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iKurnia MOOC BASICS IN AUTISM: ENHANCING EARLY CHILDHOOD EDUCATORS' KNOWLEDGE OF AUTISM

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ABSTRACT

Globally, the increased prevalence of children with autism calls for increased support in services. Therefore, support for parents and professionals such as teachers are crucial in order to ensure effective early intervention and services to improve children's development. Previous research indicates the lack of knowledge and training on autism among educators. Moreover, local studies have shown that teachers in the mainstream and preschools face obstacles to teaching children with autism as they do not have sufficient knowledge and skills. A course on early intervention and education for children with autism had been carried out for a group of educators in Selangor using the content of *iKurnia MOOC: Basics in Autism. iKurnia MOOC: Basics in Autism* is an online learning for educators that provides information about autism that could improve their knowledge, awareness and skills about autism. As such, the purpose of this study is to identify the major themes of *iKurnia MOOC: Basics in Autism* which indicate the major type of knowledge gained by participants after attending the course. A research-based self-constructed questionnaire was distributed among the participants after they had attended the course. The questionnaire was built based on the five major themes; i. Diagnose; ii. Symptom; iii. Autism Cause; iv. Treatment; and v. Screening or Early Detection. Participants in this research involved 250 early childhood educators who attended a workshop on educating children with autism in an inclusive setting. Findings show that educators scored high means for all the major themes. The highest mean is Screening or Early Detection (4.28) while the lowest is Autism Cause (4.04). *iKurnia MOOC: Basics in Autism* enables educators to gain knowledge about autism. Based on the findings, the paper further discusses ways to upgrade the contents of *Basics in Autism* to be more comprehensive for educators and professionals.

Keywords: Autism, MOOC, Online learning, Early childhood educators, Teacher training, Knowledge

INTRODUCTION

Autism Spectrum Disorder, which many autistic people nowadays like to call Autism Spectrum Condition is a neurological disorder or condition that occurs in the brain that impacts development in children. American Psychiatric Association (2020) reported that these neurological disorders cause delays and discrepancies in the development of social communication, social interaction, and behaviour of individuals with autism. Having said that, advances in detection and diagnosis have found that the prevalence of individuals with autism is increasing globally. According to the World Health Association, 1 in 270 children worldwide may develop autism (Global Burden of Disease Study, 2020).

The prevalence for autistic children in the United States in 1970 was 1 in 10,000 children. In the year 2000, there was a significant increase in the number of children with autism. Currently, the prevalence of autism is reported as 1:150 children while the latest prevalence statistics reports in 2020 show 1 case in 54 children (National Center on Birth Defects and Developmental Disabilities, Centers for Disease Control and Prevention, 2020).

Increased prevalence of children with autism calls for increased support in services. One of the most important support services is early intervention services. Early intervention services should be provided as soon as the child is found with developmental delay. Early intervention services help to improve the development of individuals with autism optimally (Koegel et al., 2014).

The Importance of Knowledge and Training About Autism

A significant way to provide support for services for autism is to disseminate knowledge via structured training and workshops. Preschool teachers are among the paraprofessionals who usually spend hours with children with autism. Hence, the knowledge of preschool teachers may help to detect children with delays including children with autism (Shetty & Rai, 2014). Therefore, mainstream teachers, especially preschool teachers should have knowledge of autism. Lack of knowledge can cause a delay in screening and diagnosis. In other words, knowledge is very important and necessary for teachers to understand the condition of children with autism and eventually to plan for suitable and appropriate assessments and individual education goals for them (Toran et al., 2014).

