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Level of Knowledge of Final Year Students in Bachelor of Education (Special Education) on Autism

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Abstract

Final-year students in the education field or pre-service teachers must undergo practicum training to meet their graduation requirements. These teachers must also have a good level of knowledge before undergoing practical training to be able to conduct effective teaching. Therefore, this study intends to identify the level of knowledge of final-year students in the Special Education course on autism before starting the practicum training. This study also examined two main objectives: i) to measure the level of knowledge of final year students in Bachelor of Education with Honors (Special Education) on autism, and ii) to identify appropriate methods to enhance their knowledge of autism. This study was conducted quantitatively using questionnaires distributed online to 35 final-year students at selected universities. The findings of this study were analyzed using descriptive analysis based on frequency and percentage. The results showed that the level of knowledge among the final-year students was at a relatively good level for basic characteristics. There were still some confusion and misunderstanding about the specific characteristics of autism. In addition, among the appropriate measures to assist final-year students to improve their knowledge is the provision of more effective teaching content and experiential training by the university. Moreover, final-year students should intensify their own efforts to increase their knowledge of autism.

Keywords: Level of Knowledge, Pre-Service Teachers, Autism, Special Education

Introduction

Autism Spectrum Disorder (ASD) is becoming more known to society nowadays due to the increased dissemination of information about autism, especially in social media and online newspapers that often provide awareness and information. Society is given extensive exposure as almost every individual has a smartphone device and social media such as Instagram, Facebook, YouTube, and so on. In addition, there are also autism associations that are active online via social media, such as Facebook, where many of the association's members are parents of children with autism. They often share various information about autism on their social media to provide the public with awareness and knowledge about it.

According to the Malaysian Ministry of Education (KPM), autism is categorized as a learning problem caused by difficulties in cognitive, behavioral, social and so on. Moreover, autism is a disorder that causes characteristics or behaviors such as self-isolation, self-injury, cognitive problems, and language problems, and its characteristics can be seen before the child is 30 months old (Hallahan & Kauffman, 1976). In addition, due to their deficiencies in communicating verbally and non-verbally, physical activities and also social interactions make it difficult for them to communicate with other individuals (American Psychiatric Association, 2013). Meanwhile, in clinical terms, autism is a neurological disorder that has a long-term negative effect on brain development (Hasnah, 2017). In addition, medical terms also define autism as an individual growth disorder in the long term that can affect children's thinking and their process of assessing information (Ramli, 2008). The nervous system in the brain of individuals with autism has problems in terms of development, which the effect can be seen in their behavior as if they are in their own world and are not sensitive to the surrounding conditions (Nurhayati et al., 2018). The Center for Disease Control and Prevention (CDC) (2016) stated that there is an increase in autism among children in the United States which is 1 in 54 children with autism that occurs every year. In Malaysia, 1 in 625 children suffer from autism (Azizan, 2008).

In 2013, the National Autism Society of Malaysia (NASOM) stated that the number of children with autism was 47,000 (Utusan Online, 2016). Therefore, it is important for children to undergo an autism detection test if there are signs of autism for early detection so that they can undergo appropriate intervention. Individuals with autism who underwent intervention treatment in the United States showed a positive improvement as they aged, and they also needed services and support from people around them until they got older (National Institute of Neurology Disorders and Stroke, 2015). Among the tests used is the Diagnostic and Statistical Manual of Mental Disorders 5 (DSM-5) by the American Psychiatric Association which is a test for mental diagnosis, behavioral conditions, and autism. Initially used in 2013, this test diagnoses autism criteria such as persistent deficits in social communication and social interaction across multiple contexts, restricted and repetitive patterns of behavior, interests, or activities, and many more. This test also diagnoses individuals with autism based on the severity of the help needed, i.e. the more help is needed, the more severe the level of autism of the individual concerned, and vice versa.

The enrollment of students with autism in public government schools is increasing compared to other categories (Ludlow et al., 2007). Individuals with autism also need education similar to typical individuals, but they need learning content that suits their cognitive and understanding. Therefore, they should attend schools that offer Integrated Special Education Program (PPKI) for appropriate learning. However, many studies have reported that teachers have low and lack knowledge about autism (Al-Sharbati et al., 2015). In addition, the level of knowledge on autism among teachers is low and only moderate (Haimour & Obaidat, 2013; Hendricks, 2011). Meanwhile, there are teachers who have a sufficient level of knowledge but are still confused by the characteristics of autism (Mavropoulou & Padeliadu, 2000). The level of knowledge on autism is important as Robertson et al (2003) stated that when teachers have the intention to establish a positive relationship between teachers and students with autism, then undesired student behavior will decrease and they will also actively participate in class social activities.

