

Teachers' perceptions on the role of augmentative and alternative communication systems^{1*}

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Abstract

The number of students using augmentative and alternative communication (AAC) systems in mainstream schools has increased in recent years, in line with the principles of inclusive education. Teacher perceptions of AAC significantly influence school practices and the overall effectiveness of these systems as a tool for communication and inclusion, which can enhance the presence, progress, and participation of students who use it. The present study seeks to analyze these perceptions and find out if aspects such as training or previous experience influence them. To this end, an analysis is conducted using the Spanish Questionnaire “Perceptions on the Inclusion of Students who use AAC in mainstream classrooms (PSIASAAC)” with a sample of 122 teachers from the Spanish Autonomous Community of Valencia. The results show favorable perceptions towards the inclusion of students who use AAC. However, there are notable differences between teachers with and without training and/or professional experience with AAC. The findings align with those of several previous studies conducted in different contexts. This leads us to believe that while there are generally positive perceptions of students who use AAC systems, it is important to intensify efforts in the initial and ongoing training of teachers. It is also crucial to share successful practical experiences demonstrating how the use of AAC systems contributes to improving the educational inclusion of the students who use it.

Keywords

Inclusive education – Teacher training – Teacher perceptions – Augmentative and/or alternative communication systems.

1- Data availability: The data set that supports the results of this study is available at: <https://doi.org/10.5281/zenodo.1068115>

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Introduction

Augmentative and/or alternative communication (AAC) systems provide communication possibilities for individuals who have trouble with speech. These systems are based on structured sets of non-verbal codes, with or without physical supports, which enable users to communicate in various ways (functional, spontaneous, and generalizable), making it easier for them to express themselves and be understood (Gómez-Taibo, 2020; Tamarit, 1989).

The profile of individuals who use AAC systems varies in terms of their physical, cognitive, and communication abilities, as well as the underlying causes that make oral communication challenging without assistance. Currently, it is estimated that approximately 97 million people around the world are potential candidates to benefit from some type of AAC system (Beukelman; Light, 2020). If we consider the large number of AAC users in the current proposals from the inclusive education movement, we can expect a growing presence of AAC in mainstream educational centers. This is because AAC can help create the right conditions for the personal and educational development of students with speech difficulties (Sancho *et al.*, 2018).

The inclusive paradigm proposes a change of perspective. It suggests shifting the focus of attention from students' difficulties to analyzing and evaluating learning contexts. The aim is to detect possible barriers to access, participation, and learning (Booth; Ainscow, 2000). These barriers, understood as the difficulties that students encounter in their environment, can originate from various sources, leading to different classifications. One of these classifications distinguishes between organizational, attitudinal, and knowledge barriers (Darrow, 2009).

Numerous studies have confirmed the existence of organizational barriers, such as the lack of resources to implement inclusive practices (Floyd, 2022; Kakhuta-Materechera, 2020); knowledge barriers, derived from initial teacher training (Giné *et al.*, 2016; Gómez-Marí; Sanz-Cervera; Tárraga-Mínguez, 2021); and attitudinal barriers, related to representations and attitudes closer to the integration paradigm than to inclusion (Lacruz-Pérez; Sanz-Cervera; Tárraga-Mínguez, 2021; Van Steen; Wilson, 2020).

Within these last barriers, teacher perceptions have a significant impact and become a highly relevant variable when it comes to student inclusion indicators. In the specific field of AAC, since the late 1990s, teacher perceptions have been considered one of the most important predictors of their use (Soto, 1997; Stauter; Myers; Classen, 2017). Therefore, studying these perceptions becomes a priority. Many works emphasize the need to promote this type of research in general (Hernández; Marchesi, 2021; Muccio *et al.*, 2014), as well as in the specific area of AAC (Johnston *et al.*, 2020; Ryan *et al.*, 2020), highlighting its relevance. With all this in mind, we find it necessary to delve deeper into the subject and analyze the characteristics that come with these perceptions.

