Professional Reflexivity in Thai Teachers' Understanding of Asperger's Syndrome

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Abstract

Introduction. The aim of this research is to investigate changes in Thai educators' attitudes towards their understanding of Asperger's Syndrome before and after a teacher-training session. Currently, opportunities for professional training regarding Asperger's Syndrome are very scarce in Thai educational communities. Educators may not be able to provide optimum education and guidance for their students with Asperger's Syndrome. Meanwhile, these students' learning outcomes are significantly affected by their educators lacking knowledge of evidence-based intervention methods. Therefore, based on a needs assessment, a teacher-training session was developed to minimize the gaps in pedagogical knowledge and practice.

Materials and Methods. A quasi-experimental, embedded mixed-methods design was used to obtain data. This study employed a one-group, pre-test/post-test design, as there were no control groups involved due to the novel learning subject matter. The limitations of the current study – its structure and participant recruitment – were identified and discussed. An availability sampling method was used for this study, resulting in the recruitment of 12 in-service teachers and 32 pre-service teachers from the northeastern region of Thailand. Questionnaires and interviews were used as measurement tools to comprehensively capture participants' learning experiences. For the statistical analysis, the paired sample *t*-test (alpha = .05) was used. Meanwhile, for the descriptive analysis, the deductive approach was used.

Results. Our results corroborate our sequential hypotheses regarding a teacher-training session and educators' perceived levels of understanding of Asperger's Syndrome. The training session was developed with a hypothesis that teachers needed educational opportunities to acquire proper knowledge of Asperger's Syndrome, so that their students could be fully benefited from the pedagogy. As a result of attending the session, a statistically significant increase in correct response rates was indicated. Indeed, this increase in knowledge fulfilled the second hypothesis that by having proper knowledge of Asperger's Syndrome, teachers' professional reflexivity can be improved.

Discussion and Conclusion. The outcomes of this study indicate that a teacher-training session has played a crucial role in cultivating Thai educators' understanding of Asperger's Syndrome. The outcomes present an interesting correlation between teachers' knowledge acquisition and their increased professional and personal reflections. Simultaneously, the findings of this study suggest the potential benefits of improving research methodology, including an employment of randomized control trial, a larger sample size, and diversity within the sample population.

Keywords: teacher training session, teacher attitudes, Asperger's Syndrome, professional learning community, school reform, teacher efficacy, professional reflection, professional development

Conflict of interests: The authors declare no conflict of interest.

Оригинальная статья

Профессиональная рефлексия в понимании тайскими учителями синдрома Аспергера

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Аннотация

Введение. В настоящее время в образовательных сообществах Таиланда недостаточно возможностей для профессиональной подготовки педагогов для работы с детьми с синдромом Аспергера. В связи с этим педагоги не способны обеспечить оптимальным образованием таких учеников. Целью исследования является анализ изменений в отношении тайских педагогов к их пониманию синдрома Аспергера до и после занятий по подготовке учителей.

Материалы и методы. Для получения данных применялся квазиэкспериментальный дизайн со смешанными методами. С целью изучения проблемы в исследовании приняли участие 12 работающих учителей и 32 учителя были задействованы до начала работы из северо-восточного региона Таиланда. В качестве инструментов для измерения всестороннего учета опыта обучения участников использовались анкеты и интервью. Для статистического анализа применялся t-критерий парной выборки (альфа = 0,05).

Результаты исследования. На основе оценки потребностей учителей были разработаны рекомендации по их подготовке для устранения пробелов в педагогических знаниях и практике. Благодаря получению надлежащих знаний в ходе этого тренинга отношение участников к их уровню понимания синдрома Аспергера значительно изменилось. После посещения тренинга частота правильных ответов обеих групп учителей увеличилась. Учебная сессия также стимулировала рефлексивность и самоанализ педагогов в отношении их педагогической практики и убеждений.

Обсуждение и заключение. Это исследование способствует разработке тренинга для учителей, который включает все три области обучения – когнитивное, эмоциональное и психомоторное. Материалы статьи будут полезны для улучшения усвоения правильных знаний о синдроме Аспергера, а также для содействия профессиональной и личной рефлексии педагогов. Проспективные исследования по предмету требуют строгой методологии исследования, включая применение рандомизированного контрольного испытания, бо́льший размер выборки и разнообразие в выборке.

Ключевые слова: тренинг для учителей, отношение учителей, синдром Аспергера, профессиональное учебное сообщество, школьная реформа, эффективность учителя, профессиональная рефлексия, профессиональное развитие

Introduction

Educators play a key role in nurturing possibilities for their students and in helping them achieve their educational goals. Educational practices and methodologies can be affected by a teacher's attitudes, perspectives, and insights towards meeting students' learning needs. This research study discusses changes in Thai educators' attitudes towards their levels of understanding of Asperger's Syndrome (AS) before and after a teacher-training session. A review of the available literature indicated the under-recognition and negative perceptions of AS in the Thai educa-

tional community, resulting from the paucity of research studies and intervention resources. To overcome the current situation as well as the cultural stigma, and to help promote appropriate perspectives and insights of AS, a teacher-training session was developed and implemented to two independent groups of educators in the northeastern region of Thailand. Prior to the training session, a needs assessment was conducted in the same region. Results of this assessment became a foundation for creating content for the training session and measurement tools used in the study. These educators' learning was assessed with pre-test and post-test measures, followed by follow-up interviews. Results and findings indicated remarkable changes in these educators' attitudes, perspectives, and insights of AS after the training sessions. These educators also became enthusiastic about learning and developed close connections to the learning subject matter. Gaining understanding of unique qualities of each student, especially students diagnosed with AS, is an asset to educators in the regular classroom. Without this awareness, educators may not be able to provide evidence-based programming for their students and may be remiss in providing important developmental and educational opportunities for students with AS to flourish.