However, the level of knowledge on autism among the final year students in the Bachelor of Special Education program is questionable as students have had to go through online learning recently which may slightly affect their learning. This is because effective learning involves

students experiencing an event physically and face-to-face. This is supported by Haimour & Obaidat (2013) that the level of education such as high school, diploma, Bachelor's degree, and Master's degree, teaching experience, and meeting students with autism will positively affect teachers' knowledge about autism. Therefore, it is important for final-year students to enhance their level of knowledge about autism in order to be more confident in educating, understanding behavior, and dealing with issues that will be faced by students with autism in the classroom.

This study aimed to find out the readiness of final-year students in enhancing knowledge about autism, such as characteristics, teaching strategies, and so on, before starting teaching training in the final semester. This study also identified the level of knowledge of final-year students of the Special Education course on Autism. In addition, this study identified appropriate methods to assist final-year students in enhancing their knowledge about autism so that they have more complete and good information.

The objectives of this study are

1. To measure the level of knowledge of final year students in Bachelor of Education with Honors (Special Education) on autism.
2. To identify appropriate methods to enhance knowledge about autism among final year students in Bachelor of Education with Honors (Special Education).

Students' Knowledge of Autism

The learning content in the Special Education course already includes types of disabilities including autism, which must already be known and recognized by university students majoring in this course. Since their first year at the university, they have been exposed to autism which can assist them in providing and enhancing knowledge about it. As a result, their level of knowledge about autism is likely to be better due to early exposure. According to the Fourth Edition Kamus Dewan (2005), knowledge means details, knowledge, or various information known by a person, while the level is a stage. Knowledge is very important, especially for prospective teachers, and teachers as an educator will impart knowledge to the new generation. Knowledge is divided into two categories, namely real and unreal, where real knowledge is usually in the form of printed documents, while unreal knowledge is in the form of ideas, minds, daily practices, experiences, memories, and the like, and is usually difficult to see with the naked eye (Sharuddi, 2002).

Final-year students are individuals who are in their last year of study and are also known as pre-service teachers as they will undergo a practicum at any school in the final semester, before the completion of their studies. The definition of a pre-service teacher is a student who is enrolled in a teacher preparation program and must successfully complete the requirements of a Bachelor's degree including coursework and field experience before being recognized and awarded a teaching license. Therefore, this practicum program aims to provide real field experience as a teacher to final-year students. Their level of knowledge is very important as they will be teaching students at school, which should take into account various aspects such as teaching strategies, communication skills, understanding the personality of students, and so on to ensure the teaching can be delivered well.

Subsequently, practicum training for pre-service teachers basically creates opportunities to foster inquiry in professional practice so that it can assist students to take responsibility and gain knowledge and understanding to demonstrate their abilities and subject expertise taught in class (Kraglund-Gauthier, 2014). However, there have been several studies conducted on

teachers regarding teaching training to students with autism and found that existing teacher preparation programs were insufficient to address this area. Apparently, the subjects offered as well as the practicum program conducted are not able to overcome the problems to enhance the level of knowledge of pre-service teachers. This matter is very alarming as pre-service teachers will teach students with autism at school during their practicum. Thus, it is important for them to be prepared in various aspects so as not to be cumbersome during teaching and learning.

However, there are previous studies reporting low and moderate levels of knowledge of pre-service teachers. For instance, Cervera et al (2017) conducted a study on pre-service teachers' knowledge, confusion, and gaps about autism and compared the knowledge levels between final-year students and first-year students. The results of the study proved that the knowledge level of final-year students was still at a weak level. Furthermore, a similar study conducted by Al-Hiary and Migdady (2019) on final-year students at a university in Jordan also showed that the knowledge level of these pre-service teachers was at a low level. In addition, Blackwell et al (2017) reported that final-year students at three universities in the United States had moderate knowledge levels. They were able to identify the basic characteristics and early signs of autism, but they lacked knowledge of the causes of autism and effective interventions in teaching students with autism. Pre-service teachers and Special Education teachers often feel unprepared to teach students with autism (Jung et al., 2011; Busby et al., 2012).

