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Research Article

SPED Teachers' Extent of Implementing Picture Exchange Communication System: It's Effect on the Functional Communication Skills of Learners with Down Syndrome

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ABSTRACT

People with limited or no communication skills can use the Picture Exchange Communication System, or PECS, to communicate visually. Based on an evaluation of the functional communication skills of students with Down syndrome, this study investigated the profile of the respondents, the respondents' level of implementation of the Picture Exchange Communication System for students with Down Syndrome, the level of effectiveness of using the Picture Exchange Communication System, and the connection between these variables. The descriptive correlational research method was used for the study. The study's respondents were special education teachers from various schools in NCR. The study's respondents were chosen through the use of purposeful sampling. Frequency count, percentage, mean, weighted mean, and the chi-square test were used to tabulate and evaluate the data collected. The respondents are aged 38 on average, with more females than males. The majority of the instructors has bachelor's degrees in early childhood special education. Additionally, it was discovered that these teachers had been working in the field for an average of 7 years. The picture exchange communication system for kids with down syndrome is being used by these teachers to a very high degree, according to the research on its deployment. Based on the evaluation of the functional communication abilities of students with down syndrome, the picture exchange communication system (PECS) is rated as fair or emerging in terms of its effectiveness. Significant relationship was also observed between age and the level of effectiveness, Gender and extent of implementation.

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Introduction

The Picture Exchange Communication System (PECS) is a low-tech AAC distributed worldwide by Pyramid Educational Consultants, Inc. PECS was invented by Andy Bond and Lori Frost at the Delaware Autism Program way back in 1985 (Overcash & Horton, 2010). The device is anchored on the principles of applied behavioral analysis; inspired by B.F Skinner's book *Verbal Behavior*. With functional communication as its primary objective, PECS enables individuals with little to no communication abilities to express themselves through pictures through its six phases. (Pyramid Educational Consultants, Inc., 2020).

Although originally created for children with Autism Spectrum Disorder (ASD), PECS has proven itself useful to people with other communication disabilities. Pyramid Educational Consultants, Inc. (2020) testified that since the development of PECS, the instrument had been utilized to approximately 52 different diagnoses; one of which was Down syndrome.

Down syndrome, Down's syndrome, or "trisomy 21" is a genetic disorder caused by an appearance of a third copy of chromosome 21, one of the human body's 23 chromosome pairs (Patterson, 2009). Despite reaching adulthood, individuals with trisomy 21 could only have mental abilities similar to that of an eight or nine-year-old child. They added that almost, if not all, people afflicted with Down syndrome have physical and intellectual disabilities.

Due to the physical and intellectual disabilities caused by Down syndrome, most people with the disorder suffer from speech impairment, preventing them from any sort of verbal communication (Kent & Vorperian, 2013). As a result, many AAC devices were often used to assist individuals with Down's, and one found to be truly effective is the Picture Exchange Communication System (PECS). A study created by Barbosa, et al. (2018), had proven that out of 1,087 articles written about AAC devices used for Down syndrome, PECS was one of twelve instruments which were the most helpful in assisting them.

From the information presented above, one may infer that PECS, albeit created for children with autism, can undoubtedly be utilized to assist those with Down syndrome. Because of this, the researcher decided to create a study concerning PECS as it is used for individuals with trisomy 21.

This study, therefore, generally determined the level of implementation of the Picture Exchange Communication System and its effectiveness based on the respondents' assessment on the functional communication skills of learners with Down Syndrome. Specifically, it sought to answer the following:

the profile of the Special Education Teachers in terms of their age, gender, field of specialization and years in handling individuals with down syndrome; the SPEd teachers' extent of implementation of the Picture Exchange Communication System for students with down syndrome; level of effectiveness of using the Picture Exchange Communication System based on the assessment of the functional communication skills of learners with Down Syndrome; significant relationship between the profile of the SPEd Teachers and their extent of using PECS in teaching individuals with Down Syndrome and between the profile variables and the level of effectiveness of using the Picture Exchange Communication System and significant relationship between the extent of the teachers' use of Picture Exchange Communication System and the level of effectiveness of using the Picture Exchange Communication System based on the assessment of the functional communication skills of learners with Down Syndrome, respectively.

