The Items Development of Social Skills for Autism Spectrum Disorder (SS-ASD) Instrument

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Abstract: Currently, there is a need to develop a reliable and valid social skills observation instrument in monitoring the progress of social skills among students with ASD in teaching and learning within school setting. This is because positive and acceptable social skills are very important aspects for students with ASD. Moreover, students with ASD who hold a strong foundation in social skills shown an improvement in academic, independent living and social acceptance by the society. The instrument was based on structured observations and there were three steps involved: (a) instrument selection, (b) item selection, and (c) validity and reliability instrument. These steps were to ensure the development of instrument was appropriate to specifically measure the progress of social skills within specific domain namely: social interaction, social communication, emotional intelligence and social behavior. The instrument was namely as "Social Skills for Autism Spectrum Disorder (SS-ASD)". Accordingly, the SS-ASD was given to 2 subject experts and 1 curriculum specialist to establish content validity and face validity. Hence, the SS-ASD instrument had established construct validity through homogeneity (internal consistency) by calculating the value of Cronbach's alpha (α) through pilot study data. Finally, the Cronbach's Alpha value for SS-ASD was 0.986 and it was highly reliable. The SS-ASD were developed suitable for children between ages 3 to 12 years old as a criterion-based instrument. Hopefully, its help students with ASD establish proficiency in social skills that create social acceptance and independent living in the future for students with ASD.

Keywords: SS-ASD, social skills for ASD, social skills, social skills instrument and observation instrument.

1. Introduction

The education-based instrument is defined as a systematic collection of information based on evidence on the effect of an educational program provided to improve student learning. The items in each instrument should be based on the curriculum, objective and learning outcome of the designated lesson. Therefore, modifying the learning outcome or objective to suit the curriculum is prohibited [1]. Hence, an excellent choice is to design and develop an instrument that assesses the existing curriculum provided [2].

Consequently, there is a need to construct instruments to specifically address on each social skills domain in difference studies. It will serve as a purpose in monitoring the achievement and progress of the students towards education program implemented [2]. The instrument was used to measure each participant enhancement based on selected social skills domain to indicate their enhancement of social skills. Moreover, students with ASD who hold a strong foundation in social skills shown an improvement in academic, independent living and social acceptance by the society [3]. This study intends to provide data for the progress of the social skills among students with ASD in a school setting focusing on domain of social interaction, social communication, emotional intelligence and social behavior.

This study involves structured observations to measure the standard behaviour of students with ASD in their natural setting [4]. This is because positive and acceptable social behaviours are very important aspects for students with ASD in social skills [5]. According to Nwea (2014), there are seven guidelines that can be used to measure the progress of social skills: (a) select test item to fit the content, (b) observation based on trajectory scale, (c) match item difficulty with student ability, (d) data collection using specific scale indicator, (e) equality observation and review, (f) accuracy of data collection, and (g) provide time for progression.

In addition, the instrument criteria are listed as (a) measure students with ASD level of improvement in social skills domain, (b) address in the school setting, and (c) items selection compromise all the content being measured

through social skills module using in teaching and learning of social skill in Malaysia. Therefore, the development of SS-ASD instrument followed the guideline entitled "Selecting and Designing Instruments: Item Development, Reliability, and Validity" by Hathcoat, Sanders and Gregg (2016). This was to ensure the development of SS-ASD was appropriate to measure and monitor the progress of social skills in students with ASD. Meanwhile, progress is defined as a similar score obtained over a period of time to indicate a change [7]. The measurement of progress or growth in students provides consistency in their achievement [6]. There were three steps involved: (a) instrument selection, (b) item selection, and (c) validity and reliability instrument.

2. Instrument selection for SS-ASD

The first step was to select appropriate instrument to be adapted in the development of SS-ASD. Therefore, the search involved using Google search engine to search through databases under Google Scholar, Science Direct, Sage and Research Gate. The purpose of this review was to measure the enhancement of social skills on students with ASD. The objective was to identify a valid and reliable instrument to monitor the progress of social skills on students with ASD. The keyword used were social competence, social skills, social skills instrument, social competence instrument, social skill intervention and social competence intervention. The selection was restricted to the following inclusion: (a) focusing on the instruments for students between 3-12 years old, (b) based on student and educator observation or rating types in the school setting, (c) consist domains of social behaviour, social communication, social interaction and emotional intelligence.

