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Original Article

Supporting students with disabilities to achieve high potential through occupational therapy services during transition periods

Apoiando estudantes com deficiência durante períodos de transição para atingirem um elevado potencial por meio de serviços de terapia ocupacional

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Abstract

Introduction: Transition periods are integral parts of a person's life span, characterized by phases of life and shifts in activity before adapting to new situations. **Objectives:** This study aims to understand the high potential characteristics of students with disabilities and evaluate the roles of school-based occupational therapists (SBOT) in assisting these students during transition periods. **Method:** This study comprised 196 students and five SBOT. Research instruments included a characteristic checklist for potential learners and an in-depth interview methodology. The checklist, developed from related literature, consisted of three domains: physical and socio-emotional health, self-determination, and communication and academic performance. Students' performance levels were rated by teachers, with high potential characteristics being defined as achieving an average total score ≥2.0, without obtaining a zero in any checklist item. **Results:** Most participants achieved full scores for high potential characteristics in the physical and socio-emotional health domain. Most SBOT provided direct, indirect, and integrated services using various service delivery models that were tailored to different types of disabilities. **Conclusion:** This study provides fundamental information for SBOT and school professionals to foster high-potential characteristics in students with disabilities during transition periods. Suitable services in the domains of physical and socio-emotional health, self-determination, and communication and academic performance can enhance these high-potential characteristics.

Keywords: Occupational Therapy, Transition Zone, Students, Disabled Persons.

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Resumo

Introdução: O período de transição é parte natural da vida de uma pessoa. Pode ser classificado por fases da vida e mudança de atividade antes de entrar em novas situações. **Objetivos:** Explorar características de alto potencial de alunos com deficiência e investigar os serviços de terapeutas ocupacionais escolares (SBOTs) para esses alunos durante os períodos de transição. **Método:** Participaram 196 alunos e 5 SBOTs. Os instrumentos de pesquisa compreenderam o checklist característico dos potenciais aprendizes e uma entrevista em profundidade. A lista de verificação foi desenvolvida pela literatura relacionada e consistia em três domínios, incluindo saúde física e socioemocional, autodeterminação e comunicação e desempenho acadêmico. A pontuação do nível de desempenho dos alunos foi avaliada pelos professores. As características de alto potencial dos estudantes deste estudo significaram a obtenção de pontuação total média igual ou superior a 2,0, não tendo tido nenhum zero em qualquer item avaliado pelo checklist. **Resultados:** A maioria dos participantes atingiu a pontuação completa das características de alto potencial no domínio saúde física e socioemocional. A maioria das SBOTs prestava serviços diretos, indiretos e integrados com base em diversos modelos de prestação de serviços diferenciados para cada tipo de deficiência. **Conclusão:** Este estudo fornece informações fundamentais para SBOTs e profissionais escolares a fim de estimular características de alto potencial em alunos com deficiência em períodos de transição. Serviços adequados nas áreas de saúde física e socioemocional, autodeterminação e comunicação e desempenho acadêmico podem aprimorar características de alto potencial para esses estudantes.

Palavras-chave: Terapia Ocupacional, Zona de Transição, Alunos, Pessoas com Deficiência.

Introduction

According to the national report of 2021, approximately 2 million people in Thailand were registered with a disability identification card, and could therefore access welfare funding and rehabilitation services, including healthcare, education and vocational training. Of those people, 141,361 were students with disabilities, aged 6 to 21 years (Department of Empowerment of Persons with Disabilities, 2021). However, a survey of the Occupational Therapy Association of Thailand revealed that only 1,674 registered occupational therapists work as allied healthcare professionals by providing services to people with disabilities (The Occupational Therapy Association of Thailand, 2022). There was an insufficient number of school-based occupational therapists (SBOTs) in the school system to provide occupational therapy programs for all children with disabilities. The Thai Occupational Therapist in Education Settings (2019) report presented only 121 SBOTs working as health providers in educational settings, including special education schools and centers, which belong to the Special Education Bureau, Ministry of Education. Meanwhile, the Thai government has attempted to support education for these children and encourage them to gain employment after they leave school. Therefore, they were enrolled in special education curricula and received related professional services from a multidisciplinary team, including occupational

therapy, physical therapy, speech therapy, special education, and many others. Studying in a special education school is an option that the government has addressed in a policy that encourages children with disabilities to join the education system. The students with disabilities in Thailand are placed in special education schools where they are classified by disability type, including physical, visual, hearing, and intellectual disabilities. Students enrolled in special education schools receive a parallel curriculum, as addressed by the Ministry of Education. Besides the provision of education, the students receive related professional services from a multidisciplinary team, including occupational therapist, physical therapist, special education teacher, speech pathologist, and school psychologist (Office of the Basic Education Commission, 2010). Unfortunately, a majority of the students could only graduate from middle school, and only 24.17% of them were employed after final graduation, despite the schools having individualized education and related intervention programs to support students and their families (Department of Empowerment of Persons with Disabilities, 2021; Goodman et al., 2019). This finding is similar to that in the study by Burgess & Cimera (2014), who indicated that only 36% of students with autism spectrum disorder (ASD) reached successful employment after school graduation.

A transition period is the duration of time in which a dynamic process of change occurs between the person and environment. Each period is influential in the daily life of a person, including developmental stages, roles, and the level of participation in daily activities (Stewart, 2013). Students must face many transition periods in their school life from preschool to kindergarten, elementary to secondary school, and secondary to high school. Thus, they have to adjust in order to participate with new friends, teachers, and environments (American Occupational Therapy Association, 2008; Stewart, 2013). These periods are important for students in moving to higher educational levels. On the other hand, if they fail to cross transition periods successfully, they regress to lower performance. Therefore, the transition service is a crucial program in which schools help students transfer learning outcomes and experiences from the current to a higher level (Eismann et al., 2017). A successful transition service needs a supporting policy by conducting the Individualized Transition Plan (ITP) for each student. The ITP allows all students to receive continuity in preparing and planning for eligible access to related services through a transition service team, which is comprised usually of administrators, teachers, occupation therapists, physical therapists (PTs), and students and their families (Panyo et al., 2023). Lim et al. (2021) revealed that it is crucial to prepare children for transition periods in school, so that they can build skills, relationships and experiences which strengthen self-efficacy. The role of SBOTs is to recommend foundational knowledge skills for parents when it comes to transition practices. The therapists might find providing services for adolescents more challenging, particularly in pre-vocational skills that use a bridge program between secondary and postsecondary programs in order to increase employment and engagement outcomes for students. However, obvious laws regarding the transition service were not legislated in Thailand. Only the Education Provision for Persons with Disabilities Act indicated equal provision of appropriate basic education to students with disabilities, including education management in regular or special education schools, and assistive technology in transition periods (Ministry of Education, 2008).