Methods

Research Design

The study employed the descriptive-correlational research design. It used of a non-probability sampling technique, particularly

the Purposive Sampling. A purposive sample is a non-probability sample that is selected based on characteristics of a population and the objective of the study. In this particular study, the objectives only require teachers who are teaching learners with Down Syndrome.

Respondents of the Study

A total of forty-three (43) teachers were identified from all the different private schools in the National Capital Region that are catering to learners with Down Syndrome. The respondents were identified using convenience sampling.

Research Instrument

The survey questionnaire was the main instrument used in gathering the data needed in this study. It consists of two parts where part I is a survey on the personal profile of the SPED teachers, while the second part is the Implementation Checklist that was adapted from Collet (2008). The implementation checklist includes indicators in each phase in the PECS process and the respondents were asked to indicate the extent to which they implement the different statements.

Statistical Tools

The tool used in assessing the functional communication skills of learners with Down Syndrome was the assessment tool commonly used by all SPED teachers when evaluating the communication skills of learners with Autism Spectrum Disorder and Down Syndrome.

Percentage and frequency distribution was used in expressing the data on the profile of the respondents. Weighted mean was used in interpreting the data on the extent of implementing the Picture Exchange Communication System for students with Down Syndrome. The five-point Likert scale below was used to describe the level of implementation of the PECS: 1.0 – 1.80 (very low degree of implementation), 1.81 -2.60 (low degree of implementation), 2.61 – 3.40 (moderate degree of implementation), 3.41 – 4.20 (high degree of implementation), and 4.21 – 5.0 (very high degree of implementation).

The Pearson-Product Moment Correlation was used to test the relationship that exists between the profile of the SPED teachers and their extent of implementation of the PECS, the teachers' profile and the level of effectiveness of using PECS among the learners with Down Syndrome. It was also used to test the relationship between the level of implementation and the effectiveness of the PECS based on the assessment of the functional communication skills of the learners with Down Syndrome.

Results and Discussion

On Profile of the Respondents

The study found that the average age of the respondents is 38.07 or 38 years old which identifies the majority of the respondents in their adulthood stage. Majority of the respondents are females and they have finished their Bachelor of Early Childhood Special Education while a few number has finished Bachelor in Elementary Education. More than half of the total number of respondents falls into the category 0 – 4 years in service, thus they are relatively young in the service of providing education to learners with Down Syndrome.

On SPED Teachers' Extent of Implementation of the Picture Exchange Communication System for Students with Down Syndrome

As shown in Table 1, all of the general indicators were described with" Very High Degree of Implementation". The following indicators acquired means as follows: Phase 1 (Teaching the Physically-Assisted Exchange) 4.39, Phase 2 (Expanding Spontaneity) 4.36, Phase 3 (Simultaneous Discrimination of Pictures) 4.23, Phase 4 (Building Sentence Structure) 4.26, and Phase 6 (Commenting in Response to a Question and Differentiating Responses to Questions) 4.22. Phase 5 (Responding To, "What Do You Want?") was the only indicator described with "High Degree of Implementation" with a mean of 4.17. The overall mean computed for the whole is 4.27 which was also described with "Very High Degree of Implementation". This discovery deduces that teachers implement picture exchange communication system for students with down syndrome at a very high degree. This could also mean that

teachers put high regards to the benefits of using picture exchange communication system for students with down syndrome.