Literature Review

Asperger's Syndrome is a developmental disorder, formerly listed in the previous edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR)[1] [1]. The common characteristics of AS are: 1) challenges in social functioning[2] [1]; 2) challenges in cognitive processing [2; 3];

3) challenges in interpersonal skills [3; 4]; 4) average to above-average intelligence [4]; and 5) restricted, narrow-focused interests[3] [4]. According to the current classification by DSM (DSM-V), AS is classified as a subcategory of Autism Spectrum Disorder or ASD[4]. Within the ever-growing body of research related to ASD, there is sufficient evidence to suggest that educators' attitudes towards students with developmental disorders, especially AS, is directly related to the satisfaction of support received by these students and their families. According to Fontil and Petrakos [5], Jarman and Rayner [6], and Tippett [7], students with AS and their families reported overall dissatisfaction with support services provided at school, and they perceived that their teachers lacked adequate insights into their learning needs.

Educational systems worldwide strive to provide optimal programming and support to students who present with diverse learning needs, and Thailand is no exception. In Thailand, however, there is currently a paucity of research, awareness, and understanding of AS and ASD[5] [8; 9]. Traditionally, education of students with diverse learning needs was provided by community-oriented organizations – including Non-Governmental Organizations (NGOs) and psychiatric hospitals for children[6]. In 1999, when the National Education Act was passed, educational rights were granted to every citizen[7] [10]. With this law, students with special needs are afforded the same rights as regular classroom students in accessing 'early intervention services, educational materials, facilities, assistive devices as well as homeschooling services provided by the government'[8].

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[1] American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders: Text Revision. 4th ed. VA: American Psychiatric Association; 2000.

[2] Attwood T. The Complete Guide to Asperger's Syndrome. London: Jessica Kingsley Publishers; 2007. Available at: https://books.google.ru/books?id=ZwQGsuCNMPYC&redir_esc=y (accessed 26.01.2022).

[3] Ibid.

[4] American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed. VA: American Psychiatric Association; 2013.

[5] Kohprasert K. Parent Perceptions of Early Intervention and Other Related Services for Young Children with Autism Spectrum Disorder in Thailand: Dissertation. Charlotte: The University of North Carolina; 2008. 185 p.

[6] Ibid; Onbun-uea A. Educating Young Children with Autism in Inclusive Classrooms in Thailand: Dissertation. Denton: University of North Texas; 2008. 161 p. Available at: https://digital.library.unt.edu/ark:/67531/metadc6067 (accessed 26.01.2022).

[7] Ibid.

[8] Kohprasert K. Parent Perceptions of Early Intervention and Other Related Services for Young Children with Autism Spectrum Disorder in Thailand. P. 24.

However, at times, these students face challenges to access appropriate support services due to the lack of 'sufficient funding or resources to provide education and services'[9]. As well, it is equally challenging when educators lack educational opportunities to learn about their students' needs[10] [8]. In particular, challenges are more apparent for both students and educators in suburban and rural areas, as the majority of service providers are primarily located in urban centers[11]. This inequity in access to services and information can be one of the contributing causes for the current lack of sufficient interventions for students with AS in the Thai educational system[12] [8; 9].

In addition, past research reported that educators did not feel confident and competent in meeting the needs of their students with AS and ASD, primarily the result of the complexity of resource allocation and the lack of professional development [11; 12]. Alfaro et al. [13] and Morrier et al. [14] discussed the significant effects of professional training on both educators and their students. Professional training can provide educators with opportunities for learning new pedagogical methods, receiving guidance, and engaging in professional and/or personal reflections [14; 15].

Simultaneously, Alfaro et al. [13] and Morrier et al. [14] indicated the lack of learning and professional development opportunities for educators. In the past, attending professional development could have been limited to individuals who were able to physically and financially afford these programs [16; 17]. Nowadays, owing to the advancement of web-based technology, professional training has become much more accessible to a wider audience [16; 17]. However, web-based instructions cannot be replaceable with hands-on learning [18].

Therefore, professional learning needs to maintain a balance between web-based and in-person instructions to complement knowledge and practice [18; 19].

