnaire were revised according to suggestions by the experts. There were some comments made by the experts, such as, “use simple, clear and specific question wording” and “add examples to clarify key words in some items.” Therefore, some questionnaire items were revised. For example, the item “rehearsal” was changed from “Did you encourage the child to think about the activity information and then repeat the activity steps mentally or verbally before starting?” to “Did you encourage the child to repeat the activity steps mentally or verbally, for retention of memory, such as, brushing, hand washing or wearing socks procedures before starting?”

The survey questionnaire was self-administered, with a set of demographic data and a dichotomous scale checklist format that asked for a yes/no answer. It was divided into two parts as follows:

Part 1: Demographic data of the participants, which consisted of age, gender, educational background and workplace.

Part 2: This part was comprised of 18 items in

a dichotomous scale checklist format, which gathered data on types of cognitive strategies used and applied by occupational therapists during their interventions, in accordance with the type of disability. The 18 types of cognitive strategies proposed by Toglia et al, (2012) were purposively selected for this study, including sensory cue, rehearsal, mnemonic technique, rote scripts, association, elaboration, imagery, anticipation, translation, organization, self-coaching, self-question, stimuli reduction, task simplification, lists, pacing strategies, attention to doing, and finger pointing. Nine types of children with disabilities were included, as described and in accordance with laws of the Ministry of Education in Thailand. They included children with visual, hearing and physical impairment, speech and language, learning, intellectual and multiple disabilities, as well as behavioral and emotional problems, and ASD.

A detailed description or example of all cognitive strategies in this study are listed below (Polatajko & Mandich, 2004; Toglia, 2011; Toglia et al., 2012):

1. Sensory cue: Using the sensory cue as a prompt or guide in tasks, such as, visual or auditory cues.

2. Rehearsal: Repeating information mentally or verbally by using key words for retention of memory.

3. Mnemonic technique: Using associated information that is easy to remember with an image or action cue.

4. Rote scripts: Using repetitive data, such as, acronyms or abbreviations to help in recalling information of actions.

5. Association: Connecting similarities of information with previous experiences or knowledge in order to enhance learning and memory.

6. Elaboration: Adding new information, such as, images, words or actions and relating it to previous information.

7. Imagery: Mental images that convert objects or actions into images, symbols or representation.

8. Anticipation: Thinking or verbalizing obstacles or possible situations in order to assist in planning

before tasks.

9. Translation: Converting into easier information during tasks such as written instructions.

10. Self-coaching: Talking to oneself positively in order to increase persistence or help in emotional control.

11. Self-question: Asking oneself key questions that relate to a task.

12. Stimuli reduction: Reducing or removing parts of information or task stimuli.

13. Organization: Arranging task steps or materials, such as grouping similar items together.

14. Task simplification: Splitting steps or simplifying tasks for easier management.

15. Lists: Using a list of steps to guide or cue actions in tasks, such as writing or pictorial sequences.

16. Pacing strategies: Using actions to assist in the timing of activities, such as, taking breaks or counting to oneself.

17. Attention to doing: Identifying important cues or paying attention to features during tasks.

18. Finger pointing: Pointing a finger for important stimuli that increases attention to details during a task.

Procedures

Researchers advertised the study and asked for volunteers to participate through the Thai Occupational Therapist in Educational Settings Association, before survey letters were sent to the 55 occupational therapists. These letters included the research objective and procedure, consent form, and questionnaire. At the follow-up stage, two weeks after the letters were sent, the researchers sent a reminder to the president of the above mentioned association

in order to re-notify its members about the research. The survey was self-administered. The participants were asked to complete the questionnaires and return them to the researchers by post. The data obtained from the questionnaires was checked for completeness and then analyzed.

Statistical Analysis

The types of cognitive strategies, practiced and applied by occupational therapists to the nine groups of children with special needs, were analyzed and presented by descriptive statistics.

Results

The reply rate for the questionnaires was 61.81% (n = 34), and findings reflected the cognitive strategies used and applied by the occupational therapists in promoting occupational performance of children with each type of disability. Characteristics of the 34 participants are displayed in Table 1. They were comprised of 5 males and 29 females with an average age of 35 years 5 months and an average of 9 years 7 months work experience in educational settings. The majority of them had a master's degree (67.65%). Most worked in special education centers (55.88%), followed by special schools (44.12%). All of them were licensed occupational therapists. Frequency and percentages of cognitive strategy usage in occupational therapy practice for the nine types of children with disabilities, were calculated and are presented in Table 2.

