Impact of Five Days AAC Instructional Program on Special Education Student Teachers' Knowledge

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Abstract: Speech-language pathologists(SLPs), special education teachers(SETs), and occupational therapists(OTs) are all expected to encounter individuals with complex communication needs, who need for Augmentative and alternative communication (AAC) .This study aimed at exploring special education student teachers' knowledge of AAC and its relationship to their academic levels and unique specializations. It also aimed at investigating the effectiveness of a proposed Instructional program for the development of this knowledge. To achieve these two objectives, the researchers administered a ten questions test on 30 participants before and after their exposure to the instructional program, all of whom met the study including criteria. Means and standard deviations of pre-post test responses were counted. Pre-test responses were analyzed by means of Analysis of Covariance (ANCOVA). *t*-test has been used to count the difference between pre - post test means. ANCOVA results haven't shown any statistically significant differences in the participants' knowledge of AAC attributed to their academic levels and unique specializations, while the *t*-test results have shown statistically significant differences between participants' responses to the pre-test *(M =4.90 , SD= 1.373)* and the post-test *(M=18.37 , SD= 0.718)* in favor of the post-test. Results of pre-test suggest that the participants' knowledge of AAC were inadequate. The large statistically significant difference between pre-post test means revealed the extent to which that the proposed instructional program has enhanced participants' knowledge of AAC. Results and implications for future research and practices are discussed.

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1. Introduction

Individual with Disabilities Education Act (IDEA) of 1997 [P. L. 105-17] requires that assistive technology (AT) should be considered in preparing individualize education program (IEP) [29 U.S.C 2201, §3 (1)] . For the time being there are about 26,000 assistive technology tools which can be included in individualized education program IEP. AAC tools and systems are one of the most important assistive technology categories. AAC is defined as an "integrated group of components, including the symbols, aids, strategies and techniques used by individuals to enhance communication" (American Speech-Language Hearing Association, 1991, p. 10).

In the previous decade and particularly since the latest amendment of the IDEA and the mandated items therein concerning assistive technology, AAC has become an important and pressing issue in educating professionals who provide services to children with disabilities and their families (Foley, 2001). SETs and SLPs are highly important members among the multidisciplinary team which takes the responsibility for AAC planning, administration, and making relevant decisions (Prelock, 2000;Parette *et al*., 2001;). AAC also includes other specialists who are responsible for doing suitable modifications required for AAC systems and tools, a thing that enables students with disabilities to access public education curricula by means of their own AAC systems and to use them in the classroom (ASHA, 1997-2004; Parette&Marr, 1999).

While the most acceptable estimations point out that the numbers of individuals who need for AAC services are likely to be in the tens of millions worldwide (Sigafoss *et al*., 2010), and such numbers totaled around 3.5 million in the USA alone (Beukelman & Mirenda ,2005). however, there is similar data confirms that, despite the wide acceptance of AAC as a supportive means for children with complex communication needs, the education and training related to the AAC as well as the number of well trained professional are not parallel to the amount of the required services (*Lebel et al., 2005*). In this context, many researchers have suggested that the lack of specially trained professionals on AAC would in turn lead to a lack of AAC services provided to a large portion of individuals with complex communication needs (ASHA, 1981; Merill *et al.,* 2000*)*.

Despite increased attention which the AAC enjoys recently among SLPs (Marvin *et al*., 2003); however, the studies conducted in the most advanced countries reveal divergent results. For example, in a survey conducted by Marvin, *et al.* (2003) in which 71 SLPs participated in, they pointed out that more than half of the participants believed that they received a limited or poor training, and over 80% declared that they hadn't received adequate education during their post graduates study. Although about one third of respondents referred to their work with the users of AAC, but the majority of them (63%) expressed their inconvenience in using it, and (72%) expressed inadequacy in using it. On the other hand, Balandin and Iacono (1998) found out in their survey conducted on Australian SLPs that the most common reason that SLPs do not recommend the use of AAC, is the limited knowledge and skills of families and teachers related to this kind of communication. After almost ten years of the last study, Iacono and Cameron (2009) reported that SLPs working with young children in early intervention programs in Australia showed broad knowledge of AAC and it's various advantages. Also their reported intervention and assessment approaches reflected the best documented practices in the literature. However, the only exception of AAC implementation was for family-centered intervention programs. Participants expressed their displeasure of family's negative attitudes towards the use of AAC. In the USA, Ratcliff *et al.* (2008) conducted a survey in an attempt to collect data about current status of academic and clinical education in AAC, and comparing its results with earlier surveys to determine any changes being made as programs in the US adopt new standards of the American Speech-Language Hearing association in the field of speech - language pathology. The Survey results showed that 73% of the respondents said they received an independent syllabus of AAC, and 80% said the content of AAC was infused in other courses. The study concluded that academic preparation of AAC has increased in the last decade; however, there is still need for further clinical preparation in this regard.