Alfaro et al. [13] and Morrier et al. [14] also report that professional development has been one of the overlooked aspects of educators' careers [13; 14]. Often attributed to assumptions that teachers learn about students with diverse needs prior to becoming classroom teachers, along with the concomitant expectation that teachers ought to be able to navigate their teaching practice with prior knowledge and training [13; 14]. Nevertheless, the practice-based evidence suggested that educators need to maintain professional learning to challenge their assumptions (as well as to gain new perspectives and insights) with the goal to improve their teaching practice in the classroom [20].

Educators' perspectives regarding their students' challenges with learning play a crucial role in their learning outcomes [5; 15]. Additionally, these teachers need to cultivate understanding of the origins of challenges that affect their students' learning [6; 7]. Hence, more opportunities for teacher education and interprofessional collaboration are urgently needed in Thailand to provide teachers with the requisite knowledge-base, perspectives, and insights of the educational and development needs of children with AS[13] [10].

Materials and Methods

At the start of the implementation, all the participants were presented with the significance, purposes, and procedures of the study by the researchers. It was emphasized that the participation was voluntary, and participants were allowed to freely agree with the information provided. After these participants were fully informed of the course

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[9] Ibid; Vorapanya S. A Model for Inclusive Schools in Thailand: Dissertation. Eugene: University of Oregon; 2008. 241 p. Available at: https://scholarsbank.uoregon.edu/xmlui/handle/1794/9487?show=full (accessed 26.01.2022).

[10] Kohprasert K. Parent Perceptions of Early Intervention and Other Related Services for Young Children with Autism Spectrum Disorder in Thailand; Vorapanya S. A Model for Inclusive Schools in Thailand.

[11] Kohprasert K. Parent Perceptions of Early Intervention and Other Related Services for Young Children with Autism Spectrum Disorder in Thailand.

[12] Ibid.

[13] Vorapanya S. A Model for Inclusive Schools in Thailand.

of the implementation, informed consent forms were provided to them to sign. With this written consent, participants provided permission to the researchers to have their interviews transcribed and their remarks during the implementation included in written manuscripts. Participants were assured that information shared by them during the study would be kept strictly anonymous and the use of collected data is restricted to purposes of this research only. Additionally, every measure was taken to protect participants' privacy and to mitigate potential harm to their well-being.

This research employed a quasi-experimental, embedded mixed methods design to obtain data[14]. Due to the novelty of the information presented to participants, using a mixed-methods design was appropriate for the investigation of teachers' perspectives, insights, and learning experiences. Both sets of data (quantitative and qualitative) were collected in a flexible manner, and they complemented each other to strengthen the findings[15] [21]. Consequently, the data analysis produced a well-integrated synthesis of information[16] [21]. The study was conducted employing a one-group, pre-test/post-test design as there were no control groups involved[17]. For the data collection, questionnaires were administered to gather baseline, quantitative results. Meanwhile, observations, discussions, and interviews followed to compile qualitative data.

The structure of the study was developed in an attempt to conform with the preexisting stereotypes, stigma, and negative perceptions towards disability in the Thai educational community [22]. The researcher encountered these negative perceptions firsthand during the needs assessment. A visit to a regional school for special education revealed that, despite staff members' willingness to engage with the researcher, the administrators declined to participate in the study, citing a strict confidentiality policy. Therefore, the most current demographic information, intervention strategies, and teaching practices could not be ascertained and incorporated in the needs assessment. This barrier created the need for this study to structure a culturally sensitive training session to avoid potentially offending participants. Similarly, the format and the presentation of measurement tools (the attitude questionnaire and the follow-up interview) were created in an attempt to allow participants to express learning experience much more fluently and in depth. This consideration necessitated a research approach that was more qualitative than quantitative. Hence, the generalizability of the findings may have been compromised by this factor.

Research Subjects. To conduct this research, an availability sampling method was used to recruit participants. This sampling method is commonly used, as it is affordable and practical[18] [23]. With this method, participants are assumed to be homogeneous so that they represent the target population fairly [23]. For this study, participants were recruited through the researcher's visits to local schools which varied in both size and grade levels – 20–35 schools in total. During the researcher's school visits, a needs assessment was conducted simultaneously to determine the educational needs of teachers. This assessment functioned as a foundation for developing the content of the training session and measurement tools. It is important to note that schools included for this assessment were completely independent from those that participated in the training session.

Participants for this study consisted of educators in the northeastern region of Thai-

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[14] Creswell J.W. Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research. 4th ed. London: Pearson Education; 2012; Privitera G.J., Ahlgrim-Delzell J. Research Methods for Education. CA: Sage Publications; 2018.

[15] Creswell J.W. Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research.

[16] Ibid; Privitera G.J., Ahlgrim-Delzell J. Research Methods for Education.

[17] Ibid.

[18] Columbia Center for Teaching and Learning. Types of Sampling. Columbia Center for Teaching and Learning. Available at: http://ccnmtl.columbia.edu/projects/qmss/samples_and_sampling/types_of_sampling.html (accessed 26.01.2022).

land. These participants were divided into two independent groups of in-service teachers and pre-service teachers. The majority of participants were female (83.3% for in-service teachers and 84.4% for pre-service teachers). The northeastern region was chosen to challenge a "double-constraining" research trend concerning AS. Firstly, research related to AS was scarce in Thailand. Secondly, research studies regarding developmental diversity were majorly found in urban areas[19]. In rural areas of the country, this type of research has been much less conducted [10; 24]. Therefore, this study was intended to provide a foundational cornerstone for the subject matter.