This finding is parallel with the results obtained by the research study of Park et. al. (2018) wherein *"PECS was observed to be implemented frequently at a very high degree among learners with special needs".* Lee et. al. (2022) also revealed that *"the same conclusive finding in terms of implementing PECS this time among students with ASD."*

Table 1. Extent of implementation of the Picture Exchange Communication System for students with Down Syndrome

Indicators	Composite Mean	Descriptive Value
Phase 1. Teaching The Physically-Assisted Exchange	4.39	Very High Degree of Implementation
Phase 2. Expanding Spontaneity	4.36	Very High Degree of Implementation
Phase 3. Simultaneous Discrimination Of Pictures	4.23	Very High Degree of Implementation
Phase 4. Building Sentence Structure	4.26	Very High Degree of Implementation
Phase 5. Responding To, "What Do You Want?"	4.17	High Degree of Implementation
Phase 6. Commenting In Response To A Question And Differentiating Responses To Questions	4.22	Very High Degree of Implementation
OVERALL MEAN	**4.27**	**Very High Degree of Implementation**

On the Level of Effectiveness of the Picture Exchange Communication System Based on the Assessment of the Functional Communication Skills of Learners with Down Syndrome

Table 2 presents the level of effectiveness of the picture exchange communication system based on the teachers' assessment of the functional communication skills of their learners with Down Syndrome.

It can be observed from the data shown in the table that out of the 20 indicators, more than half or equal to thirteen indicators achieved means ranging from 2.14 to 2.28 described as "Fair or Emerging". Among these thirteen indicators, Request – edibles and Protest or reject activity appeared to have the highest mean while Request - items for task and Request - additional work also seemed to have the lowest mean. In terms of those statements that were described as "Good", 7 indicators were identified. Among these indicators, Affirm/ Accept with a mean of 2.44 hailed with the peak mean in this category followed by Request – toys with 2.42 as mean. The overall mean of 2.27 was also computed. This clearly tells us that effectiveness of using the picture exchange communication system based on the assessment of the functional communication skills of learners with down is only "Fair or emerging".

This result negates the finding of Howlin et. al. (2017). In the study, picture exchange communication system was used to improve the communication skills of children with autism. Results revealed that picture exchange communication system (PECS) is effective in helping learners with autism to develop their communication skills. Drozdiel (2022) in another study also showed that infusing picture exchange communication system helps pre – school children with special needs to progress communications skills making it an effective strategy to target individuals.

Table 2. Assessment on the level of effectiveness of using the Picture Exchange Communication System based on the assessment of the functional communication skills of learners with Down Syndrome

Indicators	Mean	Descriptive Value
Request - edibles	2.28	Fair/Emerging (Learner can do it with physical guidance)
Request - toys	2.42	Good (Learner can do it with very minimal or no guidance)
Request - activities	2.19	Fair/Emerging (Learner can do it with physical guidance)
Request - help/assistance	2.23	Fair/Emerging (Learner can do it with physical guidance)
Request - social routine	2.21	Fair/Emerging (Learner can do it with physical guidance)
Request - given choice	2.23	Fair/Emerging (Learner can do it with physical guidance)
Request - items for task	2.14	Fair/Emerging (Learner can do it with physical guidance)
Request - additional work	2.14	Fair/Emerging (Learner can do it with physical guidance)
Request - break	2.35	Good (Learner can do it with very minimal or no guidance)
Request - information	2.26	Fair/Emerging (Learner can do it with physical guidance)
Request - clarification	2.19	Fair/Emerging (Learner can do it with physical guidance)
Request - permission	2.19	Fair/Emerging (Learner can do it with physical guidance)
Protest/reject item	2.37	Good (Learner can do it with very minimal or no guidance)
Protest/reject activity	2.28	Fair/Emerging (Learner can do it with physical guidance)
Affirm/Accept	2.44	Good (Learner can do it with very minimal or no guidance)
Greetings-respond	2.4	Good (Learner can do it with very minimal or no guidance)
Greetings- initiate	2.37	Good (Learner can do it with very minimal or no guidance)
Comment on items	2.26	Fair/Emerging (Learner can do it with physical guidance)
Comment on activities	2.37	Good (Learner can do it with very minimal or no guidance)
Comment on internal state	2.16	Fair/Emerging (Learner can do it with physical guidance)
Overall Mean	**2.27**	**Fair/Emerging (Learner can do it with physical guidance)**

On the Relationship Between the Profile of the SPEd Teachers to Their Extent of Implementation of PECS And Its Effectiveness in Teaching Individuals with Down Syndrome

As seen in the table, there exists a significant relationship between age and the level of effectiveness. This is proven by the p – value of 0.041 that is comparatively lower than 0.05. It could be that as a teacher advance in age the level of effectiveness gradually increases.