AAC services in developing countries are limited in general (Alant & Lloyd, 2005), and the reason behind that is the lack of financial, clinical and educational resources (Sigafoos *et al.,* 2010). The same reasons apply to many Arab countries; where there are many different obstacles hinder AAC. In this context, Hock and Lafi (2011) pointed out that AAC application in most Arab countries witnesses big problems which negatively affect the use of communication technology in general. Such problems are associated with interwoven cultural, economic, educational, and political issues as well as other problems related to current AAC systems.

In Egypt for instance, Wormnaes and Abdel Malek (2004) conducted a survey included 30 participants of SLPs which aimed to discover their experiences and attitudes relevant to AAC. The survey results showed that only 10 out of 23 participants (44%) who worked with children with limited and/or nonfunctional speech abilities felt they were sufficiently qualified to work in the field of AAC, while 22 respondents (74%) believed that it is very important for SLPs to learn more about AAC.

AAC programs in Israel seem no better than that, as in a study conducted there, Merrill et al. (2000), pointed out that all AAC training programs have been concentrated in Jerusalem which makes SLPs and other professionals in rural areas isolated from AAC resources and from different educational opportunities.

Problem Statement

There is vast range of individual and contextual factors affecting communication through AAC alternatives (Light, 1997). As a result of that ACC services are delivered by a collaborative team of professionals of different experiences and specialties including SLPs, SETs, and OTs (Suto *et al*., 2001). It is expected that such specialists would come across individuals with complex communication needs during their field clinical and educational practices (Costigan & Light, 2010). According to a survey included a number of professionals, 45% of SLPs and 80% of SETs said they have delivered services to individuals with complex communication needs, (Locke & Mirenda, 1992; ASHA, 2002). And because it is likely that SLPs, SETs, and OTs would meet individuals who are in need for ACC services, they are required to have at least the basic competences related to ACC services as part of their professional knowledge and skills (Hammel & Angelo,1996).

Kingdom of Saudi Arabia is a leading Arab country in providing different services for individuals with disabilities, either in preparation of trained staff, or launching of specialized educational and inclusive programs. However, there is very limited information on the status of AAC whether in terms of pre-service or in-service preparation programs, or in terms of the competences of practicing professionals. In their programs dedicated to SETs preparation, most Saudi universities tend to be category-oriented. King Abdul Aziz University is one of the leading universities in SETs preparation. When a student joins the Bachelor program in special education, he/she receives introductory courses on the subjects of special education over two terms (semesters) and then joins one of the unique majors available in the university

including speech- language disorders, autism disorder, intellectual disability, and, learning disabilities and others.

We conducted the current study in an attempt to explore the knowledge of special education student teachers majoring speech language disorders, autism disorder, and intellectual disability of AAC, as they are supposed to have basic knowledge about AAC because it is likely to come across individuals that their training would require AAC services. More precisely, we conducted the present study to explore the participants' knowledge of AAC and demonstrate to what extent this knowledge is influenced by their academic levels and unique specializations, as well as to explore the effectiveness of a proposed instructional program intended to develop their relevant knowledge.

2. Method

Participants and Including Criteria

In this study, the researchers selected the participant students according to the following criteria:

1. Participants should be in the two academic levels of third and fourth years.
2. Participants' unique-specializations should be among one of the following study pathways: (speech-language disorders, intellectual disability, autism disorder)
3. They should not have previous field experience
4. They should agree to participate in the study and to abide by its procedures till the end.

Participants

30 special education students at the faculty of education belonged to King Abdul Aziz university in Jeddah, participated in the study (N=30). According to the study's variables, they were distributed into 16 participants in third year academic level *(n*=16), and 14 participants in fourth year academic level (*n*=14). Participants were distributed according to the unique-specializations into12 students in speech language disorders pathway (*n*=12) and into 9 students in mental disability pathway (*n*=9) and 9 again in autism disorder pathway (*n*=9) for more details about participants (see table 2).