Nevertheless, a study shows that teachers have insufficient knowledge of autism (Arif et al., 2013). A survey of preschools in Singapore found that only half of the 503 teachers showed that they had knowledge of autism (Lian et al., 2007). In India, only 21% of the 326 teachers in 32 primary schools have sufficient knowledge based on a questionnaire on autism traits and symptoms (Shetty & Rai, 2014). This finding is in line with the knowledge and skills of 73 primary school teachers in Pakistan. Only 44.2% understood that autism was a neurological disorder (Ayub et al., 2017). On the same note, a local study also indicated that mainstream teachers in Malaysia showed low levels of knowledge of autism. This knowledge includes cognitive, social and emotional information related to children with autism (Philips, 2005). A study by Hasnah et al. (2016) found that although the majority of the respondents were highly educated with degrees and masters in special education, they did not have extensive knowledge on autism. For example, they misunderstood the diagnostic criteria for autism. Moreover, when the respondents were assessed for self-competence, they showed a low level of knowledge of autism and a moderate level of self-efficacy in providing learning objectives and service delivery to children with autism. A survey of 100 primary school teachers revealed that there was a significant difference in knowledge depending on the teacher's background. This knowledge however, does not indicate that teachers have a more positive attitude toward students with autism (Ozel et al., 2018). Interestingly, previous studies indicate that teachers' knowledge about autism is from the media (Ayub et al., 2017; Arif et al., 2013). However, information in the media must be verified accurately before it is disseminated to the public.

Kofidou et al. (2017) conducted a literature review of teachers' perceptions and attitudes on the inclusive education of students with Autism Spectrum Disorders (ASD) in ERIC, PsychLIT, EBSCO, Medline, and PubMed. Results indicated that the majority of the teachers have limited or inadequate knowledge and basic misconceptions about ASD. This review suggested that teachers should receive more training on autism so that they could develop positive attitudes towards autism. Razali et al. (2013) also concluded that lack of knowledge and training had become a major obstacle for teachers to pursue inclusive education in preschool. All teachers in the study reported that they did not receive any training on autism. Loi & Yasin (2017) respondents, i.e. special education teachers, were seen as less competent in using effective teaching strategies to autistic children. They posited that this was due to the lack of knowledge on theory and practices during teacher training. Lack of knowledge and training on autism could result in difficulty in handling children with autism. Therefore, these two factors are very important in teaching children with autism.

Loi & Yasin (2017) reported that educators rarely use intervention based practice. This is caused by incomplete teacher training that is noncomprehensive, hence resulting in educators being unable to identify the best methods for teaching autistic children. This finding is in line with Troshanska et. al (2019) who found that the majority of respondents in their study had little knowledge regarding

interventions and teaching methods for children with autism such as structured teaching, social story and the use of Picture Exchange Communication System where all of these interventions are evidence-based practice. In other surveys, teachers suggested that training must be given to enhance their knowledge and skills (Arif et al, 2013; Razali et al. 2013). Finch et al. (2013) proposed training related to special education with a focus on autism should be given to teachers. Teachers who have received training have been found to have better knowledge of autism (Razali et al., 2013; Arif et al., 2013; Shetty & Rai, 2014; Ayub et al., 2017; Troshanska et al., 2019).

In sum, training is deemed significant and appropriate by many findings as a way to disseminate knowledge of autism. In the current education ambience, online courses allow the masses to sit anywhere to learn a new set of skills or hone their existing skills.

Statement of the Problem

Previous research (Arif et al., 2013; Razali et al., 2013; Hasnah et al., 2016) indicated the lack of knowledge and training on autism among educators. These findings are in line with Loi and Yasin (2017) which also supported the argument that educators receive less training, hence causing them to face difficulties in educating children with autism in schools. Lack of knowledge and training can impact the child and the educator alike. Children who either do not show development or slow development can cause teachers to feel pressured to educate them, as well as causing less positive teacher behaviour towards autistic children. Past studies suggested that educators needed to get enough training to improve a good attitude towards autistic children (Kofidou et al; 2017).

Knowledge and training are very important to ensure educators have clear knowledge about autism. Past studies showed that there are still some educators who have misconceptions about autism (Toran et al., 2010; Toran et al., 2016). Therefore, the researchers have taken the initiative to provide iKurnia: *Basic in Autism* training to participants to enhance the knowledge on autism among educators. As such, this study aims to further investigate the level of knowledge gained by the participants of this study after they have attended the training.

LITERATURE REVIEW

Massive Open Online Courses (MOOC)

Education can happen anywhere. Technological advances have benefited education. Location barriers, traditional educational space can be overcome through online education. In turn, online education has succeeded in overcoming barriers to time and travel costs. The Massive Open Online Courses (MOOC) is a recent phenomenon for 21st-century learning. MOOC enables individuals to take courses in various fields of knowledge. MOOCs are offered on special or free platforms (Conache et al. 2016).