However, this is still based on the educational philosophy that all students with disabilities can learn and develop to meet their maximum potential (Panyo et al., 2021). They can be high potential learners when evaluated by the characteristic checklist. Three characteristics are crucial elements, including physical and socio-emotional health, self-determination, and communication and academic performance for crossing a transition period at each educational level. On the other hand, there is a lack of evidence when it comes to describing the characteristics of high potential learners with disabilities, who receive special education with individualized transition services. Hence, the characteristic checklist of high potential learners was developed and adjusted with the knowledge and skill domains of the Comprehensive Transition Education Model (Sitlington & Clark, 2006), the characteristics of high potential learners by Dr. Linda Silverman of the Gifted Development Center (Silverman, 2018) and the high ability learners from the Nebraska Department of Education identified by the characteristics of high-ability learners in procedures (Cognard et al., 2015). The Comprehensive Transition Education Model is used by high school special education programs to provide the best transition services possible for these students. It focuses on the major knowledge and skill domains evolving in the transition service and highlights the lifelong aspects of transitions and different expectations for various transition exit points. Regarding knowledge and skill domains, skills or performance areas are referred to, which are important across developmental levels. They comprise nine factors such as communication and academic performance, self-determination, interpersonal relationships, integrated community participation, health and fitness, independence in daily living, leisure and recreation, employment, and further education and training (Sitlington & Clark, 2006). Therefore, domains of the Comprehensive Transition Education Model can be applied to help understand the important factors that bring the students with disabilities to reach "high potential characteristics" during their transition periods. In this study, the knowledge and skill domains are scoped in areas of school life.

The SBOTs are healthcare providers who focus on maximizing occupational performance. The students with disabilities were supported and promoted by interventions, including self-care tasks, learning activities, school-leisure activities, social activities, and transition programs in order to reach their full participation. Moreover, the SBOTs were concerned with reducing the learning activity limitations and participation restrictions (World Federation of Occupational Therapists, 2016). In terms of intervention, the occupational therapy services were provided by using a range of service delivery options. There were three types of services, including direct, indirect and integrated. Direct services were provided usually one on one, meaning an occupational therapist serviced an individual student in a separate therapy room. Individualized direct services in an isolated setting might be useful for SBOTs to evaluate initial levels of performance or stages of learning a skill. Indirect services were provided on behalf of the students with disabilities, and SBOTs were required to work with stakeholders of the students, including parents, school educators and school professionals. The SBOTs might share information with class teachers in order to modify some materials for supporting the students' performance. Integrated services involved the provision of occupational therapy in the students' natural environment such as the classroom, playground, cafeteria, and so on. Hence, these services required

a collaboration team and the combination of school professionals as well as educators embedded in the natural context (Cahill & Bazyk, 2020). In terms of a transition service, the SBOTs work collaboratively with other school professionals in supporting students and their families in transition planning (Orentlicher et al., 2017). They provide direct and indirect service delivery programs during transition planning, in order to help the students to meet their goals, and encourage them to reach their maximum potential. However, previous studies found that the SBOTs currently have limited understanding of their roles and scope of involvement as an ITP team member. The ITP specified the role of SBOTs in Thailand, who were identified as working collaboratively with class and vocational teachers in arranging the ITP for students, which still omitted details of clinical practice (Kardos & White, 2005; Thai Occupational Therapist in Education Settings, 2022). This limitation makes the occupational therapy service unclear during transition periods. Therefore, the objectives of this study were to explore the characteristics of potential learners with disabilities, who were studying in the highest grade of special education schools in Chiang Mai province, and to investigate the services of SBOTs for them during transition periods.

Methods

Study design

This study had an explanatory sequential mixed method design. It began with a survey of students with disabilities who had high potential characteristics. Then, the services of SBOTs for such students during transition periods were investigated. The first step was the quantitative part that explored the characteristics of high potential learners among students with disabilities who were studying in the highest grade of special education schools in Chiang Mai province. Class teachers evaluated their students by using the characteristic checklist of potential learners. Descriptive statistics, including frequency, percentage, mean and standard deviation, were analyzed in this step. The second step was the qualitative part that investigated the services of SBOTs for students with high potential characteristics during transition periods. The SBOTs were given in-depth interviews regarding previous services, including occupational therapy service and the ITP, which encouraged the students to become high potential learners. The interview questions were based on results of the quantitative data in the first step. The researchers then proceeded with data transcription from a recording. A descriptive summary of the qualitative descriptive approach was then conducted. Hence, the method in this study consisted of two steps. Step 1 was to explore the high potential characteristics of 196 students with disabilities at the highest educational level by using the checklist. The evaluation results indicated 101 students with high potential characteristics. However, 10 students had received occupational therapy service and ITP. Step 2 was to investigate the services of SBOTs during transition periods for students with high potential characteristics by using the in-depth interview with the SBOTs. The qualitative data from this step were analyzed as the occupational therapy service during transition periods, which supported the students in reaching high potential learner status. The process of each step is shown in Figure 1.