Setting

The study was conducted at the Faculty of Education at King Abdul Aziz University (males' section) in the city of Jeddah in Saudi Arabia. More precisely the participants responded to pre-post test and received the educational program at micro instruction hall pertaining to the section of curriculum and instructional methods at the faculty of education; it is specious hall, having technical and logistic components which helped greatly in applying the study procedures and achieving its objectives.

Procedures

Design

To fulfill the two objectives of the study, we used the single-group with pre - post test design, in order to compare between participant's results on both tests to determine the effectiveness of the proposed instructional program. We also used the results of the pre-test and operated additional statistical processing to explore the participant's knowledge of AAC and find out whether it varies according to their different academic levels and unique-specializations.

Statistics

Researchers used descriptive statistic principles of means and standard deviations to find out the performance of the participants on pre-post test as well as the *t*- test to know if there are statistically significant differences between the participants' responses means to the pre-post test or no. On the other hand, we used ANCOVA in analyzing the participants' responses to the pre-test to explore whether their knowledge of AAC differed according to their academic levels and unique - specializations or the interaction between them or no.

Data Collection:

The researchers prepared a test similar in its construction and coding schemes to the questionnaire of Patel and Khamis-Dakwar (2005). Even we quoted literally seven questions with their probable responses. Those questions are written in italics in table (3). The test consisted of two parts: the first part contains the primary data of the respondent such as academic level, unique-specialization, as well as answer instructions. While the second part was made up of 10 questions measuring basic knowledge of AAC. The test didn't include any question that measures practice and attitudes domains, because all respondents were still students and have not begun their work experience yet. To check the validation of the test and the appropriateness of the translated questions, we presented the test to three raters holding Masters degree in speech language disorders and Ph.D in special education at faculty of education in king Abdul Aziz University. They rated the test in terms of: (a) relation of questions to AAC and how far they represent it, (b) checking that all questions measure knowledge dimensions (theoretical) related to AAC, and (c) appropriateness of language phrasing (wording). We took their comments into account, and we made the necessary changes. Also we counted test reliability through test – retest method, as we administered it twice on 8-students pilot sample, equal to the study's participants in terms of academic levels and unique -specializations and with a 7- days

time interval. Test- retest reliability coefficient was 0.89.

Test Administration

In the micro-instruction hall; researchers administered the pre-post test on the participants with a time interval of 15 days. When applying both tests, we asked the participants to answer all questions individually, seriously, and objectively without referring to any information source, we explained to them that the answer to the test requires approximately half an hour, without obliging them to do so.

Answers coding schemes

Researchers prepared a form to encode participants' responses/ answers to the ten tests' questions based on the theoretical content of the instructional program and on examples of typical answers mentioned in Patel and Khamis-Dakwar. The form included three proposed levels of typical responses aligned with the first eight question ranging from (inaccurate answer) given 0 score, and (partially accurate answer) given 1 score, and (totally accurate answer), given 2 scores. The ninth and tenth questions were coded within two response levels: Yes; and given 2 scores, No; and given a 0 score.

Correcting Participants' Responses/ Answers to the Pre-Post Test

To correct participants' responses on pre-post test, and to encode them within the previously mentioned levels, two independent faculty members separately reviewed the participants' responses and encoded them based on the responses encoding form prepared for this purpose, then the agreement coefficient between them was counted; where it was (0.85) for the pre-test, and (0.91) for the post-test.

Preparation of the Instructional Program

We have prepared an instructional program consisted of five study chapters corresponding in content to the questions contained in the test. In preparing the theoretical content of the instructional program we depended on several relevant sources (e.g.,Baumgart *et al*., 1990;Glennen & Decoste,1997; Mirenda, 2003; Millar *et al.,* 2006; Schlosser & Sigafoos, 2006; Beukelman *et al* ., 2007; Light & Dragen, 2007; Crissy, 2009; Merinda and Iacano, 2009; Sigafoss *et al.,* 2010; Hock and Lafi, 2011; Recourse Manual for Commissioning and Planning for SLCN, 2011; Subihi,2012).

The instructional programs' chapters covered the following topics:

Chapter 1: Concept of AAC technology, this unit contained definition of the assistive technology and AAC concepts, as well as the Common denominators of the different definitions of AAC technology, and its levels and examples.

Chapter 2: Candidates for AAC, this unit discussed categories of disability entitled to AAC services, and the most accepted prevalence of individuals nominated for these services, in addition to specifying members of AAC team and describing their duties and responsibilities.