Individuals who have joined MOOC courses receive many advantages. One of the benefits is the increase of personal knowledge for personal and professional purposes. It further supports lifelong learning (Cop, Fournier & Mak 2011). Some employment sectors have begun to use MOOC as internal training for their employees (Dodson, Kitburi, & Berge, 2015). Additionally, online education courses offer the flexibility to get access to and learn independently. Some MOOC courses that are not tied to academic requirements allow students to learn independently with flexibility (Sun & Chen, 2016). Students are also not bound by the fixed schedule because the learning is self-paced. They can complete all the content of the course at their own preference. This also includes tests, quizzes and questions.

Moreover, MOOC has the potential to encourage cooperation with various parties in the same field. There is a space for interaction among participants, collaborators and teachers. Participants are able to interact in the course through discussion rooms for questions, feedback, and information sharing with other participants. Social-based MOOC platforms like OpenLearning encourage active students to provide feedback in the discussion room.

iKurnia MOOC: Basics in Autism

iKurnia MOOC: Basics in Autism capitalises the OpenLearning platform to provide free online education to participants about autism. Interaction, an important element of education is empowered in this platform. OpenLearning provides a social learning space where users are not only able to interact with one another but also able to relate and share ideas about autism or other areas of interest.

The interaction function in the platform also helps participants to expand their networking in the same field, as well as motivate participants to take the *iKurnia MOOC: Basics in Autism* course and eventually complete the course successfully. Additionally, participants can also interact in person with the *iKurnia MOOC: Basics in Autism* administrator. Participants can give feedback such as comments and likes in the space provided and may also ask questions about the course content.

iKurnia MOOC: Basics in Autism was launched in 2016, aimed at providing accurate information about autism. In addition, the *iKurnia MOOC: Basics in Autism* hopes that through the MOOC, awareness and knowledge of autism in the community would be expanded. The target for *iKurnia MOOC: Basics in Autism* participants is parents with autistic children, teachers, students and professionals providing services to individuals with autism. Generally, the content for *iKurnia MOOC: Basics in Autism* can be divided into five main domains: i) diagnose; ii) symptom; iii) autism cause; iv) treatment; and v) screening or early detection. These five domains are the major themes for this research.

Participants are invited to join *iKurnia MOOC: Basics in Autism* ubiquitously for free and with no time limit. *iKurnia MOOC: Basics in Autism* course has three modules consisting of: i. what is autism; ii. the procedures of diagnosis; and iii. early intervention services. The three modules include introductory courses, interactive contents such as videos, sharing experiences with parents with autistic children, reading materials and reinforcement questions. Each module has videos, sharing and quizzes that are compulsory for participants to answer in order to complete the course. Participants who complete all modules will be given an online certificate. The certificate was issued by OpenLearning following approval from the GENIUS Kurnia Centre, the administrator for the *iKurnia MOOC: Basics in Autism*.

The Study of Autism Knowledge Using iKurnia MOOC: Basics in Autism

A recent study on participants of the *iKurnia MOOC: Basics in Autism* course found that the course is easily accessible and able to increase participants' knowledge and skills about autism. The clear and concise content also helps participants to understand the concepts discussed. *iKurnia MOOC: Basics in Autism* course was found to deliver quality and useful content to course participants. The types of knowledge offered by the course heightens confidence level among the participants so as to support students with autism (Mat Isa et al., 2017).

The research purpose of this study is explained in Section III, followed by Section IV which discusses the methodological approach adopted. Analysis methods and datasets used are delineated in Section V. Prior to the Conclusion in Section VI, Findings and Discussion are thoroughly explained in Section VII based on the research questions.

Research Purpose

The major purpose of this study was to identify the major themes that were pronounced among the course participants and the level of knowledge of autism gained by participants. To reiterate, the content of *iKurnia MOOC: Basics in Autism* can be divided into five major themes which are: i) Diagnose; ii) Symptom; iii) Autism Cause; iv) Treatment; and v) Screening or Early Detection.

Research Questions

Hence, this study was guided by the following research questions:

i) What is the level of knowledge of autism gained by early childhood educators after attending the *iKurnia MOOC: Basics in Autism*?

ii) Which item in each theme shows the highest and lowest understanding levels among the course participants?