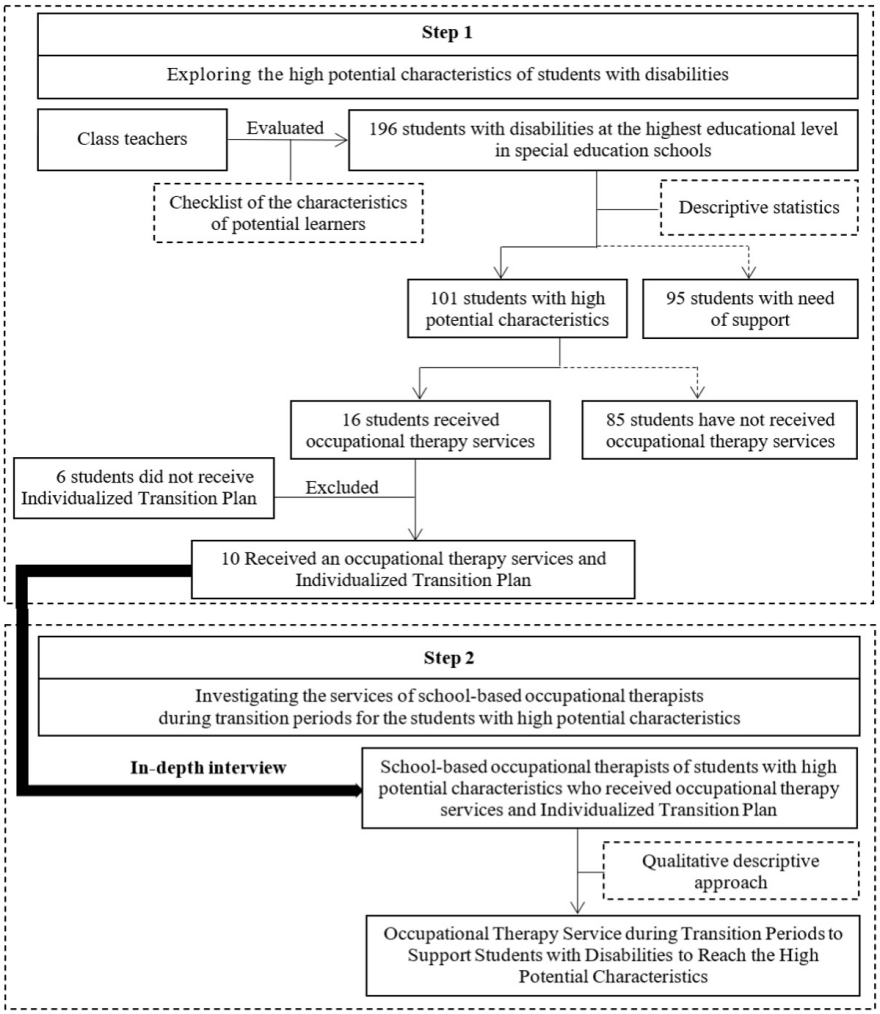

Figure 1. Methodology of the research.

Ethical approval

This study was approved by the Research Ethics Committee of the Faculty Associated Medical Sciences, Chiang Mai University, Thailand (AMSEC-63FB-006).

Study settings and participants

The study settings were at special education schools in Chiang Mai province, Thailand, which is the only province in northern Thailand with schools that support students having all 4 types of disabilities: visual, hearing, physical, and intellectual disabilities. These schools had SBOTs who were healthcare providers and also worked as an educational team. This study consisted of 2 steps. In step 1, students with disabilities were studying in the highest grade of special education schools in Chiang Mai province. The participants consisted of 196 students with disabilities, from which 179 were high school students in special education schools for hearing, physical and intellectual disabilities, and 17 were middle school students in a special education school for visual disability. The severity of

physical and intellectual disabilities was mild to moderate, due to the schools' registration criteria including students being at least partially independent in activity of daily living (ADL). In fact, the participants with intellectual disability were educable intellectual disability (IQ between 50-70) and trainable intellectual disability (IQ between 35-50). The participants with visual and hearing disabilities had severe to profound visual or hearing loss because the registration criteria of their school arranged education and related services for the blind and deaf or severe hard of hearing. Twenty-seven key informants were class teachers, who had been familiar with the students for at least 3 months or 1 semester. In step 2, the participants consisted of 5 SBOTs, including one SBOT from the special education schools for students with visual disability, two SBOT from the special education schools for students with physical disability, and two SBOT from the special education schools for students with intellectual disability. Each SBOT had at least 2 years' experience in providing such services in their given schools. All of the participants and key informants gave their informed consent to take part in this study.

Data collection procedures

In the first step, the school administrators were asked for permission to conduct this study. Invitations were then posted on school noticeboards for class teachers interested in taking part as key informants. Those interested were handed a study information sheet and consent form to sign. In addition, all of the students and their parents received a study information sheet and consent and assent form before the class teacher started to evaluate from the checklist. Class teachers were assigned to evaluate the students in their class (a total of 196) by using the checklist, designed and developed by the researchers. The checklist was based on related tools and the Comprehensive Transition Education Model (Sitlington & Clark, 2006; Cognard et al., 2015; Silverman, 2018).

The first draft of the checklist consisted of 26 items in four domains, including physical and socio-emotional health (8 items), self-determination (5 items), ADL and leisure (3 items), and communication and academic performance (10 items). However, the experts suggested three points: 1) the characteristics of items should be rearranged, 2) the sentences in some of the items should be clearer, and 3) the items should provide more examples. After that, the checklist was improved and investigated for the item-objective congruence (IOC). Finally, the number of items in physical and socio-emotional health and self-determination domains was decreased from 8 to 7 and 5 to 3, respectively, while that in ADL and leisure, and communication and academic performance were increased from 3 to 4 and 10 to 15, respectively. The IOC of the corrected checklist was between 0.9 and 1.00. Cronbach's alpha coefficient of the checklist, with four domains, was determined and indicated as good reliability of internal consistency (α=.85).

Regarding the ADL and leisure domain, the Cronbach's alpha coefficient showed unacceptable reliability of internal consistency (α=.17), and was excluded from the checklist. Thus, the checklist consisted of 25 items in three domains of performance, including physical and socio-emotional health (7 items), self-determination (3 items), and communication and academic performance (15 items). Cronbach's alpha coefficient was determined and it indicated good reliability of internal consistency (α=.89). All three remaining domains indicated acceptable to good reliability of internal consistency (α=.74-.88) (Siswaningsih et al., 2017). The stability of reliability was

examined by intraclass correlation coefficient (ICC) from 20 students with disabilities, who studied at the highest educational level in special education schools for visual, hearing, physical, and intellectual disabilities. There were four classroom teachers acting as key informants to evaluate their students in two periods, test and retest. The retest started two weeks after completion of the first test. The ICC value indicated good reliability of the checklist (ICC=.87). In each domain, the ICC indicated moderate to good reliability (ICC=.69-.87) (Koo & Li, 2016).

The final checklist comprised two parts: general information and potential characteristics. General information showed demographic data of the students with disabilities, including gender, age, educational levels, ITP, related services, caregivers, and types of disabilities. Potential characteristics consisted of 25 items within 3 domains, as shown in Figure 2.

Each item was given a score by teachers who were familiar with the students. The scoring of each item was based on a scale from 0 to 3 (0 = fail, 1 = pass, 2 = good, and 3 = excellent):

- 0 means "fail": the student does not perform or appear to meet the required characteristics.
- 1 means "pass": the student performs or appears to display the required characteristics through prompts or support in simulated situations.
- 2 means "good": the student performs or appears to match the characteristics without needing prompts or support in simulated situations.
- 3 means "excellent": the student performs or appears to display the characteristics without needing prompts or support in daily life activities.