Participant recruitment encountered limitations resulting primarily from the sensitive nature of the subject matter. In Thailand, education of students with disability and/or diverse learning needs can be a highly-sensitive subject [22]. Therefore, despite the researcher's recruitment efforts to send invitations via phone calls, emails, and postal mails, schools' responses for participation were quite limited. Subsequently, the recruitment method was switched to door-to-door school visits by the researcher. This shift may have limited the inclusion criteria. As a result, the training session was provided to a smaller number of participants (less than $N = 35$). Likewise, participants could not be randomly assigned to groups due to the sampling method. Additionally, because of the novelty of the subject matter, it was impossible to assign a control group. These factors may affect the generalizability of the findings.

In-Service Teacher Group. In total, 12 in-service educators (classroom teachers and administrative staff) attended the training session provided. All participants were from schools in the region that differed in both size and grade levels. All the educators had bachelor degrees in education and three of

them (25%) held master degrees. Over half of them (58.3%) taught at primary schools. Four of the participants (33.3%) taught at the preschool level, while 8.3% taught at a secondary school. Teaching experience among these educators ranged from 15 to 25 years. Among administrative staff who attended, one was a principal, and another was a resource teacher who was responsible for students with diverse learning needs.

Pre-Service Teacher Group. Inclusion of pre-service teachers was to front-load these teachers with adequate knowledge and skills – necessary to teach students with diverse learning needs – before they entered into practice[20] [13; 14]. Therefore, 32 pre-service teachers were recruited to participate in the training session. These participants were senior post-secondary students, majoring in Early Childhood Education. They performed their final teaching practicum shortly after the training session provided by this researcher. The training session was conducted after the session provided to in-service teachers to explore the following inquiry: "If the training is given to both in-service teachers (who have different educational, life and professional experiences) and pre-service teachers, what differences would there be in terms of outcomes?" Additionally, inclusion of pre-service teachers was to challenge assumptions that novice teachers have learned, during their program, to have sufficient skills, efficacy, and knowledge to independently navigate in a classroom containing students with diverse learning needs [13; 14].

Measurement Tools. Data was obtained using two materials: an attitude questionnaire and follow-up interviews. To assess the attitude questionnaire's reliability, Cronbach's Alpha was calculated for 0.90, representing excellent/high reliability [25]. At the same time, a local psychologist who specializes in assessments was consulted to verify

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[19] Kohprasert K. Parent Perceptions of Early Intervention and Other Related Services for Young Children with Autism Spectrum Disorder in Thailand; Vorapanya S. A Model for Inclusive Schools in Thailand.

[20] Saggers B., Klug D., Harper-Hill K., Ashburner J., Costley D., Clark T., et al. Australian Autism Educational Needs Analysis: What Are the Needs of Schools, Parents and Students on the Autism Spectrum?: Final Report. Brisbane: The Cooperative Research Centre for Living with Autism; 2018. Available at: https://www.autismcrc.com.au/sites/default/files/inline-files/Educational%20Needs%20Analysis%20-%20Final%20report%20Version%202.pdf (accessed 26.01.2022).

the construct and content validity as well as reliability of these measurement tools. The contents of the two measures were reviewed and approved by this psychologist prior to their implementation with the teacher-subjects.

Attitude Questionnaire. In this study, a questionnaire was developed to assess changes in participants' attitudes towards their levels of understanding of AS before and after the training session provided by the researcher. Attitude is an intricate, yet crucial concept that determines courses of actions in any given circumstance[21] [26]. In educational contexts, attitudes reflect personal, political, and social perspectives[22] [26]. Additionally, teachers' attitudes play a significant role in students' learning outcomes[23] [26]. Therefore, ensuring educators have the requisite knowledge, skills, and insights to address their students' learning needs is imperative to increase the likelihood of reaching desired learning outcomes.

The questions were designed to focus on the participants' understanding of AS and to help them reflect on their own teaching practices regarding students with special needs[24]. The format of questions in this tool was adapted from Lindsay et al. [11] and Rodríguez et al. [12]. The questionnaire was developed using *Google Forms*. *Google Forms* is an open-sourced platform which allows for greater flexibility for simultaneous collaboration[25].

This tool was administered as both a pre-test and a post-test. Both tests contained open-ended and closed-end survey questions to measure participants' knowledge of specific information related to AS and to gain better insights into the minds of the teacher-subject. The tests were also designed to encourage 'a range of personal views to be expressed.,' as O'Gorman and Drudy[26] described, to stimulate participants' critical thinking, and to propose possible effective methodologies and practices for students with AS.