METHODOLOGY

Research Design

This study aimed to comprehend "snapshots" of the proportion of individuals in a selected population at one point in time. Hence, cross-sectional survey research design was chosen as the most suitable one among several types of descriptive research methods in cross-sectional studies. The purpose of the research is descriptive and generally in the form of a survey. There is usually no hypothesis, but the aim is to describe a subgroup within the population with respect to a set of factors. In addition, a cross-sectional study allows researchers to find the prevalence of the outcome of interest, for subgroups within the population at a given time-point (Levin 2006).

Participants

Participants were 250 early childhood educators who attended a workshop on educating children with autism in an inclusive setting. The workshop was organized by Selangor Special Children Society (ANIS). Data were collected from four cohorts in 2019.

Table 1 shows that nearly all of the participants were female (97.2%; n = 243) while its counterpart only made up 2.8% (n = 7). Malay respondents exceeded others by 77.2%, followed by Chinese at 18%, Indian, 2% and others, 2.8%. Nearly half of the respondents were diploma holders (38.8%; n = 97), only a small handful had STPM (Malaysia Higher Education) certificate, (7.2%; n = 18) and a fair number of master's (11.6%; n = 29) and bachelor degrees (11.2%; n = 28). Most of the respondents were preschool, nursery and assistant teachers who made up the total 55.2% (n = 138), more than 20% hold administrative posts as principals (18%; n = 45) and supervisors (12.4%; n = 31) and less than 5% (2.8%; n = 7) work at community-based rehabilitation centres. More than 50% (51.6%; n = 129) self-rated themselves as having moderate knowledge in autism, while a meagre 3.6% (n = 9) confidently placed themselves as having high knowledge in autism.

Table 1: *iKurnia MOOC: Basics in Autism Respondents Demographic Information*

Variables	Category	Frequency (*f*)	Percent (%)
Gender	Male	7	2.8
	Female	243	97.2
Ethnics	Malay	193	77.2
	Chinese	45	18.0
	Indian	5	2.0
	Others	7	2.8

Education	Master's Degree	29	11.6
	Bachelor Degree	28	11.2
	Diploma	97	38.8
	STPM	18	7.2
	SPM	78	31.2
School Roles	Principal	45	18.0
	Supervisor	31	12.4
	Preschool Teacher	84	33.6
	Nursery Teacher	40	16.0
	Assistant Teacher	14	5.6
	Community Based Rehabilitation	7	2.8
	Others	29	11.6
Years of Service	0-1	66	26.4
	1-3	60	24.0
	3-5	30	12.0
	5-10	52	20.8
	10	42	16.8
Autism Knowledge	High	9	3.6
	Moderate	129	51.6
	Low	76	30.4

No knowledge	36	14.4
	N	**250**

Instrumentations

A research-based self-constructed questionnaire of 40 items in five constructs (major themes) (Table 2) was utilised in this study. The composition of the items are as follows:

(i) 40 items rated on a five-point Likert Scale with 1 signifies "Extremely Unconfident" and 5 indicates "Extremely Confident";

(ii) The range of possible scores for all the items is between 40 and 200 with a high score indicative of highly agreeing with the items; and

(iii) The items are essentially statements representing five major themes in *iKurnia MOOC: Basics in Autism*; *Diagnose* contains 8 items, *Symptoms* 15 items, *Autism Cause* 4 items, *Treatment* 10 items and *Screening or Early Detection* has 3 items.

The medium of communication of the questionnaire was Malay language due to the fact that all the respondents were more conversant in the said language. Descriptive statistics was used to analyze the data collected via the questionnaire.

Procedures

A pilot study was executed prior to the actual data collection on 35 early childhood educators who also attended the above-mentioned workshop but from different cohorts. Pilot study participants were not involved in the actual data collection. The major purpose of conducting the pilot study was to examine the feasibility of the survey i.e., its duration, the semantic of the constructed items, acceptable reliability values, as well as initial comments from respondents so as to improve upon the study design. Actual data collection was done from October till December 2019 and administered after completing each workshop to ensure high return rate (100% return rate). Participants filled up the questionnaire after they had attended the *iKurnia MOOC: Basics in Autism* during the workshop. Missing data were imputed with the mean of the respective item and detected via frequency analysis. Offending outliers were detected via stem-and-leaf plot and no discernible pattern could be traced, hence all respondents were retained in the analysis.