Interpretation of the scoring was considered by developmental milestone, and modified based on the guidelines of development, measurement and characteristic assessment of achievement by learners under the Basic Educational Core Curriculum B.E. 2551 (Bureau of Educational Testing, 2012). Therefore, the interpretation was classified into 2 groups, namely: students with high potential (HP) characteristics and students with need of support (NS). Criteria of the interpretation were as follows:

(i) The HP group – achieves more than zero score in all items with an average total score equal to or greater than 2.0.

(ii) The NS group – scores zero in at least one item or has an average total score of lower than 2.0.

In step 2, the participants consisted of 5 SBOTs with experience in providing occupational therapy service for students with high potential characteristics, who had received it during transition periods. They were interviewed individually with open-ended semi-structured questions. Each participant was interviewed two or three times. The interviews were audio-recorded and took approximately 30-45 minutes. Probe questions focused on the topic of occupational therapy service for students with high potential characteristics during transition periods. Examples of the probe questions are as follows:

- Can you describe your personal experiences of providing this professional service for students with high potential characteristics during their transition periods, evaluated by the checklist? Can you give details of the treatments included in the service?
- In your opinion, what aspects of the occupational therapy service, if any, have helped the students with disabilities to achieve high potential characteristic status during a transition period?

- What are the potential problems in providing an occupational therapy service for students with high potential characteristics during transition periods?
- If you encounter problems, how do you usually address them?
  - Was your approach effective in solving problems? What would you say is needed to support and provide occupational therapy services more effectively?

A characteristic checklist of potential learners

Part 1: General information

Gender: ○ Male ○ Female	Age: …….. years	Grade: ……
Individualized Transition Plan (ITP): ○ Received ○ Not received		Caregivers ○ Father ○ Mother ○ Others……
Types of disabilities: ○ Visual disability ○ Hearing disability ○ Physical disability ○ Intellectual disability		
Related services: ○ Occupational therapy ○ Physical therapy ○ Speech therapy ○ Others ……..		

Part 2: Potential characteristics

Domains	Items	Item score 0	1	2	3
Physical and socio-emotional health	1. Taking good care of health				
	2. Protecting from risks or dangers that may occur				
	3. Building and maintaining relationships with others				
	4. Following the rules of class, school and society				
	5. Having a stable mood and self-control				
	6. Having flexibility				
	7. Showing concern and empathy for others				
Self-determination	1. Choosing activities according to abilities, interests and age				
	2. Setting own future goals				
	3. Solving everyday problems and obstacles in a way that is appropriate and socially acceptable for the situation				
Communication and academic performance	1. Understanding the meaning of words and sentences in communication (using sign language for students with hearing disability)				
	2. Conversing in sentences to others (using sign language for students with hearing disability)				
	3. Asking reasonable questions about doubts (using sign language for students with hearing disability)				
	4. Expressing opinions with reason and accuracy when agreeing or disagreeing (using sign language for students with hearing disability)				
	5. Being able to talk about own abilities and how things should improve (using sign language for students with hearing disability)				
	6. Exchanging information and own experiences with others (using sign language for students with hearing disability)				
	7. Reading and writing correctly for communication and learning (using sign language for students with hearing disability)				
	8. Spelling written words and sentences correctly for communication and learning				
	9. Knowing the concept of numbers and calculations				
	10. Being able to learn lessons or classroom activities according to the proficiency level				
	11. Observing and remembering information from learning				
	12. Concentrating on learning during activities inside and outside the classroom				
	13. Being active in doing activities inside and outside the classroom				
	14. Creating art, crafts or other imaginative works				
	15. Being able to apply knowledge for use in daily life				
Total score					
Average score					

Items of zero score			**Interpretation**
	○ Physical and socio-emotional health	☐ items	○ Students with high potential characteristics
	○ Self-determination	☐ items	○ Students with need of support
	○ Communication and academic performance	☐ items	

Note: 0 means "fail": the student does not perform or appear to meet the required characteristics.
1 means "pass": the student performs or appears to display the required characteristics through prompts or support in simulated situations.
2 means "good": the student performs or appears to match the characteristics without needing prompts or support in simulated situations.
3 means "excellent": the student performs or appears to display the characteristics without needing prompts or support in daily life activities.

Figure 2. The characteristic checklist of potential learners.

Data analysis

Descriptive statistics, including frequency, percentage, mean, and standard deviation, were analyzed in the step of exploring the high potential characteristics of students with disabilities. The occupational therapy service for students with high potential characteristics was analyzed by descriptive summary of the qualitative descriptive approach, which determines the existence and frequency of events from the perspectives of five participants (Lambert & Lambert, 2012). Firstly, the interviews were listened to and thereafter read through several times to obtain sense of the whole. Subsequently, the transcribed text was divided into units of meaning. The data involved a straightforward descriptive summary of the informational contents that were organized from the perspectives of the SBOTs. Next, the similarities and differences were sorted into types of service delivery models. In terms of trustworthiness, member checking was used to ensure that information covered the range of the interview. In terms of credibility, the researchers returned the interview transcripts to the participants for epistemological investigation in order to ensure accuracy and whether they fit the interview data (Birt et al., 2016).

Results

The high potential characteristics of students with disabilities

Twenty-seven classroom teachers, who were teaching at the highest educational level at special education schools, were invited to be key informants. They comprised 24 and 3 classroom teachers at the high school (Grade 10-12) and middle school level (Grade 7-9), respectively, and they evaluated their students by the checklist. The total of 196 students with disabilities participated in this study, including 89 with intellectual disability (45.41%), 54 with hearing disability (27.56%), 36 with physical disability (18.37%), and 17 with visual disability (8.67%).

Regarding the demographic data (as shown in Table 1), results revealed that the majority of participants (54.59%) were male. Most of them were between 16 and 18 years old. More than half of the participants (56.63%) had never received the ITP and 47.96% of them had never been given any related services in schools. Only 18.88% of the participants had received occupational therapy programs. Moreover, mothers were the main caregiver of the students.

Results from the checklist indicated that most of the students with high potential characteristics were in the domains of physical and socio-emotional health (75.00%), self-determination (63.27%), and communication and academic performance (55.10%). The number and percentage of the students with disabilities in each domain are demonstrated in Table 2.

Of 196 evaluated students with disabilities, 101 (51.53% (and 95 (48.47%) were in the HP and NS group, respectively. When considering each type of disability, most of the HP students had hearing, visual and physical disability, while most of NS students had intellectual disabilities. Moreover, while results showed that 4 (3.96%), 5 (4.95%) and 7 (6.93%) of the HP students with visual, physical, and intellectual disability, respectively, had received occupational therapy service, those with hearing disability had never received it. Most of the NS students, who received occupational therapy service, had visual, physical and intellectual disability, as shown in Table 3.