There were 80 instruments reviewed and only 10 were identified to meet our selected criteria. The summarization was categorized into; (a) instrument title, author and years, (b) rating type, (c) target age, and (d) domains. However, none of these reviewed instruments matches every domain of social skills needed to be measured in this study. These instruments do not perfectly fit and tally towards the domain needed to be measured. Afterward a thorough review, out of the 10 instrument, 4 instruments were found to have items that were potentially useful and valid to be used in the current study. The selection of items from these instrument consistent with the domains needed to be measured to address the progress of social skills.

The selected instruments are; (a) Autism Social Skills Checklist by Hanzlick et al. (2010), (b) Autism Social Skills Profile by Bellini (2006), (c) "Social Skills Rating Form" in TRIAD Social Skills Assessment by Stone et al., (2010), and (d) Social Skills Checklist develop under "Project Data" by University of Washington (2004). These instruments measure a similar social skills domain to be integrated and adapted into the new development of social skills instrument to be used in the current study. In addition, a review on the existing instruments on social skills had specified that these 4 selected instruments were developed suitable for children between ages 3 to 12 years old as a criterion-based instrument used to explain the social skills of people diagnosed with ASD [12].

2.1 Autism Social Skills Checklist (ASSC)

Autism Social Skills Checklist was developed by Hanzlick, Petersen & Rogers, (2010) through guideline entitled, "Moving Toward Functional Social Competence. A Scope and Sequence Assessment of Social Skill Development for Students with Challenges in Social Cognition" has been developed as an alternative assessment in helping educators and parents to address the challenge in social skill for an individual with ASD. The instrument was developed as a part of "Minnesota Region 10 Low Incidence Autism Spectrum Disorder (ASD) project". Autism Social Skills Checklist is divided into nine domains; (a) joint attention, (b) greeting, (c) self-regulation, and (d) conversation, (e) perspective-taking, (f) social problem solving/critical thinking skills, (g) solitary play/leisure skills, (h) friendship, and (i) life skills. These nine domains are rated using rating scales categories and classified into three levels: beginning, intermediate and advanced. It can be used in a variety of way for any setting.

2.2 Autism Social Skills Profile (ASSP)

Autism Social Skills Profile was developed by Bellini (2006). There are three main domains in Autism Social Skills Profile to measure the concept of social functioning; (a) social reciprocity, (b) social participation/ avoidance, and (c) detrimental social behaviours. It was designed to provide planning for an appropriate intervention involving individuals with ASD. There were 49 items rated using Likert scale appropriated for students between the age of 6 to 17 years old and test-retest reliability was 0.904. Meanwhile, the internal consistency for reliability was 0.926 by the responses [13].

2.3 Social Skills Rating Form (SSRF)

Social Skills Rating Form was developed by Stone et al., (2010). Social Skills Rating Form contains four domains of social behaviours; (a) affective understanding/perspective-taking, (b) initiating interactions, (c) responding to initiations, and (d) maintaining interactions. It is teacher rating form that is used to rate ASD child's ability in performing each behaviour listed on a four-point scale. It was developed to address the need for a simple tool in evaluating social skills profile of students with ASD by providing or recommending future intervention. The internal consistency for reliability was 0.92 for parent rating form and 0.94 for teacher rating form [14].

2.4 Social Skills Checklist (SSC)

Social Skills Checklist was developed by Project Data team, (2004) from the University of Washington. It measures social skills in three levels; beginning, intermediate, and advanced. Upon completion of the observations, each child's checklist is analyzed and rated. There are three main domains; (a) Social Play and Emotional Development (Beginning Play Behaviour, Intermediate Play Behaviours, Advance Play Behaviours), (b) Emotional Regulation (Understanding Emotions, Self-Regulation, Flexibility, Problem Solving), and (c) Group Skills (Seeking Assistance, Participate in Group, Follow Group). According to Medeiros (2007), the inter-rater reliability of the instrument was 0.967.

3. Item selection for SS-ASD

Afterwards, the development of SS-ASD continued with the process of reading the actual items from four selected instruments: (a) Autism Social Skills Checklist (ASSC), (b) Autism Social Skills Profile (ASSP), (c) Social Skills Rating Form (SSRF), and (d) Social Skills Checklist (SSC). The process begins by mapping each item from the selected instruments towards the social skills domain selected for the current study. The SS-ASD was developed and designed consisting of four domains. All items were directly selected. Table 1.1 indicate the items selected from each instrument following the selected social skills domain.