In the study conducted by Kim (2017) it was found out that high school instructors over the age of 31 implement strategies more successfully than their younger counterparts, which leads to better classroom management abilities. The results are not significantly different from those of a later study by Nyagah and Gathumbi (2017) who showed that older teachers were more likely to adopt teaching methods that were more successful for students' learning than were middle-aged and younger teachers.

Gender and extent of implementation in terms of "Commenting in response to a question and differentiating responses to questions" also reveals a significant relationship since the level of significance equal to 0.05 is higher compared to the computed p – value of 0.044. This result clearly shows that gender affects the implementation in terms of "Commenting in Response to A Question and Differentiating Responses to Questions".

In the study of Rajesh and Ungaodkar (2018) argues that pupils have a little bias against female teachers, which may be due to a number of variables like empathic listening, better understanding, and a shown view of concern. However, many students still favored female instructors for a variety of reasons, including their sincerity, diligence, and effort in preparing lectures, as well as their politeness and high pitch audible voice quality (Bodhe and Jankar, 2015).

As to field of specialization, a significant relationship can also be seen towards extent of implementation specifically on teaching the physically - assisted exchange and simultaneous discrimination of pictures. This is proven to be true since the given the p – values of 0.038 and 0.044 is relatively lesser than 0.05. This suggests that field of specialization affects the way teachers implement physically - assisted exchange and simultaneous discrimination of pictures.

This finding can be linked to the results revealed in the study of Coggshall et al. (2011) wherein field of specialization is one of the critical factors in implementing a strategy. It expressed that teacher with specific field of specialization is directly related to how they implement strategies in teaching. Empirical evidence showed that specialization is capable of enhancing knowledge growth and specialization can be seen either as a property or as a process.

Table 3. Correlation result on association between the profile of the SPED teachers to their extent of implementation of PECS and the Level of Effectiveness of using PECS for Learners with DS

	Extent of Implementation												**Level of Effectiveness**	
PROFILE VARIABLES	Teaching The Physically-Assisted Exchange		Expanding Spontaneity		Simultaneous Discrimination of Pictures		Building Sentence Structure		Responding To, "What Do You Want?"		Commenting In Response to A Question and Differentiating Responses To Questions			
	Chi-square value	P-Value	Chi-square value	P-Value	Chi-square value	P-Value	Chi-square value	P-Value	Chi-square value	P-Value	Chi-square value	P-Value	Chi-square value	P-Value
Age	7.664	0.467	4.025	0.855	3.583	0.893	4.909	0.767	8.129	0.421	8.945	0.347	**13.653***	**0.041**
Gender	3.079	0.547	4.111	0.391	3.086	0.544	1.376	0.848	1.932	0.748	**9.282***	**0.044**	2.098	0.718
Field Of Specialization	**6.522***	**0.038**	3.997	0.136	**4.732***	**0.044**	0.517	0.772	0.177	0.915	0.439	0.803	0.106	0.948
Years Of Teaching Students with Do	7.590	0.475	7.796	0.454	10.922	0.206	4.233	0.836	10.420	0.237	5.107	0.746	9.434	0.307

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*. Correlation is significant at the 0.05 level (2-tailed).														

On the Relationship Between the Extent of the Teachers' Implementation of Picture Exchange Communication System and the Level of Effectiveness of Using the Picture Exchange Communication System Based on the Assessment of the Functional Communication Skills of Learners with Down Syndrome

Table 4 presents the correlation result on the relationship between the extent of the teachers' implementation of picture exchange communication system and the level of effectiveness of using the picture exchange communication system based on the assessment of the functional communication skills of learners with down syndrome.