RESULT

Descriptive statistics were used to describe the identified features of the data in the study. The percentages, means and standard deviations for all the items were presented based on the composite score range calculated. The five-point Likert Scale was collapsed into three parts of composite scores (summated scales) according to each construct low, medium and high. Such calculation was done because each construct has relatively high internal consistency (Table 2) i.e., above .7 for a social science research. Joint Committee on Standards for Educational and Psychological Testing of the AERA, APA, and NCME (1999) defined composite score as a score that is derived by combining one or more scores according to a specified formula. This is typically accomplished by averaging or summing the contributing scores which are often weighted according to their relative importance. The composite scores are used in the data presentation for this research for they help researchers focus the attention on future decision making, offering a more rounded assessment of participants' knowledge of

the workshops, as well as presenting the 'big picture' of the findings in a way in which readers can easily understand.

Internal Consistency and Validity

Table 2 below shows all the constructs (major themes), no of items, and the Cronbach's Alpha values for each construct. All values are above .8 and the overall value is .971, indicating that the research instrument is reliable to fulfil the purpose of the study. Pallant (2011) accepted the internal consistency of .6 for a newly-built instrument. As for the validity of the instrument, the questionnaire was examined by two experts prior to the administration onto the population; a lecturer in the early intervention field and an expert in the evaluation field.

Table 2: Construct, No. of Item, and Alpha Coefficient Reliability

Construct	No. of Item	Alpha Value
1. Diagnose	8	.871
2. Symptom	15	.937
3. Autism Cause	4	.838
4. Treatment	10	.904
5. Screening or Early Detection	3	.813
Total Construct	**40**	**.971**

Table 3 displays the mean and standard deviation of each construct. All constructs achieved a mean score of more than 4.0 with the lowest score for *Autism Cause* (4.04) and highest score *Screening or Early Detection* (4.28). All the standard deviations nearly approached the value of 1 except for *Symptom* which had a value of 0.87 and *Screening or Early Detection* secured at 0.86. The standard deviation describes the dispersion of the data relative to its mean.

Table 3: *Mean and Standard Deviation*

Construct	Mean	Standard Deviation
1.Diagnose	4.13	0.93
2.Symptom	4.20	0.87
3.Autism Cause	4.04	0.97
4.Treatment	4.10	0.93
5.Screening or Early Detection	4.28	0.86

The mean score was measured based on the interpretation by Pallant (2007). There are three levels of scores, the mean values of 1.00 to 2.33 is a low level, the mean score values of 2.34 to 3.66 is at a medium level and the mean score values of 3.67 to 5.00 is high level. Table 3.1 presents all the levels used in this study and Table 3.2 shows the indication of the level for each construct of the *iKurnia MOOC: Basics in Autism.*

Table 3.1: Mean Score and Interpretation

Mean Score	Mean
1.00 - 2.33	Low
2.34 - 3.66	Medium
3.67 - 5.00	High

Table 3.2: Level Indication for Each Construct

Construct	Mean	Level
1.Diagnose	4.13	High
2.Symptom	4.20	High
3.Autism Cause	4.04	High
4.Treatment	4.10	High
5.Screening or Early Detection	4.28	High

Tables 4, 5, 6, 7, and 8 report the mean and standard deviation of all the five constructs in the study. The highest percentage(s) and lowest percentage(s) for each construct are highlighted and further discussed in Findings and Discussion.