The relevance of teachers' perceptions on the inclusion of students who use AAC

Teacher perceptions on the use of AAC address a complex phenomenon, in which different areas are distinguished. In the current study, we specifically focus on the perceptions of teachers regarding four variables: the importance of the communication environment, the needs of students who use AAC, the usefulness of AAC, and the functions and roles of



teachers in its implementation. First, perceptions on the importance of the communication environment are crucial indicators of how students who use AAC can be included in both educational and social aspects. In this sense, various studies highlight the importance of understanding the value given by teachers to coordinating with families as a vital aspect of the students' communication context. A study carried out with 16 parents participating in a training program (Fäldt *et al.*, 2020), obtained results that highlighted the importance of including the family environment in communication interventions. Along these lines, a study on the myths and realities of AAC (Romski; Sevcik, 2005) concluded that families play a central and crucial role in navigating the introduction of AAC systems. However, in the socio-family environment there is still a general lack of knowledge about the introduction and use of AAC, as indicated by a recent review of 19 documents about perceptions and experiences related to AAC in family environments (Berenguer *et al.*, 2022).

In addition, we must consider the combined efforts of the professionals who serve the students. This implies coordinating closely between each other and establishing and developing shared objectives, aspects closely linked to positive results for the students (Soto *et al.*, 2001; Lillehaug; Klevberg; Stadskleiv, 2023).

Furthermore, incorporating peers as communication partners is also a relevant aspect when it comes to maximizing participation opportunities. This aspect is reflected in previous research carried out in contexts as different as Malaysia (Joginder; Diong; Kamal, 2020), South Africa (Tönsing; Dada, 2016), or the USA (Andzik *et al.*, 2019; Lorang *et al.*, 2022).

For all the above, we recognize how important individual perceptions are in the communication environment for students who use AAC, given how coordination and combined work contribute to their inclusion, as indicated by various reviews of the existing literature (Costigan; Light, 2010; Perfect *et al.*, 2020).

Second, it is relevant to analyze the perceptions in terms of the needs of students who use AAC. Current research indicates that aspects such as the time of introduction or the decrease in disruptive behaviors can give us an idea of the usefulness of these systems.

Regarding the time of introduction, a systematic review conducted in Spain, analyzing over twenty AAC interventions, concludes the importance of early introduction (Pereira; Pérez-Izaguirre; Apaolaza-Llorente, 2019), given that it will benefit the communication-linguistic development of the users (Romski; Sevcik, 2005). Similarly, a recent study with preschool students with motor difficulties highlights the importance of using AAC in the early years of life to ensure their right to access language (Lillehaug; Klevberg; Stadskleiv, 2023).

Regarding disruptive behaviors, different studies have shown that using AAC leads to improved communication and a decrease in these behaviors (Joginder; Diong; Kamal, 2020).

Third, it is interesting to understand the perceptions regarding the usefulness of AAC systems. Research has shown the importance of professionals considering these systems as useful tools when it comes to enhancing the inclusion opportunities of students who use AAC (Aldabas, 2019; Soto *et al.*, 2001). Furthermore, it is important to keep in mind that introducing AAC will enhance the communication development, as well as the independence and social relationships of students with communication difficulties (Lillehaug; Klevberg; Stadskleiv, 2023).

Fourth and final, the relevance of teachers' perceptions on their own functions and roles in the educational environment. Analyzing these perceptions is important because



these individuals are responsible for overseeing activities in which the students who use AAC participate with their peers (Soto *et al.*, 2001), which is a key aspect of inclusion. Furthermore, they also play a crucial role in fostering students' acceptance of differences (Odom *et al.*, 2006), as well as in creating communication opportunities (Suhr *et al.*, 2023).

When studying teacher perceptions, understood as the set of ideas, beliefs, knowledge, and attitudes exhibited by education professionals, they should not be seen as a fixed and unchangeable construct. Instead, they should be viewed as a variable that can be influenced by various factors. For this study, we will address some of the factors explained below.

Factors that can influence teachers' perceptions on the inclusion of students who use AAC

In this research we will focus on three of these factors: teaching in settings where there are students who use AAC, specific training in AAC, and experience with individuals who use AAC.

On the one hand, teaching in settings where AAC systems are used intensively, such as mainstream educational centers with a special unit or those that have special language and communication units (SUMC or SULC hereinafter), plays a relevant role in shaping the perceptions they have on AAC. This is because these spaces, found in mainstream education settings, serve the purposes of advising, training, and raising awareness in the educational community. They function as resource units of the centers. Therefore, these classrooms are considered facilitators of inclusion (Lacruz-Pérez *et al.*, 2021; Peirats; Cortés, 2016).