Furthermore, there is also a study on the level of knowledge of early childhood education pre-service teachers about autism conducted by (Barned et al., 2011). The results showed that the pre-service teachers have less knowledge and were confused with the basic characteristics such as the etiology and behavior of children with autism. The study also proved that the pre-service teachers did not know that autism is a developmental disorder, considered student with autism similar to each other, and did not know the role of early intervention in assisting children with autism. Thus, in this study, the number of wrong options exceeded the number of correct statements, proving that the practicum training of pre-service teachers in the early childhood field of autism was insufficient.

Moreover, the level of knowledge of pre-service teachers on autism was still at a low level which also included teachers that have been appointed (Al-Sharbati et al., 2015). In addition, the low to moderate levels of knowledge about the main characteristics of autism were revealed by several researchers (Haimour & Obaidat, 2013; Hendricks, 2011; Mavropoulou & Padelidiadu, 2000), but they were still confused with the original disorder characteristics. Based on previous studies, it can be inferred that pre-service teachers have low knowledge and often experience confusion about the characteristics of autism, which also affects existing teachers. This is very concerning as these teachers have a great responsibility and task to teach students with autism (Al-khateeb & Al-Hadid, 2013). In addition, the levels of training of pre-service teachers as well as Special Education teachers for ASD students were very low (McGregor & Campbell, 2001). Consequently, this leads to less confidence in their ability to provide services to children diagnosed with autism (Schwartz & Drager, 2008). According to Haimour and Obaidat (2013), they found that the level of education, such as high school, diploma, Bachelor's degree, or Master's degree, affected teaching experience and relationships with ASD students positively and also affected teachers' knowledge about autism.

Since the level of knowledge of pre-service teachers is still at a low level, the university should play a role by highly focusing on the training received by final-year students. Existing Special Education teachers are still not confident in their ability to provide good teaching to a students

with autism, let alone pre-service teachers who are less experienced in this field. Various efforts should be intensified to deal with this issue so that they are confident in the knowledge possessed, and the university, especially the faculty, should be involved. Additional discussions on related matters in the classroom are necessary, especially in performing assignments or coursework at the university as the opportunity to integrate examples and instructions will bring benefits (Hutchinson & Martin, 1999).

Research Methodology

The selected research design was a survey study, where the questionnaires were distributed to the respondents online. The questionnaire contained questions about the level of knowledge of final-year students in a relevant course on autism. The questions also consisted of characteristics, early signs of autism, and so on. This study identified the level of knowledge of the students as well as methods to help enhance their knowledge about autism so that this study can be a reference material for other students in the same course.

Sample of Study

This study focuses on the level of knowledge of final-year students in the Bachelor's Degree with Honors (Special Education) on individuals with autism. This study was also conducted to identify appropriate methods for final-year students to enhance their level of knowledge about autism. A quantitative method was employed where a total of 35 people were selected as respondents for this study. Respondents must encompass final year students in Bachelor of Special Education majoring in learning disabilities, hearing impairments, and visual impairments. To select a sample, the researchers needed to identify the number of people in the study area. The total number of final-year students in the Bachelor of Education with Honors (Special Education) was 49. However, only 35 respondents were selected to be observed on a small scale. The researcher used purposive sampling due to certain characteristics of this study.

Instrument of Study

The questionnaire used in this study was adopted from Toran et al (2016) and divided into three parts: Part A included the demographics of the respondents; Part B covered the introduction and training of final-year students regarding autism; Part C presented the level of knowledge of final year students on autism with two divisions, focusing on basic and specific characteristics of autism; and Part D provided the competence of final year students on autism.

In the questionnaire, part B which encompassed the introduction and training of final year students regarding autism used a Likert scale for scores, namely never (1), ever but little input (2), ever and satisfactory input (3), and ever and great input (4). For part C, the respondents only chose between correct or wrong, while the Likert scale for part D was based on strongly disagree (1), disagree (2), agree (3,) and strongly agree (4).

a. Respondent demographics

This section contains 5 items that were used to collect information about the respondent's background such as gender, age, race, and Bachelor's Degree specialization as well as identifying the desire to teach students with autism.

b. Introduction and training of final year students regarding autism

This section identifies the respondent's experience with autistic students which consisted of 5 items.

c. Level of knowledge of final year students on autism

This section aims to achieve the first objective and is divided into two categories. The first category identified the respondent's knowledge about the basic characteristics of autism with 9 items. Meanwhile, the second category identified the respondent's knowledge of specific characteristics of autism with 12 items.

d. Competence of final year students on autism

This part aimed to achieve the second objective. In this section, the ability and potential of respondents related to autism were identified with 9 items.