Table 4: Mean and standard deviation for Diagnose

No	Item	Mean	SD
1	Autism can only be diagnosed after a child has enrolled preschool	4.19	.92
2	Autism cannot be diagnosed using biological markers (e.g., blood tests).	4.19	.96
3	Autism diagnosis commonly involves parental interviews and observations of behaviour	4.14	.92
4	Teachers can give an initial diagnosis to students	3.90	.94
5	Children can be diagnosed with both autism and intellectual disability	3.91	.97
6	Autism is a neurological disorder that affects the functioning of the brain	4.20	.91
7	Autism can be diagnosed before the age of five	4.23	.91
8	Autism is 4 times more common among boys than girls	4.25	.93

Diagnose, as shown in Table 4, refers to the procedure of diagnosing a child with autism. The item includes the procedures on how to get a diagnosis, individuals who can make the diagnosis and also how the diagnosis is made. This construct consists of eight items where all of the items have high means and standard deviations. The item that has the highest mean ($\bar{x}$ = 4.25; SD = .93) refers to item 8 *where autism is 4 times more common among boys than girls* while item 4 scored the lowest mean ($\bar{x}$ = 3.90; SD = .94), determines whether *teachers can give an initial diagnosis to students*.

Table 5: Mean and Standard Deviation for Symptom

No	Item	Mean	SD
1.	Many individuals outgrow autism and function normally in adulthood	3.92	.96
2.	Children with autism are always thought as deaf because they do not respond when called	3.96	.81
3.	An early symptom of autism is a failure to attend to facial expressions, gesture and speech	4.34	.82
4.	Autism is contagious	4.54	.80
5.	Some children with autism do not develop the ability to communicate verbally until adulthood	3.90	.95
6.	All children with autism have intellectual disabilities	4.10	.93
7.	Children with autism play differently compared to their typical friends	4.18	.90
8.	Children with autism have restricted and repetitive behaviours (e.g lining the car and like the same routine)	4.38	.82
9.	Children with autism are unable to create a bond with other people	4.32	.86
10.	Some children with autism often fidget and squirm in their seats	4.04	.97
11.	Some children with autism are often annoyed by touchy	4.33	.80
12.	No eye contact is one of the main autism characteristics	4.42	.79
13.	Autism affects the communication and social areas of development	4.25	.91
14.	Children with autism might have challenging behaviours that hurt themselves	4.34	.82
15.	Autism does not have significant physical features	4.01	.96

Symptom, as shown in Table 5 explains the main characteristics of children with autism. The major characteristics include social communication, social interaction and behaviour. This construct contains 15 items where there are three items that have lower means compared to others. The items are item 1 *many individuals outgrow autism and function normally in adulthood* ($\bar{x}$ = 3.92; SD = .96), item 2 *children with autism are always thought as deaf because they do not respond when called* ($\bar{x}$ = 3.96; SD = .81) and item 5 *some children with autism do not develop the ability to communicate verbally until adulthood (*$\bar{x}$ = 3.90; SD = .95). Most participants were confident with item 4 a*utism is contagious* ($\bar{x}$ = 4.54; SD = .80) and item 12 *no eye contact is one of the main autism characteristics* ($\bar{x}$ = 4.42; SD = .79).

Table 6: Mean and Standard Deviation for Autism Cause

No	Item	Mean	SD
1.	Most evidence suggests autism can be caused by vaccines	4.01	1.01
2.	Children with siblings who have autism have a higher risk of developing autism	3.89	1.00
3.	Autism may be inherited from parents	3.91	.98
4.	Autism is caused by supernatural	4.33	.90

Autism cause, as shown in Table 6, discusses the cause of autism. It has four items where the highest mean falls on item 4 *autism is caused by supernatural* ($\bar{x}$ = 4.33: SD = .90) while the lowest mean refers to item 2 c*hildren with siblings who have autism have a higher risk of developing autism* ($\bar{x}$ = 3.89; SD = 1.00).

Table 7: Mean and Standard Deviation for Treatment

No	Item	Mean	SD
1.	One common treatment for autism is Applied Behaviour Analysis	3.86	.95
2.	Early intervention can cure autism	4.06	.92
3.	Children with autism can learn better in a structured environment	4.18	.86
4.	Punishment is an effective behavior management for children with autism	4.16	.92
5.	Sensory Intervention could help children with autism sensory issues	4.16	.89
6.	PECS strategy is designed to teach communication skills to children with autism	4.09	1.01
7.	Each and every child with autism is different	4.38	.86
8.	Some children with autism have sensory issues	4.28	.87

9.	Occupational Therapy is an early intervention services for children with autism	4.04	.97
10.	Parents must consult with doctors about non-evidence-based practices for their children	3.82	.97