Table 1: Demographic data of the participants (n = 34)

Participant Characteristics		n	%
Age	20-29 years	4	11.76
	30-39 years	24	70.59
	40-49 years	5	14.71
	50-59 years	1	2.94
	(average age = 35 years 5 months)		
Gender	Male	5	14.71
	Female	29	85.29
Education	Bachelor's degree	11	32.35

	Master's degree	23	67.65
Workplaces	Special Education Center	19	55.88
	Special School	15	44.12
	Work experience in educational settings		
	4 -11 months	1	2.94
	1-5 years	9	26.47
	6-10 years	9	26.47
	11-15 years	11	32.35
	16-20 years	3	8.82
	21-25 years	1	2.94
	(average work experience in educational settings = 9 years 7 months)		

Table 2: Percentages of cognitive strategy usage according to types of children with special needs

Types of cognitive strategies	Types of disabilities								
	% of usage * (n = 34)								
	visual	hearing	intellectual	physical	learning	speech	behavioral	ASD	multiple
Sensory cue	32.35	32.35	82.35	61.76	38.24	23.53	32.35	94.12	61.76
Rehearsal	26.47	20.58	88.24	67.65	38.24	26.47	29.41	88.24	55.88
Mnemonic technique	26.47	26.47	85.29	58.82	38.24	23.53	29.41	82.35	55.88
Rote scripts	23.53	26.47	88.24	64.71	41.18	23.53	29.41	88.24	55.88
Association	23.53	29.41	88.24	64.71	44.12	26.47	32.35	88.24	61.76
Elaboration	23.53	23.53	85.29	64.71	41.18	23.53	26.47	85.29	58.82
Imagery	23.53	26.47	85.29	64.71	38.24	20.59	32.35	82.35	58.82
Anticipation	26.47	23.53	85.29	61.76	38.24	20.59	32.35	88.24	58.82
Translation	26.47	26.47	82.35	61.76	38.24	20.59	32.35	85.29	55.88
Self-coaching	26.47	29.41	82.35	67.65	41.18	23.53	38.24	82.35	55.88
Self-question	26.47	23.53	85.29	64.71	44.12	23.53	35.29	85.29	58.82
Stimuli reduction	23.53	26.47	82.35	61.76	44.12	29.41	32.35	79.41	55.88
Organization	26.47	29.41	82.35	61.76	41.18	29.41	29.41	82.35	55.88
Task simplification	23.53	29.41	88.24	67.65	47.06	26.47	38.24	91.18	64.71
Lists	23.53	29.41	76.47	58.82	41.18	26.47	32.35	82.35	55.88
Pacing strategies	23.53	29.41	82.35	61.76	41.18	26.47	32.35	82.35	58.82
Attention to doing	23.53	23.53	88.24	70.59	44.12	26.47	35.29	88.24	61.76
Finger pointing	23.53	29.41	88.24	64.71	44.12	29.41	38.24	85.29	64.71

Remark:

* % of usage was computed and compiled based on the number of 34 participants who used each type of cognitive strategy.

In each column of disability types, the results indicated that for children with visual and hearing impairment, the therapists mostly used the sensory cue (32.35%), and they usually employed different strategies for children with intellectual disabilities, including the rehearsal technique, rote scripts, association, task simplification and attention to doing, as well as finger pointing (88.24%). In addition, attention to doing (70.59%) was mostly preferred among therapists when helping children with physical impairment. On the other hand, the therapists

mostly chose the task simplification technique for children with learning disabilities (47.06%). Stimuli reduction, organization and finger pointing were mostly selected for children with speech and language disabilities (29.41%), and self-coaching, task simplification and finger pointing were the most preferable strategies for children with behavioral and emotional problems (38.24%). Furthermore, task simplification and sensory cue were mostly selected from other types of cognitive strategies for children with multiple disabilities (64.71%).

When considering the percent age of each strategy applied for the specific type of disability, the results showed that therapists used a sensory cue mostly for children with ASD (94.12%). Rehearsal, association, rote scripts, and attention to doing were most frequently emphasized in children with intellectual disabilities and ASD (88.24%). Mnemonics and imagery were employed mostly for those with intellectual disabilities (85.29%). Elaboration was preferred mostly for children with intellectual disabilities and ASD (85.29%). Anticipation and translation were used mostly in children with ASD (88.24% and 85.29%, respectively). Self-coaching, organization, and pacing strategies were most frequently used for children with intellectual disabilities and ASD (82.35%). Self-question was used mostly for intellectual disabilities and ASD (85.29%). Finger pointing and stimuli reduction technique were selected mostly when therapists were working with children who were diagnosed with intellectual disabilities (88.24% and 82.35%, respectively). Task simplification technique, as well as lists, were used mostly in the treatment of children with ASD (91.18% and 82.35%, respectively).