Data Collection and Analysis Procedures

The data collection process commenced with the method used by the researchers to obtain information from the study participants and to build a relationship between the researcher and the respondents. The respondents were selected from the final year students in Bachelor of Education with Honors (Special Education) as they corresponded to the needs of the study population.

Before the digital questionnaire was distributed on a certain platform, the selected respondents were asked beforehand via the Whatsapp application to fill in the questionnaire related to this study. Then, a link to the questionnaire was given and respondents answered the questionnaire in Google Forms. The send button was clicked when they finished answering.

The data collection process took 1 week so that all respondents would have sufficient time to complete the questionnaire. After that, data analysis was conducted using the Statistical Package for Social Science (SPSS) version 23 software through descriptive analysis, based on frequency and percentage.

Findings

The descriptive analysis used in this study involved frequency and percentage. The results of the analysis are explained in detail according to the table provided in the questionnaire answered by 35 final-year students majoring in Special Education.

Demographic Profile

This section explains the background of respondents according to gender, age, race, and specialization in Special Education with an interest in teaching students with autism. The highest gender in the study sample was female at 74.3%, while males were 25.7%. For age, 97.1% of the respondents were between 22 and 25 years old, while no respondents were between 18 and 20 years old. In addition, only Malays were involved in this study (100%). For the item of Bachelor's Degree specialization, the highest was those majoring in learning difficulties (65.7%), while the lowest was those majoring in vision impairments (14.3%). In the aspect of interest in teaching students with autism, all respondents answered Yes (100%).

Table 1

Demographic Profile

Demographic profile		Frequency (n)	Percentage (%)
Gender	Male	9	25.7
	Female	26	74.3
Age	18-20 years old	0	0
	22-25 years old	34	97.1
	26-29 yer old	1	2.9
Specialization	irLearning difficulties	23	65.7
Special Education	Visual impairments	5	14.3
	Hearing impairments	7	20
Interest in teaching students with autism	Yes	35	100
	No	0	0

Introduction and Training of Final-Year Students Regarding Autism

Table 3 shows the experience of final-year students with students with autism or children through interaction and direct tutoring while pursuing their studies in the Bachelor of Special Education.

For item 1, there were two scales that recorded the same total percentage of 45.7%, namely ever with satisfactory input and also ever with great input. This indicated that the majority of final-year students received good input about autism throughout their studies at the university. Moreover, all respondents knew the characteristics of autism as indicated by 0%. Meanwhile, item 2 showed that most of the respondents have assessed children with autism (54.3%) and only 5.7% of respondents have never assessed children with autism.

Meanwhile, item 3 proved that the majority of respondents have implemented teaching strategies with students with autism (42.9%), and only 8.6% have not implemented any strategies. For item 4, the highest percentage of 42.9% showed that most respondents have had direct experience with students with autism, while the lowest percentage was 8.6%. This indicated that the majority of final-year students have interacted physically with students with autism. Moreover, item 5 recorded that 34.3% of respondents had collaborated with other professionals and parents but they received little input or benefit, while 11.4% of respondents had never collaborated with any party.

Table 2

Experience of final-year students with children with autism

Statement	n (%)			
	Never	Ever but little input	Ever satisfactory input	Ever and great input
Identify autism characteristics	0	3 (8.6)	16 (45.7)	16 (45.7)
Assess students with autism	2 (8.6)	4 (17.1)	9 (54.3)	7 (20.0)
Teaching strategies for students with autism	2 (5.7)	4 (11.4)	19 (54.3)	10 (28.6)
Hands-on experience with students with autism	3 (8.6)	7 (20.0)	15 (42.9)	10 (28.6)
Collaborate with other professionals and parents	4 (11.4)	12 (34.3)	11 (31.4)	8 (22.9)

Level of knowledge of final year students on the autism

Table 4 shows part 1 consisting of 9 items for the level of knowledge of final-year students on autism. Item 1 showed that most respondents (97.1%) answered children with autism must exhibit social interaction problems, while item 2 showed that the majority of respondents (57.1%) answered children with autism must show self-injurious behavior. For item 3, 97.1% of respondents answered children with autism must exhibit stereotyped and repetitive behaviors and interests.