Treatment in Table 7 represents early intervention services to children with autism and their families. This construct has 10 items which indicate knowledge of interventions. The items with the lowest means are scored by item 1 *one common treatment for autism is Applied Behaviour Analysis* ($\bar{x}$ = 3.86; SD = .95) and item 10 *parents must consult with doctors about non-evidence-based practices for their children* ($\bar{x}$ = 3.82; SD = .97). The highest mean is item 7 *each and every child with autism is different (*$\bar{x}$ *= 4.38; SD = .86).*

Table 8: Mean and Standard Deviation for Screening or Early Detection

No	Item	Mean	SD
1.	Child Health Record Book has M-CHAT screening for autism	4.09	.96
2.	Knowledge about a child's behaviour and development can help parents to detect early signs of autism	4.40	.78
3.	Early detection allows for early diagnosis and intervention	4.36	.84

Screening or Early Detection as shown in Table 8 explains about the early symptoms of autism. It consists of three items with the highest mean for item 2 *knowledge about a child's behaviour and development can help parents to detect early signs of autism* ($\bar{x}$ *= 4.40; SD = .78),* and the lowest mean for item 1 *Child Health Record Book has M-CHAT screening for autism* ($\bar{x}$ *= 4.09; SD = .96).*

DISCUSSION

This section discusses the findings based on the research questions posed by utilizing all the descriptive statistics analyses in the Data Analysis and Results section.

RQ1: What is the level of knowledge of autism gained by early childhood educators after attending the *iKurnia MOOC: Basics in Autism*?

The findings show that all the five major themes proposed by this study via *iKurnia MOOC: Basics in Autism* i.e., *Diagnosis*, *Symptom*, *Autism Cause*, *Treatment*, and *Screening or Early Detection* have high means, which are between 3.67 to 5.00 (Pallant, 2007). Based on the interpretation level made by Pallant (2007), the findings could be translated as all the five major themes achieved a high level of knowledge of autism. The highest theme is *Screening or Early Detection*, followed closely by *Symptom*, while the lowest theme is *Autism Cause*.

Participants self-rated themselves as having highly confident with their knowledge of *Screening or Early Detection* when they confidently scored high on the ideas that M-CHAT screening for autism contains in the Child Health Record Book. Participants were also aware that knowledge on a child's behaviour and development can help parents to detect early signs of autism. Moreover, participants were aware that early detection allows for early diagnosis and intervention.

Likewise, among the 15 items in *Symptom*, participants showed a significantly high confidence level in 10 of the items. *Autism is contagious, no eye contact is one of the main autism characteristics, children with autism have restricted and repetitive behaviours (e.g., lining the car and liking the same*

routine) and *early symptoms of autism are a failure to attend to facial expressions, gesture and speech,* to name a few. These findings, however, should be taken cautiously. When the statement *autism is contagious* is self-rated confidently among the participants, it simultaneously shows the erroneous understanding that participants have. This finding corroborates with the findings from Kofidou et al. (2007) research which showed that the majority of the teachers in their study had limited or inadequate knowledge and basic misconceptions about ASD. Scrutinizing the demographic data of this study, nearly 50% of the participants admitted that they either have low or no knowledge of ASD. Hence, explained some of the misconceptions of ASD shown by the participants on other items across the major themes.

Autism Cause securely places itself as the lowest mean among all the five themes. It's interesting to highlight that the participants showed a high confidence level on another erroneous idea of autism, i.e., autism is caused by the supernatural.

RQ2: Which item in each theme shows the highest and lowest understanding levels among the course participants?

The highest and lowest means of each construct (major theme) were identified to further explain the level of understanding or knowledge shown by course participants.

In *Diagnosis*, participants showed the highest mean (knowledge) for *autism is 4 times more common among boys than girls*. This indicates that participants have knowledge regarding ratios in autism where this information is commonly highlighted or discussed among early intervention educators. Participants showed low confidence in the idea that *teacher can give an initial diagnosis to students*. Most often those who are new in the field have difficulties in differentiating between screening and diagnosis. The term diagnosis itself may be less clear to the participants causing the participant to be unsure of this item. Some also might not know that only specialist doctors and clinical psychologists are allowed to do diagnosis on students.