Follow-up Interviews. Follow-up interviews contained open-ended, semi-structured questions that allowed 'in-depth probing and expansion of ideas.,' according to O'Gorman and Drudy[27]. Since AS was a novel learning subject for most participants, collecting subjective data is thought to strengthen the analysis by combining these results with the objective data that were gathered from the attitude questionnaire [27]. Hence, interview questions were focused on participants' perspectives and insights as well as their feelings in relation to their learning. These questions provided the researcher with valuable insights into the participants' learning experience. The format of questions in the interview was adapted from Lindsay et al. [11] and Rodríguez et al. [12]. Confidentiality and anonymity were reinforced to minimize potential threats to participants' physical and psychological safety. Verbal consent was obtained at the start of each interview regarding the transcription of answers provided by the teacher-subject.

Analysis Method. This study employed both statistical and descriptive analysis methods for data analysis. For the statistical analysis, the paired sample *t*-test (alpha = .05) was used to examine differences in participants' attitudes before and after the training. The *t*-test was chosen due to the sample size

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[21] United Nations Educational, Scientific and Cultural Organization. Attitude. United Nations Educational, Scientific and Cultural Organization; 2022. Available at: http://www.ibe.unesco.org/en/glossary-curriculum-terminology/a/attitude#:~:text=A%20learned%20tendency%20or%20readiness,have%20an%20influence%20on%20behaviour (accessed 26.01.2022).

[22] Ibid.

[23] Ibid.

[24] Siniscalco M.T., Auriat N. Questionnaire Design. In: Ross K.N., ed. Quantitative Research Methods in Educational Planning. Paris: United Nations Educational, Scientific and Cultural Organization International Institute for Educational Planning; 2005. p. 1–86.

[25] Google. Google Forms [Internet]. CA: Google; (no date). Available at: https://www.google.com/forms/about (accessed 26.01.2022).

[26] O'Gorman E., Drudy S. Professional Development for Teachers Working in Special Education/Inclusion in Mainstream Schools: The Views of Teachers and Other Stakeholders. Dublin: University College Dublin; 2011. Available at: http://ncse.ie/wp-content/uploads/2014/10/Professional_Development_of_Teachers.pdf (accessed 26.01.2022).

[27] Ibid. P. 41.

(less than $N = 60$) and the research being a quasi-experimental design[28] [28]. For the descriptive analysis method (transcription of interviews, observation, and discussion), the deductive approach was used. The deductive approach focuses on similarities and differences in data and supplements quantitative data[29].

Results
The In-Service Teacher Group

Pre-Test: Closed-Ended Questions. Participants were asked dichotomous, introductory questions regarding AS. Based on the information provided by Siniscalco and Auriat[30], dichotomous questions were used to obtain specific information from teacher-subjects as well as to provide customary respect for their expertise as experienced educators. All participants ($N = 12$) answered "No" to all introductory questions. Therefore, computational analysis was not performed as statistical significance was not observed.

Pre-Test: Open-Ended Questions. This section of pre-test included semi-structured inquiries about participants' perspectives and insights as well as their experience teaching students with diverse learning needs. The majority of answers appeared very broad, reflecting participants' unfamiliarity and uncertainty with the subject matter. Table 1 summarizes the questions and participants' responses (their responses were summarized and inserted with permission). Questions in Table 1 were adapted from Lindsay et al. [11] and Rodríguez et al. [12].

Post-Test: Closed-Ended Questions. Half of the participants in this group were unable to complete the questionnaire due to unforeseen circumstances, time constraints, and their occupational commitments after the training. Therefore, the statistical and discourse analyses for this group were based on the participants who completed the questionnaire. Those who could not complete the questionnaire were interviewed as a follow-up to assess their learning.

This section included dichotomous questions, allowing the researcher to precisely assess participants' learning from the training provided by the investigators. From the analysis of the paired sample *t*-test (alpha = .05), it was evident that participants felt confident in acquiring the sufficient and appropriate knowledge about AS ($t(6) = 1.94$, $P \leqq 0.005$). Table 2 is the statistical item descriptions of these questions. Questions in Table 2 were adapted from Lindsay et al. [11] and Rodríguez et al. [12].

Post-Test: Open-Ended Questions. This section employed semi-structured questions to stimulate participants' critical thinking as well as to enhance their knowledge retention and transfer. Participants' open-mindedness and willing reception were apparent in their responses.

T a b l e 1. **In-Service Teacher Participants' Responses to Open-Ended Questions**

Questions	Responses
Do you think students with ASD should get help and support? If yes, how?	– Students with ASD should get help. – Students with ASD can succeed if they receive the appropriate support
What do you think would make you feel confident and comfortable to teach these students?	– Educators need to understand the strengths and challenges that students with ASD experience. – Educators need to be open-minded so that they can fully support their students with ASD
If you have students with AS in your class, how could you help or support them?	– Some educators were uncertain and hesitant about supporting students with AS due to the lack of experience, while others strived to provide optimal support with available resources

[28] McDonald J.H. Handbook of Biological Statistics. 3rd ed. MD: Sparky House Publishing; 2014; The British Medical Journal. The t tests. London: The British Medical Journal; 2020. Available at: https://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one/7-t-tests (accessed 26.01.2022).

[29] Nigatu T. Qualitative Data Analysis. CA: SlideShare; 2009. Available at: https://www.slideshare.net/tilahunigatu/qualitative-data-analysis-11895136 (accessed 26.01.2022).