Table 1.1: Selected Items for Integration and Adaption for SS-ASD

Social Skills Domain	Instrument	No.	Item
Social Interaction	**ASSC**	1.	Gives momentary response when name is called
		2.	Asks for help
		3.	Can answer social questions: name, age, family names
		4.	Can state likes/dislikes
		5.	Responds to the communication of familiar people
		6.	References a person upon hearing own name
		7.	Accepts 1-2 changes in schedule (flexibility)
		8.	Ability to wait for short periods of time
		9.	Identifies others by name
		10.	Ability to follow schedule/rules
		11.	Copes with change in schedules, activities, and routines
	ASSP	1.	Introduces Self to Others
		2.	Responds to the Greetings of Others
		3.	Talks About or Acknowledges the Interests of Others
		4.	Interacts With Groups of Peers
		5.	Allows Peers to Join Him/Her in Activities
		6.	Responds to the Invitations of Peers to Join Them in Activities
		7.	Allows Others to Assist Him/Her With Tasks
		8.	Joins in Activities With Peers
	SSRF	1.	Ask others for help when he/she needs it?
		2.	Initiate greetings to familiar people on his/her own
		3.	Join a group of children who are already playing
		4.	Play cooperatively with other children (e.g., sharing, taking turns, following rules)
	SSC	1.	Identify likes and dislikes.
		2.	Seek assistance from adults.
		3.	Seek assistance from peers.

		4.	Answer simple social questions (e.g., name, age, hair color, address).
		5.	Answer subjective questions such as "what do you like to eat/drink?" or "what is your favorite color/video?").
		6.	Accept unexpected changes.
		7.	Accept changes in routine.
		8.	Continue to try when something is difficult.
		9.	Give assistance to peers.
		10.	Remain with group.
		11.	Follow the group routine.
		12.	Follow directions.
		13.	Accept interruptions/unexpected change.
Social Communication	**ASSC**	1.	States wants/needs (demands)
	ASSP	2.	Invites Peers to Join Him/Her in Activities
		3.	Offers Assistance to Others
		4.	Initiates Greetings With Others
		5.	Expresses Sympathy for Others
		6.	Maintains Eye Contact During Conversations
		7.	Compromises During Disagreements With Others
	SSRF	1.	Ask others in a direct manner for something he/she wants
		2.	Start conversations with others?
		3.	Invite others to play with him/her
		4.	Get the attention of others before talking to them
		5.	Offer to assist others when they need help
		6.	Use a wide range of conventional facial expressions to express his/her feelings (for example, raised eyebrows to express surprise; a scowl to express anger).
		7.	Offer comfort to others when they are upset or hurt
		8.	Acting sulky or sad
	SSC	1.	Introduce him/herself to someone new.
		2.	Introduce people to each other
		3.	Demonstrate affection toward peers (e.g., gives peers hugs).
		4.	Demonstrate empathy toward peers (e.g., if a peer's toy breaks, the child may feel sad for them).
		5.	Allow others to comfort him/her if upset or agitated (e.g., allows caregiver to give them a hug or peers to pat their back).
		6.	Use acceptable ways to express anger or frustration (e.g., states they are upset or asks to take a break).
		7.	Say "no" in an acceptable way to things s/he doesn't want to do.
Emotional Intelligence	**ASSC**	1.	Imitates emotions.
		2.	Guesses others emotion imitations.
		3.	Labels emotions in pictures.
		4.	Labels emotions on people, cartoons.
		5.	Label emotions in self.
	ASSP	1.	Recognizes the Facial Expressions of Others
		2.	Verbally Expresses How He/She Is Feeling
	SSRF	1.	Understand that other people can have thoughts and feelings that are different from his/her own
		2.	Understand what makes other people feel basic emotions such as happiness, sadness, or fear
		3.	Ability to understand and express feelings
		4.	Understand what other people's facial expressions mean.
	SSC	1.	Justify an emotion once identified/labeled (e.g., if a girl is crying the child can say she is crying because she fell down and is hurt).
		2.	Identify emotions in self.

		3.	Label emotions in self.
		4.	Identify emotions in others.
		5.	Label emotions in others.
Social Behaviour	**ASSC**	1.	Labels body parts on a person (hair color, eye color, glasses, etc.)
		2.	Gains the attention of another in an appropriate manner
	ASSP	1.	Maintains an Appropriate Distance When Interacting With Peers
	SSRF	1.	Touching him/herself inappropriately
		2.	Touching others inappropriately
	SSC	1.	Maintain appropriate proximity to conversation partner (e.g., does not stand too close or touch other person).