Furthermore, for item 4, the majority of respondents (85.7%) answered children diagnosed with autism must have communication problems. Meanwhile, item 5 showed that 97.1% of respondents perceived some children with autism are over- and under-sensitive to pain. In item 6, 82.9% of respondents agreed boys are more likely to be diagnosed with autism compared to girls. For item 7, 97.1% of respondents perceived some children with autism exhibit unequal gross motor and fine motor skills. In addition, item 8 showed that 65.7% of respondents agreed some children with autism never make eye contact. In item 9, about 77.1% of respondents viewed autism symptoms can only be seen in children aged 36 months and above.

Table 3

Level of knowledge of final year students on autism (Part I)

Statement	n (%)	
	Correct	Wrong
Children diagnosed with autism must exhibit social interaction problems	34 (97.1)	1 (2.9)
Children diagnosed with autism must exhibit self-injurious behavior	20 (57.1)	15 (42.9)
Children diagnosed with autism must exhibit stereotyped and repetitive behaviors and interests	34 (97.1)	1 (2.9)
Children diagnosed with autism must exhibit communication problems	30 (85.7)	5 (14.3)
Some children with autism exhibit over-sensitivity and under-sensitivity to pain	34 (97.1)	1 (2.9)
More boys are diagnosed with autism than girls	29 (82.9)	6 (17.1)

Some children with autism exhibit unequal gross motor and fine motor skills	34 (97.1)	1 (2.9)
Some children with autism never make eye-contact	23 (65.7)	12 (34.3)
Symptoms of autism can usually be seen in children aged 36 months and above	27 (77.1)	8 (22.9)

Table 5 shows part 2 which has 12 items for the level of knowledge of final-year students on autism with specific characteristics. Item 1 proved that 37.1% of respondents perceived emotional factors play a great role in the cause of autism and 8.6% strongly disagreed with the statement. For item 2, the researcher used the reverse technique, where the majority of respondents (42.9%) perceived students with autism unintentionally behave negatively and do not follow instructions, and 2.9% strongly disagreed with this statement.

Furthermore, the researchers also used the reverse method for item 3, where the majority of respondents (45.7%) did not admit that students with autism show emotional attachment to other people including their parents, and some respondents strongly agreed with the statement. For item 4, the researchers used the reverse technique, thus 40% of the respondents did not admit that most students with autism can speak, and there were also respondents who strongly agreed with the statement. Furthermore, the researchers also applied the reverse method for item 5, where 48.6% of respondents viewed most students with autism do not experience mental retardation, but 2.9% of respondents disagreed with the statement.

Furthermore, item 6 demonstrated that 62.9% of respondents admitted that most students with autism have special abilities and talents, and only 2.9% of respondents disagreed. On item 7, 48.6% of respondents perceived that the majority of students with autism are smarter based on their exam scores, and only 8.6% disagreed with the statement. Moreover, the researchers used the reverse method for item 8, and 51.4% of respondents viewed autism does not only exist during childhood. About 2.9% of respondents did not have the same opinion. For item 9, the researchers also applied the reverse method, where 37.1% of respondents admitted that students with autism would not recover even with appropriate treatment, and 11.4% of them disagreed. Subsequently, for item 10, 40% of respondents perceived that autism is a type of developmental disorder, and 8.6% of respondents disagreed with the statement. On item 11, the researchers also applied the reverse method, whereby 34.3% of respondents considered if children with autism are given early intervention, they would be able to live independently in the community, and 8.6% of respondents strongly supported this statement. In addition, the reverse technique was also applied for item 12, and 51.4% of respondents deemed students with autism do not intentionally behave disobediently by not responding to questions or instructions that they had previously responded to, but 2.9% of respondents strongly disagreed with this statement.