[30] Siniscalco M.T., Auriat N. Questionnaire Design.

T a b l e 2. **Statistical Item Description of Post-Test Questions (The In-Service Teacher Group)**

Questions	Participants' Responses ($N = 6$)	
	Correct	Incorrect
Do you think individuals with AS can develop their skills successfully if they receive appropriate interventions at an early age?	4	2
Do you think individuals with AS often have difficulties with social interactions and working with others?	6	0
Do you think individuals with AS can be sensitive to sensory stimulation (Vision, hearing, smell, taste, touch)?	3	3
Do you think individuals with AS tend to learn better with visual stimuli?	4	2
AS is incurable; however, do you think there are ways to help them integrate to live better in the community?	6	0
Do you think that teachers may need to revise teaching methods when teaching individuals with AS?	6	0
Do you believe that clear guidance is needed when explaining procedures to individuals with AS?	6	0
Do you believe that when individuals with AS receive good advice and guidance, they can be successful?	6	0
M	5.13	0.88
SD	1.25	1.25

Note: *M* = mean, SD = standard deviation.

Their answers appeared more precise compared to those in pre-test, reflecting their acquired familiarity and certainty with AS. Table 3 shows questions and participants' responses, used with permission (their responses were summarized). Questions in Table 3 were adapted from Lindsay et al. [11] and Rodríguez et al. [12].

Follow-up Interview. Participants' open-mindedness, willingness, and motivation for learning were evident in the interview. They were very conscientious with their responses, and commonly regarded their learning experience as riveting. Table 4 is a summary of interview questions and in-service teacher participants' responses, inserted with permission (their responses were summarized). Questions in Table 4 were adapted from Lindsay et al. [11] and Rodríguez et al. [12].

T a b l e 3. **Open-Ended Questions and In-Service Teacher Participants' Responses**

Questions	Responses
What are the most distinctive features of AS?	– Social skills deficiency; outstanding memorization skills; intelligence; and special interests related to curiosity
What are the roles of classroom teachers when they have students with AS in the classroom?	– Educators can be active supporters who can provide guidance to students with AS. – Educators can facilitate the modified learning lessons for students with AS. – Educators can act as guardians who are attentive to the developmental and academic progress of students with AS. – Educators need to be able to communicate effectively with families of students with AS
What do you think can be done to help students with AS to work effectively together with other students in the classroom?	– Assisting to develop social skills. – Facilitating activities that can be shared with neurotypical peers. – Promoting awareness of AS

T a b l e 4. **Summary of Follow-up Interviews with In-Service Teacher Participants**

Questions	Responses
What kind of benefits do you think you obtained from this training session?	– The training session is very helpful to all the staff members at school. The staff members need to learn more about AS so that the entire school team can be resourceful and vigilant of challenges related to developmental cornerstones of students with AS. – The training session provided the wealth of information about AS, which is very beneficial for the profession. The session was inspiring to learn more about students who present with both special needs and special talents
How did you think of your learning experience?	– Very satisfied with the learning experience. – Eye-opening as to the amount of information that was previously unknown to participants. – Inspiration for critical thinking
From your learning experience, what do you think you would apply to your teaching practice?	– More understanding and empathy to students with AS. – Guidance and allocation of resources. – Hands-on learning

The Pre-Service Teacher Group

Pre-Test: Closed-Ended Questions. Two multiple-choice questions were provided to these pre-service teachers. Since they were entry-to-practice level educators, these questions were formatted as an introduction to the subject matter. To answer these questions, participants were instructed to correctly select one or more applicable answers from the given choices (partial points were not granted).

As a result of statistical analysis, the majority of participants answered the questions incorrectly ($M = 21.5$). It is significant to note that the *t*-value was not calculated, given the smaller number of question items. Table 5 indicates the statistical item description of multiple-choice questions. Questions in Table 5 were adapted from Lindsay et al. [11] and Rodríguez et al. [12].

Pre-Test: Open-Ended Questions. Similar to the ones used for in-service tea-chers, this section contained semi-structured questions. However, given the differences in experience, the content of inquiries was modified to reflect teaching philosophy and principles of inclusion. Collected answers indicated unfamiliarity and uncertainty towards the subject matter, yet these answers seemed more hypothetical. Table 6 is a summary of questions and participants' responses (their responses were summarized and inserted with permission). Questions in Table 6 were adapted from Lindsay et al. [11] and Rodríguez et al. [12].

Post-Test: Closed-Ended Questions. For this section, pre-service teachers were asked embedded questions and instructed to answer "Yes" or "No" to these questions. This style was used for purposes of precise data collection for the researcher and to serve as a review and reflection of learning demonstrated by these participants.

T a b l e 5. **Statistical Item Description of Pre-Test Questions (The Pre-Service Teacher Group)**

Questions	Participants' Responses ($N = 32$)	
	Correct	Incorrect
Choose the right answer(s) describing the core characteristics of AS	12	20
Choose the right answer(s) describing differences between Autism and AS	9	23
M	10.50	21.50
SD	2.12	2.12
df	0	0

Note: *M* = mean, SD = standard deviation, df = degree of freedom.