Table 1. Demographic data of the participants (N=196).

Types of disability	Numbers (%)				
Demographic	**Visual disability**	**Physical disability**	**Hearing disability**	**Intellectual disability**	**Total**
Gender					
Male	9 (4.59)	21 (10.71)	27 (13.78)	50 (25.51)	107 (54.59)
Female	8 (4.08)	15 (7.65)	27 (13.78)	39 (19.90)	89 (45.41)
Age (year)					
Under 16	7 (3.57)	-	2 (1.02)	-	9 (4.59)
16-18	7 (3.57)	18 (9.18)	13 (6.63)	57 (29.08)	95 (48.47)
19-21	3 (1.53)	13 (6.63)	36 (18.37)	30 (15.31)	82 (41.84)
Over 21	-	5 (2.55)	3 (1.53)	2 (1.02)	10 (5.10)
Individualized Transition Plan (ITP)					
Received	4 (2.04)	25 (12.76)	26 (13.27)	30 (15.31)	85 (43.37)
Not received	13 (6.63)	11 (5.61)	28 (14.29)	59 (30.10)	111 (56.63)
Related services (answer more than one)					
Occupational therapy	6 (3.06)	6 (3.06)	-	25 (12.76)	37 (18.88)
Physical therapy	-	16 (8.16)	-	2 (1.02)	18 (9.18)
Speech therapy	-	-	51 (26.02)	3 (1.53)	54 (27.56)
No related services	11 (5.61)	14 (7.14)	3 (1.53)	66 (22.67)	94 (47.96)
Caregivers					
Father	6 (3.06)	7 (3.57)	19 (9.69)	15 (7.65)	47 (23.98)
Mother	6 (3.06)	19 (9.69)	19 (9.69)	45 (22.96)	89 (45.41)
Both father and mother	4 (2.04)	3 (1.53)	8 (4.08)	18 (9.18)	33 (16.84)
Grandparents	-	3 (1.53)	3 (1.53)	2 (1.02)	8 (4.08)
Others	1 (0.51)	4 (2.04)	5 (2.55)	9 (4.59)	19 (9.69)

Table 2. Number and percentage of the students with disabilities in each domain.

Types of disability	Numbers (%)									
	Visual disability		**Physical disability**		**Hearing disability**		**Intellectual disability**		**Total**	
Performance domains	HP	NS	HP	NS	HP	NS	HP	NS	HP	NS
Physical & socio-emotional health	16	1	28	8	50	4	53	36	147	49
	(8.16)	(0.51)	(14.29)	(4.08)	(25.51)	(2.04)	(27.04)	(18.37)	(75.00)	(25.00)
Self-determination	16	1	21	15	48	6	39	50	124	72
	(8.16)	(0.51)	(10.71)	(7.65)	(24.49)	(3.06)	(19.90)	(25.51)	(63.27)	(36.73)
Communication & academic performance	13	4	21	15	42	12	32	57	108	88
	(6.63)	(2.04)	(10.71)	(7.65)	(21.43)	(6.12)	(16.33)	(29.08)	(55.10)	(44.90)

Note: HP = Students with high potential characteristics; NS = Students with need of support.

Table 3. Provision of the occupational therapy service.

Types of Disability	Numbers (%)					
	HP (n=101)			**NS (n=95)**		
	Not received	**Received**	**Total**	**Not received**	**Received**	**Total**
Visual disability	9	4	13	2	2	4
	(8.91)	(3.96)	(12.87)	(2.11)	(2.11)	(4.22)
Physical disability	12	5	17	18	1	19
	(11.88)	(4.95)	(16.83)	(18.95)	(1.05)	(20.00)
Hearing disability	42	0	42	12	0	12
	(41.58)	(0.00)	(41.58)	(12.63)	(0.00)	(12.63)
Intellectual disability	22	7	29	42	18	60
	(21.78)	(6.93)	(28.71)	(44.20)	(18.95)	(63.15)
Total	85	16	101	74	21	95
	(84.16)	(15.84)	(100.00)	(77.89)	(22.11)	(100.00)

Note: HP = Students with high potential characteristics; NS = Students with need of support.

In conclusion, only 16 students (15.84%) received occupational therapy service during transition periods. However, the results showed that 6 of those did not receive the ITP as school students, so they were excluded from this study. Thus, only 10 participants were studied regarding high potential characteristics. Those students had various disabilities, except for hearing, because the SBOT at the school for hearing disability had only been there for 2 years previously. This occupational therapist was responsible for providing occupational therapy intervention programs in kindergarten to primary school students. Therefore, HP students with hearing disability had never received an occupational therapy intervention program before.

Thus, only five SBOTs, who provided occupational therapy service for HP students with disabilities during transition periods, were named SBOT 1-5. All of them were occupational therapists who graduated in the Diploma Program in Teaching Profession because that is a criterion for school professionals, as regulated by the Ministry of Education. Half of them graduated with a Master's Degree, which included Educational Administration, Occupational Therapy, and Computer Science. They had approximately 3 to 18 years of experience as a SBOT. Their demographic data are shown in Table 4.

Table 4. Demographic data of the participants (n=5).

Participant	Characteristics					
	Gender	Education			Experience (years)	
		Diploma Program	Bachelor's Degree	Master's Degree	Occupational Therapist	School-based Occupational Therapist
SBOT 1	Female	Teaching Profession	Occupational Therapy	-	13	13
SBOT 2	Male	Teaching Profession	Occupational Therapy	▪ Educational Administration ▪ Computer science	13	11
SBOT 3	Female	Teaching Profession	Occupational Therapy	Occupational Therapy	22	18
SBOT 4	Female	Teaching Profession	Occupational Therapy	Educational Administration	17	11
SBOT 5	Female	Teaching Profession	Occupational Therapy	Study in Special Education	3	3

HP students with disabilities who received occupational therapy service during transition periods.

Only 10 participants were studied regarding students with high potential characteristics. The majority of them were female and had been studying in Grade 8. Their average age was 16.60±3.34 years. Each HP student was given a pseudonym for publication. Results from the students with high potential characteristics in each type of disability were gathered from the perspectives of the SBOTs, as follows.

HP students with physical disability

The performances of HP students with physical disability, who received occupational therapy service during transition periods, depended on severity of the

disability. All of them had a physical limitation but they presented good characteristics. The HP characteristics of the students with physical disability focused on physical function, basic ADL management, and interpersonal skills. Illustrative examples of statements from the SBOTs are as follows.