As indicated in several descriptive studies (Marín; Lizcano; García, 2016; Mascarell-Borreda; Grau-Rubio, 2014), creating classrooms with these characteristics should be accompanied by training aimed at the entire educational team and related to inclusion and attention to diversity (including AAC). However, another study indicated that a large part of the teaching staff in centers with special units barely have knowledge about this subject (Arnaiz-Sánchez *et al.*, 2021). This would make the inclusion of the students who attend these units difficult.

Another influencing factor that will be analyzed is prior training, which is considered a great facilitator of inclusion of students with special educational needs (SEN). This can be seen at different educational stages (Pegalajar; Colmenero, 2017), and with students with needs of a different nature (Ravenscroft *et al.*, 2019).

In the case of students who use AAC, this training is related to a successful implementation, as suggested by a study carried out with 376 professionals in the field of language and speech (Lorang *et al.*, 2022). In this regard, another study, conducted with a sample of 88 Italian teachers (Racici *et al.*, 2018), supports this statement, emphasizing the need for more training in this area, which can, in turn, favor an increase in teachers' confidence in their daily practice (Joginder; Diong; Kamal, 2020).

Lack of training influences teaching attitudes towards students with SEN (Eklund *et al.*, 2020), negatively affecting participation opportunities (Suhr *et al.*, 2023). This could hinder inclusion, according to a study carried out in special education classrooms in 68 mainstream centers in the Spanish region of Murcia (Arnaiz-Sánchez *et al.*, 2023).

The third factor refers to previous experience with individuals who use AAC. We know that living with individuals who use these systems can increase one's sense of competence



in the field, as shown by research carried out in educational systems as diverse as Finland (Eklund *et al.*, 2020) or Israel (Werner *et al.*, 2021). In this regard, the now classic review of 26 studies related to teachers' attitudes towards inclusion (De Boer; Pijl; Minnaert, 2011), also links this previous experience with the development of more inclusive practices.

With all this in mind, based on the importance of teachers' perceptions on AAC, and taking into account the variables that can influence these perceptions, the objectives of this study were: a) to analyze the perceptions of a sample of active teachers regarding the relevance of the communication environment in school settings, the needs of students who use AAC, the usefulness of AAC, and the functions and roles of teachers in the use of AAC; and b) to analyze whether experience in centers with SUMC/SULC, previous training in the field of AAC, and/or previous experience with individuals who use AAC influences the teachers' perceptions regarding the inclusion of these students.

Methodology

Participants

A total of 122 active teachers in mainstream centers in the Valencian Community (Spain) participated in the present study. The main demographic data are summarized in Table 1.

Table 1 - Demographic data of the participants

		Frequency	%
Gender	Woman	101	82.8
	Man	20	16.4
	Not indicated	1	0.8
Age	20-30	42	34.4
	31-40	41	33.6
	41-50	19	15.6
	> 50	20	16.4
Years of experience	0-2	28	23
	3-5	27	22.1
	6-10	10	8.2
	>10	57	46.7
Experience in school with SUMC/SULC	Yes	64	52.5
	No	58	47.5
Experience with students who use AAC	Yes	79	64.8
	No	43	35.2
Specific training in AAC	Yes	56	45.9
	No	66	54.1
TOTAL		122	100

Source: Research data.



Design

The present study is of a non-experimental quantitative nature, based on the comparison of groups. Each comparison has two independent groups and a single measurement for each of the variables.

Instrument

Data collection was carried out using the Perceptions on the Inclusion of Students who use AAC in mainstream classrooms (PSIASAAC), a self-developed instrument designed to get to know teachers' perceptions regarding the inclusion of students who use AAC in mainstream classrooms.

The process of developing the PSIASAAC started with a thorough review of the models that explain how teachers perceive students who use AAC (Joginder; Diong; Kamal, 2020; Ryan *et al.*, 2020; Soto, 1997; Tönsing; Dada, 2016).

Based on these models, a total of 22 items that evaluated different variables related to teachers' perceptions of AAC and its use as a school inclusion tool were developed. The content validity was analyzed through consultation with 6 university teaching experts specializing in the subject (AAC and/or inclusive education), using the method of individual aggregates, who provided their assessment of the coherence, relevance, sufficiency, and clarity of the content items. According to the parameters usually used in terms of content validity (Lawshe, 1975), these values can be considered high (CVI close to 1 in most items), which denotes a great consensus among the judges. Despite this, observations and proposals from experts were incorporated in order to improve the content validity of the instrument.