Chapter 3: AAC, concepts and implications, in this unit; we highlighted different concepts included in AAC, and we distinguished between communication tool and communication system, and explained the considerations that make a communication system either an alternative, or an augmentative one. We also discussed AAC functions in the area of disability in terms of its role in increasing speech intelligibility, and enhancing communication and social adaptation, as well as its implication in the field of education and rehabilitation.

Chapter 4: (Assessment process) this unit dealt with assessment topic, where we reviewed the importance of the assessment process in determining the need for AAC technology, and its role in determining the appropriate means of AAC to an individual, and assessment in accordance with the participation-model, in addition to areas of assessment referred to by ICF(2002), and the evaluation of the surrounding environment of AAC users to find out the various challenges, and factors that hamper the communication process.

Chapter 5: (AAC, critical issues), in this unit we pointed to the impact of AAC on the users' language development and their ability to speak. We also discussed the wide age span covered by AAC technology, in addition to social, cultural and economic challenges, which hinder the use of AAC and deactivate its role in the Arab region. This unit also included the limitations of AAC technology such as cost and availability.

Instructors:

The instruction team was made up of the researchers themselves, all of whom are Ph.D holders in special education. All instructors are assistant professors at the faculty of education, and they have sufficient clinical experience in working with students with disabilities. They all have a particular interest in the implications of AAC technology for individuals with complex communication needs.

Presentation of Instructional Program

We presented the instructional program over five consecutive days in the aforementioned micro-instruction hall. In that presentation, we applied lecture, discussion approach, audio visuals such as video and illustrative images as well as asking questions, and providing appropriate feedback. Each participant was given a manual containing the topics of the instructional program.

3.Results

The study was conducted to achieve two main objectives: one objective was to explore the participants' knowledge of AAC and to find out whether that knowledge would differ according to their academic levels and unique-specializations. Therefore, we counted means and standard deviations of participants' responses to pre-tests and were statistically analyzed by (ANCOVA). The results showed no statistically significant difference in the participants' responses on pre-test attributed to the academic year F (0.737) = 0.309, $P \geq 0.05$, or unique-specialization F (0.600) = 0.282 $P \geq 0.05$, or the interaction between them F(0.921) = 0.082, $P \geq 0.05$(see tables 1&2).

Table 1. ANCOVA results of the impact of academic level and unique -specialization and the interaction between them on the participants' response to the pre-test.

Variation source	Sum of squares	df	Mean squares	F value	Sig
unique-specialization	1.338	2	.669	.309	.737
Academic level	.611	1	.611	.282	.600
Unique – specialization × Academic level	.357	2	.179	.082	.921
Error	52.014	24	2.167		
Total	54.700	29			

Significant at $P \geq 0.05$

The second objective of the study was to discover the effectiveness of a proposed instructional program in the development of participants' knowledge of AAC, so we counted means and standard deviations of the participants' responses to the post-test as well. Table 2 shows the difference between the means of the participants' responses to the pre-post tests. It shows that the total means and standard deviation of the participants' responses (N=30) to the pre-test were (*M= 4.90 , SD=1.373), while they were (M= 18.37, SD = 0.718) to the post-test.* This result reveals a significant difference between the responses means to the pre-post tests, and this in turn reflects the effectiveness of the proposed instructional program. The *t*-test result shows statistically significant differences between participants' responses to the pre-post tests at $P \geq 0.05$ (See Table 4).

Table 2. Means and standard deviations of the participants' responses to the pre- post tests according to variables of academic level and unique specialization.

Academic level	Unique specialization	Means		Standard deviations		Number of participants
		Pre test	post test	Pre test	post test	
Third year	Speech and language disorder	4.43	18.57	.787	.976	7
	Intellectual disability	4.75	18.50	.500	.577	4
	Autism	5.2	18.20	2.168	.837	5
	Total	4.75	18.44	5.291	.814	16
Fourth year	Speech and language disorders	5.00	18.40	1.414	.548	5
	Intellectual disability	5.00	18.00	1.871	.707	5
	Autism	5.25	18.5	1.500	.577	4
	Total	5.07	18.29	1.492	.611	14
Total	Speech and language disorders	4.67	18.50	1.075	.798	12
	Intellectual disability	4.89	18.22	1.364	.667	9
	Autism	4.90	18.33	1.373	.707	9
	Total	4.90	18.37	1.373	.718	30