Interestingly, in *Symptom*, participants scored confidently for autism is contagious. As previously mentioned, the misconception of this notion paved new insight to the current study whereby the researchers' interest was to identify the level of understanding among participants. Little did the researchers prepare for the misconceptions that might occur among the participants. Such erroneous belief does not only occur on this particular item but others as well, across all the themes. Participants showed low confidence in the idea that some children with autism do not develop the ability to communicate verbally until adulthood. The lack of knowledge regarding this notion once again stems from the fact that communities in general, especially those who are not involved with autistic people are unaware of the importance of early intervention for autistic children. Once the detection is done early, most autistic children could be helped to communicate, though extremely slow compared to typical children.

Similar to the above case of the erroneous belief of many, autism is caused by supernatural scored confidently by the course participants for *Autism Cause*. This is highly likely related to the superstitious beliefs that exist in the cultures of the participants. Another interesting finding is when the participants showed the lowest confidence on *children with siblings who have autism have a higher risk of developing autism*. This finding, however, shows that *iKurnia MOOC: Basics in Autism* should equip more information on the relationships between genetics risk factors as an autism cause. Research reported that autism runs in families and increases the risks passed to a child. (Bhat et al., 2014)

Each and every child with autism is different was scored highly in *Treatment*. This indicates that many understand the idea of the spectrum that is closely attached to autism. Parents must consult with doctors about non-evidence-based practices for their children, however, scored lowest for this construct. The researchers deemed that the expression of non-evidence-based practices is a professional term that could hardly be understood by many, especially those who are not directly involved with autism.

In *Screening or Early Detection*, the course participants were highly confident with the statement that early detection allows for early diagnosis and intervention. Though many course participants admitted that they either have low or no knowledge of autism, this expression could also have relied on logic; when detection is done early, hence diagnosis and intervention would follow suit. They, nevertheless, scored lowest for *Child Health Record Book has M-CHAT screening for autism*.

This finding gives a suggestion for researchers to upgrade information on the use of M-CHAT and Health Record Book.

All in all, although participants showed high means for all the constructs and most of the items, there are questions and words that are difficult to understand and do not have a direct answer in the *iKurnia MOOC: Basics in Autism* course such as *autism cannot be diagnosed using biological marker* in D*iagnose*; c*hildren with siblings who have a higher risk of developing autism* in A*utism Cause* and *one common treatment for autism is Applied Behaviour Analysis* in T*reatment*.

CONCLUSION

iKurnia MOOC: Basics in Autism has successfully delivered quality content that is beneficial to participants among educators. Researchers found that all the five major themes achieved a high level of knowledge of autism based on high mean scores for all constructs. However, participants are encouraged to gain more in-depth knowledge about autism to avoid misconception on the facts of autism. Knowledge and skills acquired will enhance the educators' confidence in providing effective early intervention services to children with autism.

However, content providers of *iKurnia MOOC: Basics in Autism* are suggested to improve on the content for *Autism Cause* and *Screening or Early Detection*. With improvements made to the content, researchers can review the items in the questionnaire too. It is also advisable to ensure that the number of items for each major theme are of the same. The different emphasis on content in the *iKurnia MOOC: Basics in Autism* course has impacted the mean score of the constructs.

The sampling size of this study was limited to educators who attended workshops on educating children with autism. It's not applicable for those who did not join the workshops. For future research, researchers would like to suggest that sampling also involves those having specific characteristics. A sample with different educators' roles such as teacher aids would produce differences in findings. Researchers also suggest that the level of knowledge of teachers before joining *iKurnia: Basic in Autism* be tested with the same questionnaire to see the difference in autism knowledge before and after the training.

Researchers found that participants reached the level of understanding based on high mean scores for all constructs. The major finding from this study shows that *iKurnia: Basics in Autism* has improved participants' knowledge about autism. Participants' learning is also no longer restricted to time, location and individual gaps due to the ubiquitous characteristics of the platform. It is hoped that the improvement of knowledge will help them better be able to educate children with autism to develop and achieve their optimal potential as at the end of the course, participants would build an accurate understanding of autism which would enable them to apply it in their services. Accordingly, the training for educators should focus on the themes constructed in *iKurnia: Basic in Autism.*

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