T a b l e 6. **Pre-Service Teacher Participants' Responses to Semi-Structured Questions**

Questions	Responses
Who do you think plays an important role in educating and nurturing the talents of students with AS?	– Educators. – Family members of students with AS
If you have students who learn differently from their peers, how do you support them?	– Educators can discover and nurture interests of students who learn differently from their peers
What do you think is the most effective strategy to help students with AS when they are experiencing difficulties?	– Educators can be attentive and understanding of the needs of students with AS. – Educators need to be able to manage students with AS in their classroom

The same statistical analysis method (the paired sample *t*-test with alpha = .05) was used for this group. It was apparent that pre-service teachers recognized the importance of acquiring more knowledge about AS ($t(6) = 1.94$, $P \leq 0.0001$). Table 7 is the statistical item descriptions of these questions. Questions in Table 7 were adapted from Lindsay et al. [11] and Rodríguez et al. [12].

Post-Test: Open-Ended Questions. Semi-structured questions were used for this section. However, contents were more focused on investigating pre-service teachers' problem-solving and critical thinking skills. They were very enthusiastic to learn about AS and their engagement and motivation to participate is characterized, by this investigator, as remarkably high. Table 8 shows questions and participants' responses (their responses were summarized and inserted with permission). Questions in Table 8 were adapted from Lindsay et al. [11] and Rodríguez et al. [12].

Follow-up Interviews. Pre-service teachers openly discussed how their learning experience could improve their future practice during the interview. Their responses suggest they appreciated this learning opportunity in an honest, vibrant, and whole-hearted manner. Table 9 is a summary of pre-service teacher participants' responses to interview questions. Permission was obtained from these participants to insert their responses (these responses were summarized). Questions in Table 9 were adapted from Lindsay et al. [11] and Rodríguez et al. [12].

T a b l e 7. **Statistical Item Description of Dichotomous Questions (The Pre-Service Teacher Group)**

Questions	Participants' Responses ($N = 32$)	
	Correct	Incorrect
Do you think individuals with AS can develop their skills successfully if they receive appropriate interventions at an early age?	15	17
Do you think individuals with AS often have difficulties with social interactions and working with others?	27	5
Do you think individuals with AS can be sensitive to sensory stimulation (Vision, hearing, smell, taste, touch)?	25	7
Do you think individuals with AS tend to learn better with visual stimuli?	25	7
AS is incurable; however, do you think there are ways to help them integrate to live better in the community?	26	6
Do you think that teachers may need to revise teaching methods when teaching individuals with AS?	26	6
Do you believe that clear guidance is needed when explaining procedures to individuals with AS?	31	1
Do you believe that when individuals with AS receive good advice and guidance, they can be successful?	32	0
M	25.88	6.13
SD	5.14	5.14

Note: *M* = mean, SD = standard deviation.

T a b l e 8. **Open-Ended Questions and Pre-Service Teacher Participants' Responses**

Questions	Responses
What are the most distinctive features of AS?	– Cognitive intelligence; comprehension for complex concepts; high talents based on interests
What are the roles of classroom teachers when they have students with AS in the classroom?	– Classroom teachers are to be attentive to interests/strengths of students with AS and to strive to nurture their talents. – Classroom teachers can integrate students with AS and those without AS. – Curriculum can be adjusted for students with AS to optimize their learning experience. – Abilities and strengths of students with AS can be shared to their peers and staff members
What do you think can be done to help students with AS to work effectively together with other students in the classroom?	– Classroom teachers need to understand challenges experienced by students with AS and to provide guidance accordingly. – Students with AS also need to learn to integrate with the community, starting from smaller social circles. – Students with AS can practice their social skills with individuals surrounding them

T a b l e 9. **Summary of Follow-up Interviews with Pre-Service Teacher Participants**

Evaluation Question	Pre-Service Teacher Participants' Responses
What is the most notable learning component for you, and how would you make improvements to your teaching practice from your learning?	– The video presentation by a psychologist: Specialist knowledge. – The guest speaker presentation: Inspired by the lived experience of an individual with AS. – Role-playing activities: Hands-on activities. – The entire session: Valuable career preparation; Opportunities for knowledge application

Discussion and Conclusion

Participants' attitudes towards their levels of knowledge and understanding of AS can be characterized as changing, in a positive manner, after the training provided by the investigator. This shift is apparent when comparing scores from attitude questionnaires before and after the training session. Table 10 indicates the percentage rates of correct responses to questions as well as variations in their levels of understanding and acceptance.

This shift in attitude is also represented by their comments, demonstrating a noticeable increase in enthusiasm among participants and in increased emotional/psychological connections to the content provided. Participants collectively reported that their perspectives towards AS changed significantly post training session and acknowledged the need for appropriate training in order to assist students with AS in an effective manner. During the follow-up interviews, participants unanimously requested the following: 1) training be extended to a one-day program to include more in-depth discussions and hands-on learning activities; and 2) the program be offered more frequently to schools with diverse grade levels throughout the region.