Table 3. Coding schemes of participants' responses to pre-post tests' questions

Question	Response Category	Response Code	Examples of Typical responses	Number of responses Pre training	Pos training
Can you define the AAC?	Inaccurate	0	No response, or any inconsistence response with 1 or 2	20	0
	Partially Accurate	1	Tools, strategies, or systems that support verbal communication	10	9
	Fully Accurate	2	Wide concept that points to any means that supports verbal communication or temporally or permanently compensates it, and it includes aided	0	21

			and non-aided communication through low and high technology.		
What are disabilities that need to AAC?	Inaccurate	0	No response at all, or mentioning a categrey that doesn't need AAC, such as non-exceptional children, or children with learning disabilities.	2	0
	Partially Accurate	1	Individuals with speech impairmnets	23	1
	Fully Accurate	2	Individuals with expressive and communication impairments	5	29
Who are those specialists responsible for AAC training and monitoring?	Inaccurate	0	No response at all, or mentioning a member in 2 or somone contrary to that	0	0
	Partially Accurate	1	Speech-language pathologist and/or special education teacher	30	0
	Fully Accurate	2	SLPs, OTs, SETs	0	30
What examples of AAC that you know?	Inaccurate	0	No answer at all, or answering computer and stickers	9	0
	Partially Accurate	1	Mentioning one example only, such as (PECS) or sign language	21	5
	Fully Accurate	2	Mentioning at least four examples such as PECS, PCS, VOCAs, Signs, Communication board, writing	0	25
What are the functions that AAC serves?	Inaccurate	0	No answer at all	7	0
	Partially Accurate	1	Mentioning one function only such as communication or speech intelligibility .	23	2
	Fully Accurate	2	Mentioning all functions: speech intelligibility, communication, and social adaptaion	0	28
Is there any difference between alternative and augnentative communication? What is it?	Inaccurate	0	Answering No, or no answer at all.	30	0
	Partially Accurate	1	Answering Yes, without any explanation	0	11
	Fully Accurate	2	Answer ing yes: communication system performs the same function and what determines its role as alternative or augmentative is the existence or non-existence of language with the individual subjected to training.	0	19
Is there any age limit for AAC use?	Inaccurate	0	Yes. Or no answer at all.	16	0
	Partially Accurate	1	No. without any explanation	14	8
	Fully Accurate	2	No. AAC can be used for different age levels (children, adults, and old people)	0	22
Does the use of AAC negativelly affect the ability of producing speech?	Inaccurate	0	Answering yes, or no answer	20	0
	Partially Accurate	1	Answering no without sufficient explanation	10	13
	Fully Accurate	2	No, the AAC supports language development and speech production if it is perfectly used.	0	17
Have you recently read anything about AAC? What was it?	Yes	2		3	30
	No	0		27	0
Have you ever had any training or supervision on AAC?	Yes	2		0	30
	No	0		30	0

Table 4. *t*-test results concerning pre -post administrations

Administration	Number	Means	Standard deviation	*t* value	df	Sig
Pre	30	4.90	1.373	-53.334	29	.000
post	30	18.37	.718			

Significant at $P \geq 0.05$

4. Discussion

The study aimed at exploring special education student teachers' knowledge related to AAC, and the relationship of that with their academic levels and unique-specializations, besides knowing the effectiveness of a proposed instructional program in the development of such knowledge. The ANCOVA results of the participants' responses to the pre-test based on the variables of academic level, and unique -specialization, and the interaction between them, showed no statistically significant differences in the participants' responses attributed to these two variables, or the interaction between them, which means that the academic levels of the participating students (the level of third, and fourth years), and their unique-specializations in (speech and language disorders, autism or intellectual disability) were not influential variables in their knowledge of AAC.

This result implicitly assumes equal knowledge of the participants of AAC despite different specialties and academic levels; this can be described as very limited knowledge compared to what resulted in this knowledge after the participants have been exposed to the instructional program. It is unfortunate to say that this result involves different meanings with negative predictive indicators. Since these student teachers on the assumption that they were not exposed to the instructional program, were to engage later in field work without having a minimum theoretical knowledge and essential practical relevant skills, bearing in mind that the competencies of AAC are part and parcel of the professional competence of SLPS, SETs and other specialists (Hammel & Angelo, 1996). Even some countries such as the United States will not grant students majoring speech and language, for instance, certificates and career practice license until they prove that they have knowledge and skills related to AAC (ASHA,2002).