Table 4

Level of knowledge of final year students on autism (Part II)

Statement	n (%)			
	Strongly disagree	Disagree	Agree	Strongly agree
I think emotional factors play a great role in the cause of autism	3 (8.6)	7 (20.0)	12 (34.3)	13 (37.1)
I think students with autism deliberately behave negatively and do not follow instructions	1 (2.9)	5 (14.3)	15 (42.9)	14 (40.0)
I think students with autism do not show emotional attachment even to their parents	5 (14.3)	16 (45.7)	10 (28.6)	4 (11.4)
I think the majority of students with autism do not speak	2 (5.7)	14 (40.0)	13 (37.1)	6 (17.1)
I think the majority of students with autism suffer from mental retardation	1 (2.9)	6 (17.1)	17 (48.6)	11 (31.4)
I think the majority of students with autism have special abilities and talents	1 (2.9)	2 (5.7)	10 (28.6)	22 (62.9)
I think the majority of students with autism are smarter based on their exam scores	3 (8.6)	7 (20.0)	17 (48.6)	8 (22.9)
I think autism only exists during childhood	2 (5.7)	1 (2.9)	18 (51.4)	14 (40.0)
I think with appropriate treatment, the majority of students with autism can be cured	4 (11.4)	5 (14.3)	13 (37.1)	13 (37.1)
I think autism is a type of developmental disorder	3 (8.6)	13 (37.1)	14 (40.0)	5 (14.3)
I think that even if students with autism receive early intervention, their ability to live independently in the community is low	10 (28.6)	12 (34.3)	10 (28.6)	3 (8.6)
I think students with autism are stubborn and deliberately disobey instructions when they do not respond to questions/instructions that they have previously responded to	1 (2.9)	6 (17.1)	10 (28.6)	18 (51.4)

Competence of final-year students on autism

Table 6 shows 9 items for the competence of final year students on autism. For item 1, 54.3% of respondents were confident in their own ability to prepare appropriate teaching and learning objectives for students with autism. Meanwhile, item 2 indicated that 60% of respondents felt comfortable giving counseling and guidance to parents and caregivers of students with autism. Furthermore, on item 3, 65.7% of respondents felt contented when they received assistance and guidance from professionals or autism experts to develop appropriate programs for students with autism. For item 4, 51.4% of respondents were confident that they have received sufficient training to effectively teach students with autism. Furthermore, item 5 indicated that 60% of respondents viewed courses and additional training in the field of autism can benefit them. For item 6, 54.3% of respondents perceived there are opportunities to undergo undergraduate studies in the field of autism that can provide benefits to this field. In addition, item 7 showed that 62.9% of respondents believed schools would benefit in general if there is an autism specialist. For item 8, 54.3% of respondents viewed if an autism specialist lives in the same district as the respondent, he would be a referral source. Meanwhile, for item 9, 40% of respondents have an interest in becoming an autism specialist despite having to attend additional courses and training.

Table 5

Competence of final year students on the autism

Statement	n (%)			
	Strongly disagree	Disagree	Agree	Strongly agree
I am confident in my ability to determine appropriate teaching and learning objectives for students with autism	3 (8.6)	19 (54.3)	13 (37.1)	
I feel comfortable giving guidance and counseling to parents and caregivers of students with autism	4 (11.4)	21 (60.0)	10 (28.6)	
I love getting assistance and guidance from professionals or autism experts to develop programs that are appropriate for students with autism	1 (2.9)	11 (31.4)	23 (65.7)	
I am confident that I have sufficient training to effectively teach students with autism	1 (2.9)	10 (28.6)	18 (51.4)	6 (17.1)
I think additional courses and training in the field of autism would benefit me	2 (5.7)	12 (34.3)	21 (60.0)	
I think the existence of opportunities to undergo undergraduate studies in the field of autism can benefit this field	1 (2.9)	15 (42.9)	19 (54.3)	
I think schools generally benefit from having an "autism specialist"	1 (2.9)	12 (34.3)	22 (62.9)	

If there is an autism specialist in my area, I will use that individual as a referral source	1 (2.9)	15 (42.9)	19 (54.3)
I am interested in becoming an autism specialist even though I have to take additional courses and training	9 (25.7)	12 (34.3)	14 (40.0)

Discussion

The objectives of the study were to measure the level of knowledge of final-year students on autism and also to identify appropriate methods to enhance knowledge about autism among final-year students in Bachelor of Education with Honors (Special Education). The research design was in the form of a survey. In addition, this study used quantitative research via descriptive analysis based on percentage and frequency. Research data were obtained through a questionnaire involving 35 final-year students from a selected university in Selangor. This section discusses the results of the study based on the objectives highlighted. Findings showed that the majority of final-year students involved in this study were confident in their knowledge. Based on the findings from the introduction and training of final-year students regarding autism, the respondents received satisfactory and sufficient information about autism throughout their studies at the university. They have also had the experience of assessing and developing teaching strategies for students with autism. As a result, they were confident in their ability to teach students with autism. However, respondents stated that although they were able to collaborate with various parties such as parents, they received little input as a result of the project. Therefore, total knowledge of pre-service and experienced teachers working with students with autism contribute to a situation that needs to be overcome (Taylor & Sobel, 2001). The knowledge gained while studying and also the experience found in the field are different and play a great role in contributing to the knowledge of pre-service teachers.