T a b l e 10. **Rates of Correct Responses and Levels of Understanding and Acceptance**

	Rates of Correct Responses (%)		Levels of Understanding and Acceptance
	Pre-Test	Post-Test	
In-Service Teacher Group	0	85.5	High (85.5% increase)
Pre-Service Teacher Group	32.8	80.8	Medium (40.6% increase)

In particular, in-service teachers' shift in attitudes was notable. Two participants commented that they had a brief encounter with individuals with AS/ASD in the past. However, they admitted that, at the time, they did not have adequate understanding of the condition. The majority of participants described that attending the training was intellectually-stimulating, empowering, and cognitively-compelling. Their experience was summarized in Table 11, with two key themes ('Shift in Attitude towards AS' and 'Knowledge Transfer from the Learning'). Permissions for insertion were granted from these participants (their responses were summarized).

On another occasion, one in-service teacher participant recommended that this program be delivered regularly to as many audiences as possible. This participant believed that the resourcefulness of this program would benefit all the educators with diverse levels of experience. Additionally, this participant took initiatives to connect the principal researcher and the Dean of the School of Medicine at a local university, in an attempt to expand the community of learning. The Dean and the principal researcher held a meeting to discuss the inter- and intra-disciplinary as well as communal benefits of this program. It appeared that the participants' enthusiasm for the training session expanded the possibilities of prospective learning opportunities.

After the training sessions, several participants demonstrated emotional/psychological connections to the information presented in the training session. Through observation, participants were able to engage in both intellectual and affective learning. For instance, experienced in-service teachers commented that they felt very close to the acquired knowledge from the session, further mentioning that they felt fortunate to be engaged in a well-established professional learning community.

Pre-service teachers demonstrated the close-knit circle of learning as well. Among the 32 participants, only two mentioned that they encountered a single paragraph about AS in the assigned readings list in their teacher-training program. Furthermore, this section was part of a supplemental reading list and, therefore, not highlighted in the course material. These motivated participants influenced the learning of the entire group. Table 12 represents their experience with a key theme of "Integration of Knowledge and Perspectives." Permission for the insertion of summarized quotes was received from these participants.

Participants also contemplated contents from both professional and personal viewpoints. Several participants remarked that while attending the training session, they reflected on particular family members or acquaintances. A participant mentioned that she thought of her children throughout the training. According to this participant, she has committed herself to learning more about AS so that she could provide appropriate guidance to her children. Another participant stated that she had her sibling in mind. She was grateful that she gained a better understanding of her sibling.

T a b l e 11. **Summary of Key Themes and In-Service Teachers' Responses**

Key Themes	Responses
Shift in Attitude towards AS	– Increased motivation for learning more about AS. – Inspired by the fact presented regarding AS. – Admitted the lack of previous knowledge and an inquiring mind to learn about AS
Knowledge Transfer from the Learning	– Becoming more resourceful and prepared. – Deepening of professional knowledge

T a b l e 12. **Summary of Key Theme and Pre-Service Teachers' Responses**

Key Theme	Responses
Integration of Knowledge and Perspectives	– The training session complemented the previous knowledge and generated the motivation to learn more about AS. – Motivated to apply knowledge to teaching practice

This research study was conducted to assess changes in Thai educators' attitudes towards their levels of understanding of AS before and after a researcher-led training session. The efficacy of the training was examined by employing multiple groups of participants with different levels of professional experience, given that the learning subject was new to the majority of educators. Furthermore, in order to produce rigorous synthesis of information, data were collected from multiple sources (questionnaires, interviews, observations, and discussions). As a result of these training sessions, teacher-participants were able to gain sufficient knowledge to shift their perspectives and insights regarding AS. Similarly, these educators' confidence with the subject matter was increased, ranging from medium to high. Moreover, the training sessions created opportunities for these participants to reflect on their professional and personal practices as well as to initiate the professional learning communities in an attempt to increase knowledge application. Most importantly, this research increased the accessibility to necessary knowledge and resources for educators in the sub-urban areas of the country.

Several recommendations for future research were generated from the findings. Firstly, due to the constraints in recruitment, this research became a small-scale study, which diminishes the strength of statistical rigor and the generalizability of the results. Therefore, the training's prospective participants can be recruited from an increased number of audiences to improve rigor in analysis. Secondly, the training sessions can be implemented in urban centers of the country (for instance, in Bangkok and its surrounding communities). The current study was conducted in a sub-urban area of Thailand, where resources were less available compared to the urban centers. Hence, prospective studies can compare and contrast the outcomes of the training when it occurred in the communities that disparate levels of educational resources.

According to Dr. Tony Attwood, 'Asperger's syndrome has probably been an important and valuable characteristic of our species throughout evolution'[31]. It is hoped, indeed, that this research can play an initiative role to generate prospective studies of AS and ASD in Thailand. In order to optimize learning outcomes of students, it is imperative to empower educators through proper channels of knowledge, guidance, professional reflection, and personal development. Subsequently, students can receive the maximum benefit of the renewed pedagogy and can realize their full potential. In turn, improving these students' learning outcomes would be beneficial for the school community, family, society, and the nation as a whole.

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