The selected items in table 1.1 went for a review by an expert review selected for this study. The SS-ASD was given to 2 subject experts and 1 curriculum specialist to establish content validity and face validity. They validated the items by eliminating similar items between selected instruments. Each selected item need to measure a single topic without redundancy. Table 1.2 indicates the finalized items after the elimination process of similar items and was organized according to the social skills domain. The instrument adapted Likert Scale approach. The items were rated based on four value in form of an ordinal scale. An ordinal scale was used for the measurement of each item. It will provide an excellent assessment of the assumption of each item towards the factor [16]. The observation rating value for each item can be referred to in Table 1.3.

Table 1.2: Finalize Items Selected for Integration and Adaption to SS-ASD

Social Skills Domain	**No.**	**Item**
Social Interaction	1.	Gives momentary response when name is called
	2.	Asks for help
	3.	Can state likes/dislikes
	4.	References a person upon hearing own name
	5.	Ability to wait for short periods of time
	6.	Identifies others by name
	7.	Ability to follow schedule/rules
	8.	Copes with change in schedules, activities, and routines
	9.	Introduces Self to Others
	10.	Responds to the Greetings of Others
	11.	Talks About or Acknowledges the Interests of Others
	12.	Interacts With Groups of Peers
	13.	Allows Peers to Join Him/Her in Activities
	14.	Responds to the Invitations of Peers to Join Them in Activities
	15.	Allows Others to Assist Him/Her With Tasks
	16.	Joins in Activities With Peers
	17.	Initiate greetings to familiar people on his/her own

	18.	Play cooperatively with other children (e.g., sharing, taking turns, following rules)
	19.	Answer simple social questions (e.g., name, age, hair color, address).
	20.	Continue to try when something is difficult.
	21.	Give assistance to peers.
Social Communication	1.	States wants/needs (demands)
	2.	Invites Peers to Join Him/Her in Activities
	3.	Offers Assistance to Others
	4.	Maintains Eye Contact During Conversations
	5.	Compromises During Disagreements With Others
	6.	Start conversations with others?
	7.	Get the attention of others before talking to them
	8.	Use a wide range of conventional facial expressions to express his/her feelings (for example, raised eyebrows to express surprise; a scowl to express anger).
	9.	Offer comfort to others when they are upset or hurt
	10.	Acting sulky or sad
	11.	Introduce him/herself to someone new.
	12.	Introduce people to each other
	13.	Demonstrate affection toward peers (e.g., gives peers hugs).
	14.	Demonstrate empathy toward peers (e.g., if a peer's toy breaks, the child may feel sad for them).
	15.	Allow others to comfort him/her if upset or agitated (e.g., allows caregiver to give them a hug or peers to pat their back).
	16.	Use acceptable ways to express anger or frustration (e.g., states they are upset or asks to take a break).
	17.	Say "no" in an acceptable way to things s/he doesn't want to do.
Emotional Intelligence	1.	Imitates emotions.
	2.	Guesses others emotion imitations.
	3.	Labels emotions in pictures.
	4.	Labels emotions on people, cartoons.
	5.	Label emotions in self.
	6.	Recognizes the Facial Expressions of Others
	7.	Understand that other people can have thoughts and feelings that are different from his/her own
	8.	Understand what makes other people feel basic emotions such as happiness, sadness, or fear

	9.	Ability to understand and express feelings
	10.	Justify an emotion once identified/labeled (e.g., if a girl is crying the child can say she is crying because she fell down and is hurt).
	11.	Identify emotions in self.
	12.	Identify emotions in others.
	13.	Label emotions in others.
Social Behaviour	1.	Labels body parts on a person (hair color, eye color, glasses, etc.)
	2.	Gains the attention of another in an appropriate manner
	3.	Maintains an Appropriate Distance When Interacting With Peers
	4.	Touching him/herself inappropriately
	5.	Touching others inappropriately
	6.	Maintain appropriate proximity to conversation partner (e.g., does not stand too close or touch other person).

Table 1.3: Observation Rating Value for Each Items

Scale	Observation value
1	Almost always
2	Often
3	Sometimes
4	Almost Never

4. Validity and reliability of SS-ASD

The SS-ASD was given to 2 subject experts and 1 curriculum specialist selected for this study to establish content validity and face validity [17]. They were asked to address; (a) items selected reflect the domain selected, (b) revision of items; and (c) suggestion for adding or eliminating selected items for each domain. The SS-ASD also went for the process of item clarification, deletion and selection from the expert review. The selected items in Table 1.2 were given to the expert reviewers for item selection that matches with the social skills domain selected for this study. Afterwards, the selected items went for revision among the few educators in Malaysia for their opinion.