> *Nat* [pseudonym] *is a student with physical disability of Osteogenesis Imperfect, which is a brittle bone disease. Although she tended to be shy in presenting herself in front of the class and on stage, she is a nice and polite girl.* [SBOT-1].

> *Cris* [pseudonym] *was diagnosed with hemiplegia* […] *She had flexor spasticity of the right upper and lower limbs, poor coordination, and poor hand dexterity. She liked to take care of others and give them help when they asked for it.* [SBOT-1].

> *Rose* [pseudonym] *was diagnosed with spina bifida* […] *She was a student with paraplegia and sensory impairment and weakness in both her lower limbs* […] *She was able to carry out basic activities of daily living with minimal assistance.* [SBOT-2].

HP students with visual disabilities

All of the HP students with visual disability, who received occupational therapy service during transition periods, had related-sensory problem behaviors, including stereotyped behaviors and poor postural control, which interfered with their daily life. Communication skills and leadership were the outstanding HP characteristics of these students. Illustrative examples of statements from the SBOTs are as follows.

> *Owen* [pseudonym] *was a blind student. He was an athlete and a leader of sport activities. When he was young, he had problems with his stereotyped behaviors and sensory processing, such as body rocking, head swaying, eye rubbing, eye pressing and gravitational insecurity. He was well spoken, sociable and outstanding in sharing his ideas with people.* [SBOT-3].

> *Kate* [pseudonym] *was a student with low vision. She had good verbal skill and high motivation to study and participate in school activities. However, she had problems with her stereotyped behaviors such as body rocking, head swaying and eye rubbing.* [SBOT-3].

> *Jack* [pseudonym] *was a student with low vision. He loved to play sports. He had good verbal and organizational skills. He was highly motivated in participating in school activities, but had problems with postural control, coordination, and dyspraxia.* [SBOT-3].

HP students with intellectual disabilities

All of the HP students with intellectual disability, who received occupational therapy service during transition periods, had limitation of academic ability, gross motor skill and fine motor skill. However, in terms of HP characteristics, they presented good

relationships and non-academic skills, especially in arts and sports. Illustrative examples of statements from the SBOTs are as follows.

> *Sarah* [pseudonym] *was a student with trainable intellectual disability* [...] *She loved to study art, especially cartoon painting. She also had good communication skill, but her weaknesses were academic ability, poor hand function, and poor postural control. She had difficulty in initiating writing tasks such as writing new sentences, describing a picture, and taking summary notes.* [SBOT-4].

> *Emma* [pseudonym] *was a slow learner* [...] *She loved to play sports and was usually a leader on sports days. However, she had problems with academic skills such as reading, writing and math. Although she had good performance foundation and verbal skill, she was limited in analyzing, reasoning, and learning skills.* [SBOT-5].

Occupational therapy service during transition periods for HP students with disabilities

The results revealed that SBOTs provided occupational therapy for HP students with disabilities based on direct, indirect and integrated services during transition periods. Consideration of occupational therapy services depended on the disability of the students.

In terms of physical disability, provision of the direct service focused on maintaining and promoting motor skills. These strategies provided intervention programs that facilitated neuro-musculoskeletal and movement related functions, and increased performance in occupations such as learning, basic ADL, and participation by playing a role in student activities during transition periods. The SBOTs provided indirect service for students through consultation with parents and school professionals, including physical therapists and teachers. For instance, they suggested that parents should pay attention to health education and deformity prevention while the students are at home. For provision of the integrated service, the SBOTs collaborated with school professionals. For example, they planned rehabilitation strategies with physical therapists to improve motor control, muscle strength, trunk balance, and maintain functional performance. Meanwhile, they worked with class teachers and school educators to provide an emotional strategy and behavioral disturbance to the students with physical disability to improve pre-vocational skill in the workplace. In addition, the students emphasized pre-vocational training and assistive technology, in order to improve their competence and compensate for functional limitations. The SBOTs usually encouraged pre-vocational training to the students in natural settings. Both simulated and real situations were organized for practice in the coffee shop, canteen, minimart, and farm. Most pre-vocational activities for their students were agricultural, such as hydroponic vegetable gardening and livestock farming, as well as weaving, machine repairing, and selling. In addition, they provided assistive technology that is usually related to improving or maintaining functional mobility such as wheelchair training, splinting, positioning devices for writing, and so forth.

In terms of visual disability, provision of the direct service highlighted problems of the sensory system. The students presented inappropriate behaviors due to visual loss, especially those with stereotyped behaviors. Most of the students displayed self-rocking, hand flapping, head swaying, and eye pressing, which were caused by sensory input impairment. Thus, the SBOTs considered the provision of sensory-based and sensory integration approaches. They also considered perceptual processing and cognitive training programs to encourage topographical orientation, which related to Orientation and Mobility (O&M). These were the basic skills of independent functioning and community mobility of students with visual disability. In providing the indirect service, consultation was the main approach made by SBOTs for students with visual disability. They had frequent discussions with school professionals, including class and physical education teachers, special educators and guidance counselors regarding the strengths and weaknesses of students in order to promote appropriate learning activities. In provision of the integrated service, the SBOTs focused on training in assistive technology, and they sometimes advocated the National Electronics and Computer Technology Center (NECTEC) of Thailand in providing high tech devices. These devices were based on a compensatory approach that enhanced remaining sensory systems such as auditory and tactile senses. Examples of these devices included closed circuit television (CCTV), screen reader, screen magnifier, and so forth. The SBOTs applied these devices to encourage academic skills and participation in learning activities.

As students with intellectual disability had a wide range of developmental delay, the occupational therapy direct service needed to provide various intervention programs covering all developments such as sensory integration, visual perception, cognition and motor skill programs. When providing an indirect service, the SBOTs consulted with school professionals and parents. They worked closely with teachers of subjects such as art, music, physical education and cooking by providing information on the needs, interests, limitations, and occupational performance goals of the students. In addition, they usually shared the causes of and handling strategies for inappropriate behaviors and social skill problems relating to sensory and cognitive impairments with school professionals and parents. In providing the integrated service, the SBOTs focused on environmental modification and prevocational training. Assistive technology was considered less regarding the students with intellectual disability because of their cognitive limitation. Environmental modification was a compensatory strategy that integrated with improving student performance during school life and after graduating. Prevocational training was integrated with learning activities for promoting work experiences for the students in simulated and real situations. These experiences included being a shopkeeper, cashier, or staff member in the school shop. The details of occupational therapy services that encourage high potential characteristics of students with disabilities during transition periods are shown in Table 5.

Table 5. Occupational therapy service during transition periods to support students with disabilities to reach high potential characteristics.