It can be seen that there exists a significant relationship between teachers' extent of implementation of PECS in terms of Responding To, "What Do You Want?" and Commenting In Response to A Question And Differentiating Responses To Questions towards level of effectiveness of using the Picture Exchange Communication System based on the assessment of the functional communication skills of learners with Down Syndrome. Data shows that the computed p – value Phase 5. Responding To, "What Do You Want?" which is 0.04475 and Phase 6. Commenting In Response to A Question and Differentiating Responses to Questions which is 0.03747 is fairly lower than 0.05 significance level. This means that extent of implementation factors such as Responding To, "What Do You Want?" and Commenting in Response to A Question and Differentiating Responses to Questions affects the level of effectiveness of using the Picture Exchange Communication System based on the assessment of the functional communication skills of learners with Down Syndrome. This implies that a high degree of implementation is needed to for a better level of effectiveness as to using the Picture Exchange Communication System based on the assessment of the functional communication skills of learners with Down Syndrome.

McCoy and McNoughton (2018) discovered that Phase V and Phase VI are the hardest to implement as to the sections of the Picture Exchange Communication System. It requires high notch of skill, knowledge and patience to maximize its functionality. According to Mahmoud Raba (2017) effective teaching pedagogies is a result of using the most beneficial kind of knowledge which in turns will achieve good and fruitful learning outcomes. Lack of effective education is one of the greatest barriers to success and achieve learning purposes

Table 4. Correlation result on the relationship between the extent of the teachers' implementation of Picture Exchange Communication System and the level of effectiveness of using the Picture Exchange Communication System based on the assessment of the functional communication skills of learners with Down Syndrome

Extent of implementation Factors	Chi-square value	Probability Value	Remarks
Phase 1. Teaching The Physically-Assisted Exchange	0.21042	0.17562	NS
Phase 2. Expanding Spontaneity	0.22000	0.15631	NS
Phase 3. Simultaneous Discrimination of Pictures	0.23426	0.13053	NS
Phase 4. Building Sentence Structure	0.20959	0.17737	NS
Phase 5. Responding To, "What Do You Want?"	0.3080*	0.04475	S
Phase 6. Commenting In Response to A Question and Differentiating Responses to Questions	0.3180*	0.03747	S
*. Correlation is significant at the 0.05 level (2-tailed).			

Conclusion

Looking at the findings presented above, the subsequent conclusions were developed:

1. Some schools hire teachers who lack the necessary education qualifications and preparation to deal with learners with special needs like those that have Down Syndrome.
2. The teacher respondents put high regards to using picture exchange communication system as an effective tool to teach learners with down syndrome to communicate.
3. PECS can help teachers facilitate the development of communication skills among learners with Down Syndrome.
4. As the teacher advances in age the level of effectiveness gradually increases in employing PECS. Gender affects the implementation in terms of "Commenting in Response to A Question and Differentiating Responses to Questions". Field of specialization affects the way teachers implement physically - assisted exchange and simultaneous discrimination of pictures.
5. A higher degree of implementation of the PECS leads to a more effective result in developing the functional communication skills of learners with Down Syndrome.

Recommendations

The following recommendations were made in relative to the results of the study:

1. School Heads and HR Managers of SPED schools should give priority to educational qualifications as the primary qualification for employing teachers who will teacher learners with Down syndrome and other special needs.
2. School heads should regularly provide or send teachers to trainings or workshops on using PECS and other similar strategies to further enhance the quality of services provided to learners with Down Syndrome.
3. Teachers should be consistent in implementing the use of PECS across all the phases in in order to further help the learners with Down Syndrome to become more independent in their functional communication skills with the use of pictures and symbols.
4. The school heads and teachers should work hand in hand in order to strengthen the use of PECS, which in turn will enhance the functional communication skills of the learners with Down Syndrome.
5. A further review must be done to ensure the effectiveness of using the Picture Exchange Communication System based on the assessment of the functional communication skills.

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