It is very important for prospective teachers to have knowledge about autism as it can help in building effective teaching strategies for students with autism. This is also similar to the study conducted in Jordan by Al-Hairy et al (2015) on the problems faced by pre-service teachers in four universities. The teachers were willing to improve their knowledge and ability so that they could provide effective teaching to students with special needs including autism. This proved that most pre-service teachers have the desire to increase their knowledge about autism in terms of characteristics, teaching methods, interventions, and so on so that they can help students with autism master important skills. Therefore, early identification and intervention can directly improve educational outcomes and reduce the severity of ASD diagnosis in the long term (Hart & More, 2013).

Based on Table 6 regarding the competence of final-year students on autism, most respondents were confident in all matters related to autism including providing guidance and counseling to parents or caregivers of students with autism. In addition, they were also ready to enhance their knowledge about autism from professionals or autism experts' guidance and become a reference source if they live nearby. Moreover, they showed an interest in becoming an autism specialist despite the need to attend additional courses or training. This proved that pre-service teachers highly believed in their abilities and were always ready to enhance their knowledge. It is more likely that personal experiences and accompanying autism awareness activities play a great role in knowledge level differences (Leblanc et al.,

2009; Lerman et al., 2004). From the findings, 42.9% (n=15) of respondents had conducted hands-on activities with students with autism, which affected their level of confidence, ability, and knowledge.

Furthermore, the knowledge of pre-service teachers about the basic characteristics of autism was good overall. Table 4, it showed that the teachers realized students with autism have social interaction problems, communication problems, a high number of boys diagnosed with autism, and low or high sensitivity to pain. However, there is still some information or characteristics of autism that are not certain. They also stated that students with autism exhibit self-injurious behavior, same or repetitive behaviors, and interests and never made eye contact, and these characteristics recorded the highest percentage in each item. Those characteristics were not included in the main criteria or diagnostics of autism and the results showed that the level of knowledge of final year students majoring in Special Education about autism was at a good level as the main criteria of autism were known but uncertain for other criteria. Therefore, it is important for pre-service teachers to have the knowledge and experience of teaching children with disabilities so that it can help the teacher's readiness to conduct appropriate strategies for the class (Taylor & Sobel, 2001). However, each pre-service teacher has different knowledge and experience despite taking the same subject. A few final-year students did not directly gain experience collaborating with outside parties including parents as represented by 11.4% (n=4). These factors influenced their knowledge and experience due to the large role played in gaining knowledge from the experts. According to Leko & Brownell (2011), the experience and knowledge of pre-service teachers obtained from college courses and field training are different.

In addition, a study conducted by Cervera (2017) on the level of knowledge of pre-service teachers exhibited that final-year students still have less knowledge about autism due to frequent misunderstandings about the characteristics of autism compared to first-year students. When answering the questionnaire, first-year students were more cautious than final-year students who took risks as they were about to graduate. Most of these misunderstandings were related to the general characteristics of autism such as the possibility of having several comorbid conditions, or the diagnostic process. Therefore, the final-year students involved in this questionnaire have confidence in their knowledge even though there were still some misunderstandings. This may be due to their learning in several autism-related subjects and also field training experiences involving themselves directly with autism during their studies at the university.