Occupational therapy service	***Potential learners with disabilities***									
	Physical disability			**Visual disability**			**Intellectual disability**			
Type of service	**Case 1**	**Case 3**	**Case 10**	**Case 2**	**Case 8**	**Case 9**	**Case 4**	**Case 5**	**Case 6**	**Case 7**
Direct service										
- Sensory-based	-	-	+	+	+	+	-	-	-	+
- Sensory integration	-	-	-	+	+	+	+	+	+	+
- Sensory stimulation techniques	-	+	-	-	-	-	-	-	-	-
- Maintain the Range of Motion program	+	+	+	-	-	-	-	-	-	-
- Decrease spasticity of muscle tone	-	+	-	-	-	-	-	-	-	-
- Stimulate motor control	-	+	-	-	-	-	-	-	-	-
- Weight-bearing activities	-	+	-	-	-	-	-	-	-	-
- Muscle strength	+	+	+	-	-	-	-	-	+	-
- Endurance training	+	+	+	-	-	-	-	-	+	-
- Balance training	+	+	+	-	+	+	-	-	+	+
- Hand function skill	-	+	-	-	-	-	-	-	+	-
- Visual perception training	-	+	-	-	-	-	+	+	+	-
- Perception of motor development	-	-	-	+	+	+	-	-	-	+
- Cognitive training	-	+	-	+	+	+	+	+	+	+
- Executive function skill	-	-	-	+	+	+	-	-	-	+
- Topographical orientation skill	-	-	-	+	+	+	-	-	-	+
- Social skill	-	-	-	+	+	+	-	-	+	+
- Behavioral management	-	-	-	+	+	-	-	+	-	-
- Basic activities of daily living (BADL) training	+	-	-	-	-	-	-	-	-	+
Indirect service										
- Collaboration with physical education teachers regarding sport activities	-	-	-	+	-	+	-	-	-	-
- Collaboration with special education educators regarding intervention planning	-	-	-	+	+	+	-	-	-	-
- Collaboration with school professionals regarding prevocational skill	-	+	+	+	-	-	+	+	+	+
- Collaboration with school professionals to encourage social skill	-	-	-	+	+	+	-	-	+	+
- Collaboration with school professionals to encourage parental involvement	+	+	-	-	+	-	+	+	+	+
- Collaboration with school professionals regarding psychological support for the students and their families	-	+	-	+	-	-	-	-	-	-
- Collaboration with physical therapists regarding rehabilitation strategies	+	-	+	-	-	-	-	-	-	-
- Consultation with teachers regarding behavioral management	+	+	+	+	+	-	-	+	-	-
- Consultation with parents regarding continuity of the intervention program	+	+	+	+	+	+	+	+	+	+
Integrated service										
- Assistive Technology										
- Wheelchair training program	+	-	+	-	-	-	-	-	-	-
- White cane training program	+	+	+	-	-	-	-	-	-	-
- Screen reader	-	-	-	+	-	-	-	-	-	-
- Screen magnifiers	-	-	-	-	+	+	-	-	-	-
- Computer for low vision users	-	-	-	-	+	+	-	-	-	-
- Braille printers	-	-	-	+	+	+	-	-	-	-
- CCTVs	-	-	-	+	+	+	-	-	-	-
- Pancake hand splint	-	+	-	-	-	-	-	-	-	-
- Environmental modification	-	-	-	-	-	-	-	+	+	-
- Pre-vocational skill	-	+	+	+	-	-	+	-	+	+

(+) Yes, (-) No.

Discussion

This research indicated that only 16 HP students received occupational therapy service during transition periods. Of those, 10 had received the ITP in school. Despite the fact that professional standards of SBOTs in Thailand addressed their roles as a transition service team member for students with disabilities (Thai Occupational Therapist in Educational Settings, 2015), they still had minimal involvement regarding occupational therapy service during transition periods. Previous study found that only 7.5% of students with disabilities received occupational therapy services during transition to adulthood. A critical reason for this low percentage was the possible misunderstanding of SBOTs about their role in transition periods (Eismann et al., 2017). Even though the HP students with disabilities were limited by their disability, they were able to compensate with their remaining competency in order to build high potential characteristics in all three domains. The majority of HP students achieved full score in the domain of physical and socio-emotional health. Although they presented their self-interests, the final decisions were made generally by the teachers. This was similar to previous studies in which only 44% of students with disabilities had received opportunities in decision-making skills (Cabeza et al., 2013). Meanwhile, some teachers offered self-determination skills primarily to students with mild cognitive impairments, rather than promoting them for all students with disabilities. This could be because teachers chose to provide these skills based on the students' abilities, and felt that they would not benefit all students, especially those with severe disabilities, who might need more urgent support with other skills instead (Wehmeyer, 2005). Nevertheless, Goodman et al. (2019) found that SBOTs gave more consideration to encouraging self-determination skills during transition periods, especially at the secondary school level. This was a key to successful transition programs that prepared future careers and postsecondary pathways for students with disability.

All of the students in this research studied in special education schools rather than mainstream ones because the former generally supported those with severe disabilities. Thus, although they are students with high potential characteristics, they still need support in some domains because of their disabilities. The SBOTs should be concerned in providing indirect or integrated services, particularly with compensatory strategies, in order to support communication and academic performance fully and help students with disabilities to cross transition periods.

According to results, the SBOTs provided various intervention programs through service delivery models in order to improve and encourage performance to reach maximum outcomes. The therapists provided integrated programs in schools individually between medical and educational services for students with disabilities. They focused on improving student outcomes and arranging the most appropriate and efficient services, based on knowledge-based practices (Upton et al., 2014). In terms of HP students with physical disability, the direct service provided was based usually on a strategy to improve individual movement capacity. In providing a direct service, the result reflected good collaboration between the SBOTs and other school professionals, especially the physical therapists in rehabilitation programs. The HP students with physical disability in this research did not need the integration service because environmental modifications helped them to access and participate in learning activities independently (Egilson & Traustadottir, 2009). This also

might be because receiving the assistive technology service was enough to access and participate in activities without environmental modification. Regarding HP students with visual disability, they lacked sensory input that consequently had impact on present stereotyped behaviors. Thus, the SBOTs provided both direct and indirect services. Furthermore, integrated services provided many types of assistive technology for students to increase their academic skills. Similar to previous study, it was reported that students with visual disabilities would rather use and need more assistive technology than those with other disabilities in order to facilitate their education (Lersilp et al., 2016). In terms of HP students with intellectual disability, the SBOTs emphasized on many direct intervention programs for improving and encouraging sensory and motor development in order to prepare necessary basic skills in learning activities. Those programs would help students with cognitive impairment and learning limitations to participate in their education. As well as the above two disabilities, the SBOTs provided indirect service for the other two by collaborating and consulting with school professionals and parents.