It also means that until the date of this study the participants haven't received a specialist course, or chapter of a course, or any training concerning AAC and this was clear from their response to the ninth, and tenth questions. This is consistent in part with what is referred to in the literature concerning the lack of educational and training programs available for AAC (Lebel *et al,*. 2005), and the consequent parallel lack of AAC services that are supposed to be available to a large proportion of individuals with complex communication needs (ASHA, 1981; Merill *et al.,* 2000). Also; this result fits partially to what was referred to by Costigan & Light (2010) that a significant proportion of pre-service preparing programs for SLPs, OTs and SETs have failed to provide AAC specialist course; which means that a large proportion of students learning these disciplines may graduate with minimal knowledge or without exposure to AAC at all.

As for the effectiveness of the instructional program and the extent of its effect on the participants' knowledge; a quick look at table 3 will enable us to notice a dramatic difference in the grades for the participants' answers showing their knowledge of AAC before and after training. In general; there is a significant difference in the accuracy of the responses to the pre-post tests, in favor of the post-test. This difference in performance is supported with statistical significances, as the average performance of the participants to the pre-test was *(M =4.90) versus (M = 18.37) to the post-test.*

We discuss in the following lines and in more detail the significances of results listed in Table 3. It is clear from this table that some of the participants have had limited knowledge or logical expectation to answer the first question, as ten responses of the participants were within the level of coding (1), and may be such an answer was a result of a personal experience not related to formal academic course or study course requirements; because all the participants, without exception, were not subjected to a specialized course, or specialized study chapter in AAC. See question 9.

The same thing applies to the second question, as five answers of the participants were within the coding level (2); they mentioned three categories of disability suffer from weakness in expressive language and communication. In answering the fourth question, 21 participants were rated within the coding level (1); seventeen of them answered (sign language), while four of them answered (the picture exchange communication system. PECS). For question 6, responses of all participants lie within the coding level of (0), it means that the participants either answered no, or they did not answer this question, and no doubt that this question was more precise than the preceding ones, as it reflects a more advanced level of knowledge.

For the seventh and eighth questions, we will assume random answers to them; the review of

the two questions showed us that all the participants answered Yes or No without providing justifications for their answers. On the other hand, we found that the participants' responses to the post-test were better regarding all questions, without exception, especially for questions 2, 3, 5.

In general; the study results provide additional support for the literature, as the previous studies conducted on specialists' knowledge of AAC, and the assessment of their skills have expressed the need for more knowledge and training (Blandin & Iacono, 1999;Marvin *et al.,* 2003; Wormanes & Abdel Malek, 2004). Ratcliff, *et al.,* 2008)

Limitations of the Study and Guidelines for Future Studies:

While the study sought to achieve its two objectives, it's advisable to deal with its results with caution, as they are unlikely to be generalized, because the study was confined to only one program out of the preparation programs of SETs in Saudi universities, in addition to the quasi-experimental research approach used in it, which was limited to one group with pre-post test. On the other hand we refer to the fact that we have limited our programs to address the theoretical knowledge domain, as the program did not include attitudes and practice domains, due to the nature of the participants, as they were all undergraduate students and they haven't joined the field work yet.

In light of the study results; researchers recommend conducting further studies to assess the status of AAC on a larger scale, involving various provinces and cities in the Kingdom of Saudi Arabia and cover special education teachers' preparation programs and other relevant specialties, in addition to the training needs of professionals working in the field, and then take procedural steps for the preparation of skilled, trained and qualified staff, and pursue the ways leading to it.

Conclusion:

The study aimed at discovering special education student teachers' knowledge related to AAC and knowing whether it varies according to their academic levels, and unique-specializations, besides checking the effectiveness of the proposed instructional program in the development of such knowledge. The results showed limited knowledge of the students participating in AAC, and that knowledge didn't vary according to their academic levels or unique-specializations, and also showed the effectiveness of the proposed instructional program in the development of such knowledge. Also the participants' results on some pre-test questions reflected that they did not receive specialized courses or any training on AAC, a thing that foreshadows graduation of SLPs and SETs without having the minimal theoretical knowledge and practical skill for AAC