Discussion

Results from this study showed that occupational therapists employed all types of cognitive strategies in the treatment of all types of children with disabilities in educational settings, especially ASD and intellectual disabilities. There were very high percentages of all techniques, when compared to those with different types of disabilities, while the highest percentage was the sensory cue technique which was emphasized by therapists when providing intervention for children with ASD. This may be due to the signs and symptoms of ASD that affect cognitive ability. ASD is a neurodevelopmental disorder that impairs social activity, language and sensory integration, as well as being closely related to cognitive domains and executive function (EF) (American Psychiatric

Association, 2013; Luyster & Lord, 2009; Solomon et al., 2009). Atypical responses to sensory stimuli and atypical sensory behavior, which are new criteria in DSM-5 for diagnosing ASD, were reported in 92% of ASD cases (Dido, Susie, Tony, Emily, & Gillian, 2016). In addition, children with ASD presented EF difficulties, such as, poor concept formation, working memory and mental flexibility, and inhibited response (Demetriou et al., 2018). In accordance with these problems, the sensory cue technique was mostly preferred by the occupational therapists. The sensory cue consisted of visual, tactile, auditory and kinesthetic cues, such as, pictures, tones, light touch and deep pressure, which could promote attention and guidance while performing activities (Toglia, 2011; Toglia et al., 2012). As such, the therapists mostly selected the sensory cue technique to solve sensory or behavioral problems in children with ASD. This finding is consistent with the study by Lal & Bali (2007), which addressed the use of visual strategies as having a positive effect on the development of communication skills in children with ASD. Visual strategies included objects, pictures, symbols and manual signs, which were provided for each child during the intervention period.

Furthermore, when compared within types of disabilities, the results illustrated that children with intellectual disabilities presented high percentages of cognitive strategy use by occupational therapists. Various strategies, such as, rehearsal, rote scripts, association, task simplification, attention to doing, and finger pointing, were used. Children with intellectual disabilities often demonstrate limitations in intellectual functioning, adaptive behavior, cognitive functioning and EF, such as working memory, which affects their participation in daily living skills (Shree & Shukla, 2016; Danielsson, Henry, Rönnerberg, & Nilsson, 2010). In accordance with these problems, the therapists used all types of strategies in over 75% of these children. Algahtani (2017) suggested many strategies for teaching children with intellectual disabilities,

one of which was a breakdown of activities into small parts in order to make them simple and appropriate for each child. This kind of teaching strategy is similar to the task simplification technique, which was defined and used by therapists in this study. Moreover, other teaching techniques, such as direct instruction and asking a child what to do, or how to do something, were reported by Algahtani (2017). Those techniques were considered as similar to the attention to doing strategy in this study.

Furthermore, the percentage of usage analysis found that the therapists used all of the strategies in over 50% of the children with physical impairment and multiple disabilities, including attention to doing, task simplification and finger pointing. These children not only presented orthopedic disabilities or motor function problems, but also cognitive impairments, for example, in children with multiple sclerosis of longer disease duration. They demonstrated deficits in executive functions, information processing speed, attention, working memory, and expressive language. (Banwell & Anderson, 2005; Till et al., 2011). Therapists usually provide these cognitive strategies to improve the daily activities performance of each child. Besio, Carnesecchi, & Converti (2013) reported that the prompt technique was a key element, which could be used to facilitate attention to doing, in daily activities. Results noted that percentages were less than 50% use, in all types of cognitive strategies in five types of children with special needs, including those with visual and hearing impairment, speech and language and learning disabilities, and behavioral and emotional problems. Various cognitive strategies were used for each child, depending on their individual problems and levels of severity. This result differed from previous research by Zhang & Kong (2018), which reported that cognitive strategy use could improve attention and working memory in learning disabilities. They used various cognitive strategies in a 12-session training program, for instance, increasing the field of using a card, repeat of content, rehearsal, summarizing, classifying, association, and lists.

Thus, use of appropriate cognitive strategies assisted learning ability, academic performance and participation in daily tasks for children with special needs (Shiran & Breznitz, 2011; Cook et al., 2016). Additionally, the participants in the study worked in special schools and special education centers which are not involved with all types of children with disabilities. These settings mainly provided services for children with ASD and intellectual disabilities. These therapists had few opportunities to assist children with visual and hearing impairment, speech and language and learning disabilities, and behavioral and emotional problems.

Limitations

There were some limitations in this study. The sample size was small and only one area of occupational therapy practice was covered, which was in educational settings. Thus, this study cannot be generalized overall for practices in Thailand. Future research in other settings, such as hospital-based and community-based settings, is suggested.

Implications

The findings of this study have implications for occupational therapy practitioners. The results illustrated that therapists provide services for all types of children with special needs in special education centers and special schools. They have diverse levels of complications in cognitive problems. The therapists selected cognitive strategies that were suitable for each child, based on clinical reasoning skill and knowledge translation among cognitive models of practice. In addition, they used all types of cognitive strategies because children with special needs display various and different cognitive problems. However, all of the cognitive strategies needed to be emphasized with children with ASD and intellectual disabilities. The main goal of the therapists is to facilitate opportunities and participation of each child in their occupations and educational settings. It was

indicated that therapists in educational settings are concerned with cognitive problems affecting the abilities of children in their daily life activities, education, and other occupational areas.

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