Therefore, during transition periods, SBOTs are key contributors within transition teams in promoting functional abilities and the participation of students in daily routines. In the early childhood period, the occupational therapy service starts from early school-based intervention programs. The SBOTs adjust the school demands to match the students' strengths and abilities, including participating in classroom activities, socializing with peers, and engaging in pre-academic tasks. In the school-aged period, the occupational therapy service is provided from one school to another or between grades. The SBOTs also encourage the students to adjust to higher expectations from new environments by establishing new routines, developing new skills needed for independence in adulthood, and engaging in appropriate social interactions. Similar to several studies, Besi & Sakellariou (2019) revealed that individual social skills were highlighted as essential performance for students during transition periods from preschool to primary school, due to socio-emotional development being a complex path for students to learn in the process of educational and personal development. Furthermore, social skills were the most important child factor for the collaborative team in providing school-aged intervention (Larcombe et al., 2019). Consultation was provided on behalf of students with disabilities through interaction with school professionals, who enabled students to have potential and reach impact outcomes. The SBOTs should spend time sharing and discussing student performance with school professionals in order to follow and give recommendations for improving occupational performance of the students. The occupational therapy is a type of bridge service that promotes students in expressing their newly learned skills in the classroom and setting up goals and challenges (Clough, 2019). In the adulthood period, the students were prepared to move from school to adult life. The SBOTs focused on helping them gain the necessary skills for employment or higher education, demonstrating self-determination, and ultimately living as independently as possible. In conclusion, the SBOTs provide services that support students with special learning needs and their families during transition periods. Hence, transition periods in school settings are an important process for all parties, including students, families, professionals and others, in order to support children during their lifespan (Dockett & Perry, 2007).

In the educational policy for students with disabilities in Thailand, the SBOTs are included in a transition team that consists of various professionals such as school

educators, community employees, health providers, facilitators, worksite employees, and so forth. They are a collaborator within the team that participates in transition planning, and they use clinical reasoning to understand and anticipate how the disability might affect the occupational performance of the students during transition periods. Then, they can prepare the students with disability for post-school experience by supporting crucial interventions, especially problem-solving, vocational training, self-efficacy, and self-determination. In addition, in transition planning, the SBOTs should work collaboratively with school staff in providing communication skills for application in practical issues such as transportation, scheduling, and running over time. The empowerment of students and families should provide them with the opportunity to lead in ITP meetings. However, this is challenging for SBOTs in Thailand in the current situation. One of the important reasons is that the SBOTs are health professionals with strong medical perspectives. When they work in school settings, they might face barriers to collaboration with educational professionals, who have different perspectives. As there is a medical perspective amongst occupational therapists no matter where they are, including school-based settings, awareness of effective communication is a crucial point for SBOTs. The SBOTs should consider providing a service as a transition team. Working as a team and focusing on a client-center approach, by integrating medical and educational perspectives, might be a way of providing suitable services in the school practice. As appeared in the results, SBOTs worked closely with teachers by providing information on the needs, interests, limitations, and occupational performance goals of the students, and sharing causes and handling strategies with school professionals.

The implication of this research could be applied by SBOTs as policy makers and practitioners in actively advocating the emergence of explicit educational policy regarding the transition services that address their roles and scope of collaboration. In addition, they can design intervention programs that encourage potential characteristics for students with disabilities. Moreover, the results of this research would be a guideline for SBOTs to consider suitable services relating to high potential characteristics, including the domains of physical and socio-emotional health, self-determination, and communication and academic performance.

Limitations and future research

Although there were a large number of HP students with disabilities screened by the checklist, few received occupational therapy service or the ITP during their transition periods. Thus, this study was limited in generalization. Consequently, the research domain was limited to only upper northern Thailand, and the required experience of providing the transition service was new and unfamiliar with many SBOTs. In addition, because of the small sample size of SBOTs, the outcome measure could not be analyzed in each subgroup. Future studies could explore the high potential characteristics among students with disabilities in mainstream schools, analyze each subgroup of students with disabilities, and expand the perspectives of SBOTs to other related service providers in various school contexts. Besides, family background and parental involvement should be concerned with transition planning, but they were not included as the variable in this study. Furthermore, a cross-cultural study would be interesting in terms of comparison.

Conclusion

Suitable services in the domains of physical and socio-emotional health, self-determination, and communication and academic performance can enhance high potential characteristics for students with disabilities. In this study, the HP students achieved the physical and socio-emotional health performance domain that was a fundamental skill when HP students studied in kindergarten or primary school. Meanwhile, the performance domains of self-determination and communication and academic performance were usually promoted to the HP students later when they studied in primary, middle, and high schools. However, most of the students in this research did not achieve a full score in the domain of communication and academic performance. Thus, SBOTs and school professionals should focus on all three domains, especially communication and academic performance. Although the students received minimal occupational therapy service during transition periods, it was provided in various service delivery models such as direct, indirect, and integrated ones. The direct service focused on designing appropriate intervention programs together with the strengths and weaknesses of the students. The SBOTs should provide and encourage interaction skills, including expressive and receptive languages to improve students' communication when they are studying at the first educational levels such as kindergarten and primary school. Moreover, the SBOTs should emphasize perception and cognition activities to prepare the students for academic performance when they move to higher educational levels. In addition, the indirect service focused on collaboration and consultation with school professionals and parents. The SBOTs should share and exchange perspectives regarding how to promote physical and socio-emotional health, and self-determination skills with the transition team, including educators, special educators, physical therapists, parents, caregivers, students, and all parties. The students can achieve these skills if they receive appropriate intervention continuously. Finally, the integrated service emphasized on applying assistive technology and modifying environments. The students should be fostered and receive support from school administrators and government through welfare funds and explicit policies. If the students receive the appropriate assistive technology and study in an environment conducive to learning, they will improve and increase their capacities to reach maximum potential.

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Author's Contributions

Suchitporn Lersilp designed the research, provided advice on gathering and analyzing data, and developed and approved the manuscript. Kewalin Panyo reviewed the literature, designed the research, collected and analyzed the data and developed the manuscript. Supawadee Putthinoi provided advice on the research design and approved the manuscript. Hsiu-Yun Hsu provided advice on the research design and approved the manuscript. Li-Chieh Kuo provided advice on the Results and Discussion. Napalai Chaimaha provided

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