On the other hand, there was some confusion in the knowledge of final year students for specific characteristics of autism as they perceived that students with autism do not suffer from mental retardation, most students with autism cannot speak, and do not show any emotional attachment to others including parents. These characteristics are basically inaccurate as according to Lee et al (2017), ASD is a neurodevelopmental imbalance in children related to cognitive and language deficits. Individuals with autism can also experience intellectual disabilities because autism can affect a person's cognitive ability or brain. In addition, students with autism can still speak but are slightly delayed, and they love to repeat words known as echolalia (Fariza et al., 2017). In addition, the affection of ASD children for their parents is reduced (Wong, 2015). Therefore, it is proven that students with autism have a sense of love for their parents but it is not the same as other typical children. For these specific characteristics of autism, pre-service teachers or final-year students have a lack of understanding of the specific autism characteristics. Although intervention methods are advancing in understanding children with ASD, this disorder is still not well understood which

leads to many myths (Schwartz & Drager, 2008; Segall & Camp-bell, 2012; Barsed et al., 2011; Frith, 2003; De los Reyes, 2010; Hadjikhani, 2014; Scahill & Bearss, 2009).

However, several characteristics were appropriately selected, among which autism would not be cured even with proper treatment, and it is a type of developmental disorder. Children with ASD experience developmental delays and deficits compared to typical children (Ainul Izzah et al., 2018). Therefore, final-year students may be able to acquire additional information from additional training from various sources such as formal discussions with friends or Special Education teachers, television, news, or the internet (Cervera et al., 2017).

Among the methods that can help enhance the knowledge of these pre-service teachers is the provision of regular field training by the university for final-year students with face-to-face interactions with students with autism. Their knowledge and the significant number of correct answers can be influenced by specific training outside the university and school placement to educate children with autism (Cervera et al., 2017). This direct or physical experience plays a very important role in gaining knowledge as the characteristics of autism can be observed directly and can be identified more easily. Previous studies also have proven that specific training or experience in educating students with autism positively and significantly affects teachers' knowledge about autism (Haimour & Obaidat, 2013; Johnson et al., 2012; Leblanc et al., 2009).

Moreover, they should search or intensify their efforts to acquire additional information about the characteristics of autism such as attending seminars, seeking reading materials such as journal articles or books, participating in activities involving individuals with autism, and so on. As a result, it helps in improving their theoretical knowledge when studying in class. A study conducted by Blackwell et al (2017) showed that there was a statistically significant difference in the level of knowledge between students who had more direct and personal experience with students with autism by participating in autism awareness activities, personal communication, or having a close relationship, compared to those who had never. In addition, pre-service teachers would apply relevant theories that have been learned in the classroom with ASD children and intend to build a sense of excitement for these children to learn (Donovan et al., 1999). Therefore, it is important for final-year students to enhance their own knowledge about autism, especially before starting teaching training as it can help them understand the criteria of autism and provide teaching that is more suitable for students with autism.

Conclusion

This study was limited to only 35 final-year students at a university as respondents to identify the level of knowledge on autism. Therefore, the findings of this study cannot be extended or generalized to final-year students in the field of Special Education throughout Malaysia. Nevertheless, it is suggested that this study be extended by involving more respondents in order to be able to diversify the findings of this study.

The number of students diagnosed with autism has increased in recent years which has also increased the number of enrollments of these children in schools. All parents, including those with students with autism, also demand the best education for their children. Therefore, it is very important for pre-service teachers to enhance and improve their knowledge about autism in terms of basic and specific characteristics, interventions, learning planning, and others so that they can provide beneficial teaching and knowledge to students with autism. Based on the findings of this study, it can be inferred that the most effective method to

enhance the knowledge of pre-service teachers is to increase training and experience working with students with autism. The experience of interacting physically and directly with students with autism can help final-year students to understand their characteristics and behaviors more closely and better.

In addition, the teachers who have been appointed also showed a less than satisfactory level of knowledge about autism (Al-Jabri et al., 2013). Therefore, the existing training offered at the university should be improved by providing sufficient knowledge and competence so that effective teaching can be conducted. While at the university, it is crucial to acquire a variety of knowledge, especially in the classroom as students are very exposed to new knowledge on autism. It can be a catalyst for students to increase their knowledge through independent efforts. Various methods can also be performed by final year students, one of which is to find reliable reference materials on the internet. Furthermore, they can also participate in webinars with parents and experienced teachers so that pre-service teachers are open to different perspectives.

Furthermore, autism-related subjects offered at universities should also emphasize and focus on the initial characteristics of autism and effective teaching methods in order to help final-year students. A more in-depth introduction to the characteristics of autism will provide a better and more effective understanding to final-year students. The findings of the study found that the majority of respondents did not know that autism also has a sense of love for their parents, although similar to normal children. The characteristics of autism can be explained in more depth when studying in the classroom and help to produce effective interventions and teaching suitable for students with autism.

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