References

1. Alant, E., & LIoyd, L. L. (2005). *Augmentative and alternative communication and severe disabilities: beyond Poverty*. London: Whurr Publisher.
2. American Speech- Language Hearing Association Ad Hoc Committee on Communication Processes and Non Speaking Communication. (1981). *American Speech and Hearing Association*, 23(8), 577- 581.
3. American Speech-Language Hearing Association. (2002). Augmentative and alternative communication : Knowledge and skills for service delivery. *ASHA Supplement*, 22, 97-106.
4. American Speech-Language-Hearing Association (1997–2004). *Introduction to augmentative and alternative communication.* Retrieved from http://www.asha .org/public/speech/disorders/Augmentative-and-Alternative.htm
5. American Speech-Language-Hearing Association. (1991). Report: *Augmentative and alternative communication. ASHA, 33*(Supplement5*)*, 9–12.
6. Balandin, S., & Iacono, T. (1998). AAC and Australian speech pathologist report on national survey. *Augmentative and Alternative Communication, 14, 239-249.*
7. Balandin,S., & Morgan, J.(2001). Preparing for the future: Aging and augmentative and alternative communication. *Augmentative and Alternative Communication. ISSAC*, 17 (2), 99-108.
8. Baumgart, D., Johnson, J., & Helmstetter, E. (1990). *Augmentative & alternative communication systems for persons with moderate and severe disabilities***.** Paul H. Brookes Publishing Co: Baltimore
9. Beukelman, D. R., Fager, S., Ball, L. D., & Dietz, A. (2007) AAC for adults with acquired neurological conditions: A Review. *Augmentative and Alternative Communication*, 23, 230-242. doi: 10.1080/ 07434610701553668.
10. Beukelman, D., R., & Mirenda, P. (2005). *Augmentative and alternative communication: Supporting children and adults with complex communication needs*. Baltimore: Brookes
11. Costigan, A., & Light, J. (2010). A review of preservice training in AAC for speech-language

pathologist, special education teachers, and occupational therapist. *Assistive Technology*, 22, 200-212. doi: 10.1080/ 104000435.
12. Cress, J., & Marvin, C. A. (2003) Common question about AAC services in early intervention. *Augmentative and Alternative Communication*, 19, 254-272. doi: 10.1080/0743610310001598242.
13. Crissey, P. (2009). *Teaching communication skills to children with autism***.** Attainment Company: Verona, WI.
14. Foley, B. (2001). AAC: *Looking back and to the future.AAC in the public schools.* Retrieved from http://www.ussaac.org/pages/presentation_pt3.html#top
15. Glennen, S., & DeCoste, D. (1997). *Handbook of alternative & augmentative communication.* Singular Publishing Company: New York.
16. Hammel, J., Angelo, J. (1996). Technology Competencies for Occupational Therapy Practitioners. *Assistive Technology*, 8(1), 34 - 42.
17. Hock, B. S. & Lafi , S., M. (2011) Assistive Communication Technologies for Augmentative Communication in Arab Countries: Research Issues. *UNITAR e Journal, 7(1), 57-66.*
18. Iacono, T., & Cameron, M. (2009). Australian speech-language pathologists perceptions and experience of augmentative and alternative communication in early childhood intervention. *Augmentative and Alternative Communication*, 25, 230-249. doi: 10. 3109/ 07434610903322151.
19. Individuals with Disabilities Education Act Amendments of 1997, P. L. 105–17. (June 4, 1997). 20 U.S.C. § 1400 et seq Institute for Matching Person and Technology. *Matching person and technology assessment process.* Retrieved from http://members.aol.com/impt97/ mptdesc.html.
20. Lebel, T., Olshtain, E.,& Weiss, P.L. (2005). Teaching teachers augmentative and alternative communication: Opportunities and challenges of a web-based course. *Augmentative and Alternative Communication*, 21, 264-277. doi: 10.10800/ 07434610500140311.
21. Light, J. (1997). "Communication is the Essence of Human Life'': Reflection on the Communicative Competence. *Augmentative and Alternative Communication,* 13(2), 61-70.
22. Light, J. C., & Dragger, K. D. (2007). AAC technologies for young children with complex communication needs: state of the science and future direction. *Augmentative and alternative communication*, 23, 204-216. doi: 10.1080/ 07434610701553635.
23. Locke, P., & Mirenda, P. (1992). Roles and responsibilities of special education teachers serving on teams delivering AAC services. *Augmentative and Alternative Communication, 8(3)*, 200–214.
24. Marvin, A. L. , Montano, J. J., Fusco, L. m M., & Gould, E. P. (2003). Speech – language pathologist perception of their training and experience in using alternative and augmentative communication. *Contemporary Issues in Communication Science and Disorders,* 30, 76-83. doi: 1092-5171/ 03/ 3001-0076.
25. Merrill, N., Yilon-Hamivitz, S., Weiss, T., Lebel, T., &Seligman-Wine, J. (2000) Students with severe communication impairment in special education settings in Israel :A demographic Survey. *Augmentative and Alternative Communication: ISAAC-Israel, 16, 38-44.*
26. Millar, D., Light, J.C., Schlosser, R.W .(2006). The impact of augmentative and alternative communication intervention on the speech production of individuals with developmental disabilities: A research review. *Journal of Speech, Language, and Hearing Research* 49:248-264. doi:10.1044/1092-4388(2006/021)
27. Mirenda, P. (2003) Toward functional augmentative and alternative communication for students with autism : Manual signs, graphic symbols, and voice output communication aids. Language, *Speech and Hearing Services in School*, 34, 203-210. doi: 10.1044/0161-1461(2003/018)
28. Mirenda, P., & Iacono, T. (2009). *Autism spectrum disorders and AAC***.** Paul H. Brooks Publishing Co: Baltimore, MD.
29. Parette, H. P., & Marr, D. D. (1997). Assisting children and families who use augmentative and alternative communication (AAC) devices: Best practices for school psychologists. *Psychology in the Schools, 34,* 337–346. doi: 10.1002/(SICI)1520-6807(199710)34:4<337:AID-PITS5>3.0.CO;2-1
30. Parette, H. P., Huer, M. B., & Brotherson, M. J.(2001). Related service personnel perceptions of team AAC decision-making across cultures. *Education and Training in Mental Retardation and Developmental Disabilities, 36(1),* 69–82.
31. Patel, R . & Khamis-Dakwar, R. (2005). An AAC training program for special education teachers: A case study of palestinian arab teachers in israel. *Augmentative and Alternative*