Hence, the SS-ASD instrument had established construct validity through homogeneity (internal consistency) by calculating the value of Cronbach's alpha (α) [18]. Cronbach's alpha was measured through pilot study data from the current study to obtain the reliability of SS-ASD items. In other words, it refers to the extent of consistency for construct and items correlated with each other [17]. The Cronbach's Alpha value for SS-ASD was 0.986 and it was highly reliable.

5. Result and Discussion

The researcher had run a pilot study in order to determine the reliability of SS-ASD instruments. According to Nunnally (1982) a new constructed instrument must indicate a value not less than 0.67 to secure the accuracy of the developed instrument. This pilot study was conducted on 94 data of participants obtained from students with ASD in Malaysia. The SS-ASD instrument was piloted using the structured observation method where educator observed participants based on the selected items.

The male participants comprised of 88.3% (n=83) and females comprised 11.7% (n=11). This is due to the prevalence of ASD which arises on boys four times greater than girls [19]. Meanwhile, the age of participants in this study is ranged from 4 to 12 years old. The majority of participants were 6 years old (23.4%, n=22) and 5 years old (22.3%, n=21). This was due to the purpose of the Early Intervention Program that promotes inclusion in mainstream education that starts at the age of 7 in Malaysia. Those who fit for the enrolment in mainstream

education are no longer will be in the Early Intervention Program [20]. That is the reason for the higher number of children below 7 years old and the number decrease from 7 to 12 years old.

Furthermore, most of the participants had moderate ASD severity level compromise of 66.0% (n=62) and mild severity level 34.0% (n=32). Typically, those categories as severe ASD severity level is always associated with a severe psychomotor ability [21]. In addition, they are usually associated with greater difficulty in social behaviours such as tantrum and impulsive behaviour [22]. This contributed to non-capability in handling the use of technology in their teaching and learning. Also, this is because they frequently have a seizure that has been diagnosed under severe ASD severity level that can occur anytime [23]. Therefore, the participants are restricted into mild and moderate ASD level.

Data analysis was conducted using the Statistic Package for Social Science (SPSS) Version 23 through homogeneity (internal consistency) by calculating the value of Cronbach's alpha (α) using pilot test data. Since the instrument was developed based on item from four highly reliable instruments, therefore we can see a high value of reliability for SS-ASD (0.986). Furthermore, according to Hinkin et al., (1997), a quality measurement for each construct should consist between four to six item. The SS-ASD instrument had preceded this number and this concluded the result in high value of Cronbach's Alpha (α).

Furthermore, the reliability result from each domain can be referred in Table 1.4. Based on Table 1.4, the coefficient of the item correlation from each domain based on Cronbach's alpha (α) value omitted was above 0.9. The highest value can be seen from emotional intelligence domain. Hence, followed by social interaction and social communication. Meanwhile, social behavior had the lowest value. The overall Cronbach's alpha (α) value for all domain a highly reliable. The strengths of the Cronbach's alpha (α) value came from the item development process whereby every item was selected directly from four highly reliable instruments previously. Therefore, we can conclude that SS-ASD instrument was highly reliable to measure social skills for specifically domain focus on social interaction, social communication, emotional intelligence and social behavior.

Table 1.4: Cronbach's alpha (α) value

No.	Domain	Cronbach's alpha (α)
1.	Social Interaction	0.968
2.	Social Communication	0.952
3.	Emotional Intelligence	0.969
4.	Social Behaviour	0.909

However, the study involved 18 educators with different observation style and preference and might influence the reliability of SS-ASD instrument. Therefore, in future the researcher can provide a specific guideline or provide an external observer. Hence, the SS-ASD can be transformed into a digital version to eliminate human error. There is a lot of educators and each of them will have different techniques and strategies in their teaching and learning for the children. Therefore, identifying the educator's characteristics may have important roles in the reliability of SS-ASD instrument.

6. Conclusion

The educational instruments are a mechanism that can be used to measure intended subject study. In addition, the analyses obtain can explain the information on each items in each domain constructed specifically for the intended subject study. This means that the item can elaborate or clarify behaviour or statement. This information was valuable for researcher to continue their study for further action. Specifically, the SS-ASD instruments assess the progress of social skills through specifically domains of social interaction, social communication, emotional intelligence and social behavior. Therefore, a systematic development of instrument that followed guideline had established the SS-ASD instrument as one of a highly reliable instrument to be used in ASD students' population in Malaysia.

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