Communication. 21, 205-217. doi: 10.1080/07434610400011638.
32. Prelock, P. A. (2000). Multiple perspectives for determining the roles of speech-language pathologists in inclusionary classrooms. *Language, Speech, and Hearing Services in Schools,* 31(3), 213–218.
33. Ratcliff, A., Koul, R., & LIoyd, L. L. (2008). Preparation in augmentative and alternative communication: An update for speech-language pathology training. *American Journal of Speech- Language Pathology*, 17, 48-59. doi: 1058-0360/ 081701-0048
34. RCSLT Recourse Manual for Commissioning and Planning for SLCN. (2011) *Augmentative and alternative communication (AAC*) . Royal college of speech and language therapist. Retrieved from http://www.rcslt.org/speech.../commissioning/aac_plus_intro
35. Roms, M. A., & Seveik, R., A. (2005) Augmentative communication and early intervention : Myths and reality. *Infants and Young Children,* 18, 174-185. Retrieved from : http://journals.lww.com/iycjournal/toc/2005/07000#214504017
36. Schlosser, R., Sigafoos, J.(2006). Augmentative and alternative communication interventions for persons with developmental disabilities: Narrative review of comparative single-subject experimental studies. *Research in Developmental Disabilities, 27, 1-29.* doi: 10.1016/j.ridd.4004.04.04.004
37. Soto, G., Muller, E., Hunt, P., & Goetzl, L. (2001). Professional skills for serving students who use AAC in general education classrooms: A team Perspective. *Language, Speech, and Hearing Services in School*, 32, 51-56. doi: 10.1044/0161-1461(2001/ 005)
38. Subihi, A. (2012). Effectiveness of Picture Exchange Communication System (PECS) in teaching functional communication skills and reducing maladaptive behavior of developmentally disabled children. (Unpublished doctoral dissertation). University of Jordan, Amman.
39. .Sigafoos, J. Schlosser, R.W., Sutherland, D. (2010). Augmentative and alternative communication In: JH Stone, M Blouin, editors. International Encyclopedia of Rehabilitation. Available online: http://cirrie.buffalo.edu/encyclopedia/en/article/50/
40. Wormnæs, S. & Abdel Malek, Y. (2004). Egyptian speech therapist want more knowledge about augmentative and alternative communication. *Augmentative and Alternative Communication*, 20, 30-41. doi: 10. 1080/ 07434610001629571.
41. World health organization, International classification for functioning, disability, and health. (2002). Towards a Common Language for Functioning, Disability and Health. Retrieved from http://www.who.int/classifications/icf/training/icfbeginnersguide.pdf.

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