For construct validity, an exploratory factor analysis (EFA) was carried out and preliminary analyses showed very positive values. The method used to extract factors was a principal components analysis, applying a Promax type oblique rotation. Items with a factor loading of less than .4 were eliminated. The EFA resulted in a 4-factor structure (see Table 2), capable of explaining 71.7% of the total variance. The grouping of the factors is supported by a robust theoretical basis and corresponds to the categories defined a priori during the review phase of the explanatory models.

The final version of the instrument was subjected to a reliability analysis obtaining a Cronbach's alpha coefficient of $\alpha=.821$, which suggests good internal consistency (Nunnally, 1978).

The criterion validity analysis was also carried out by comparing the psychometric properties of the PSIASAAC with a validated instrument about teachers' perceptions of inclusion (Chiner, 2011). The result indicated a statistically significant relationship at the



.01 level (bilateral) between the results of both tests ($r=.291^{**4}$ $p=.002$), which confirms satisfactory results regarding the criterion validity of the PSIASAAC.

To analyze the feasibility of the instrument, a pilot study was developed with the participation of 15 active teachers. The questionnaire was positively valued as an easy-to-understand instrument, with an accessible and agile format.

The final version of the questionnaire consists of a total of 12 Likert-type items with 5 response options (from 1 Strongly disagree to 5 Strongly agree). The total scores of the questionnaire range from 12 to 60 points, with higher values indicating more accurate perceptions of the possibilities of AAC students. Given that the items in factor 2 have an inverse structure, their scores were recalculated to be analyzed together with the rest of the questionnaire.

Overall, the PSIASAAC is, according to the analyses of content validity and psychometric properties, an instrument with robust, feasible, reliable, and valid content to measure teachers' perceptions on the inclusion of students who use AAC, which is why it was used for the current study.

Procedure

The questionnaire was distributed in digital format, using the Microsoft Forms platform. Convenience, non-probabilistic sampling was conducted, distributing the questionnaire among the faculty of educational centers with and without SUMC/SULC classrooms in the same locations.

Data collection took place over 8 weeks. The results were analyzed with the SPSS 25.0 statistical package.

Ethical aspects

All participants completed an informed consent prior to accessing the questionnaire. The project was approved by the Research Ethics Committee of the Catholic University of Valencia (UCV/2020-2021/134).

Results

Descriptive analysis

In order to analyze teacher perceptions on the inclusion of students who use AAC, a general descriptive analysis was conducted on the data obtained.

4-** confidence interval 95%



Table 2 - Descriptive data by item and factor

Factors	Items	Mean	DT
1.Importance of the communication environment.	1. Coordination with the rest of the professionals working with our students who use AAC is very important.	4.73	0.60
	2. A positive attitude of the interlocutors (teachers or classmates) towards the use of AAC favors interaction and increases its frequency.	4.61	0.64
	3. The participation of families in the AAC intervention should be encouraged because of the fundamental role they play in working with the system.	4.69	0.55
	4. The training of classmates in relation to AAC will facilitate the inclusion of students who use the system.	4.54	0.69
2.Needs of students who use AAC.	5. Students who use AAC develop more disruptive behaviors when they have the system available.	3.94	1.02
	6. Accompanying oral language with gestures or images makes it difficult to establish relationships between signifier-meaning.	4.01	1.26
	7. When it comes to students who use AAC, it is not necessary to work on strategies and/or communication methods adapted to various environments.	4.18	0.99
	8. AAC should not be introduced before the age of 3.	3.52	1.02
3.Usefulness of AAC.	9. AAC can be useful in any situation (direct intervention, speech support, speech replacement...).	4.34	0.88
	10. AAC facilitates communication for students who would not be able to communicate without them.	4.26	0.93
4.Functions and roles of teachers.	11. Teachers are more successful when they are confident in their abilities in the field of AAC.	4.01	0.81
	12. Communication is basic for the acquisition of learning, so AAC will be used as a means of access to the curriculum.	4.12	0.80
Total score		50.94	5.79

Source: Research data.



As seen in Table 2, the total score of the questionnaire reaches an average of 50.94 (out of a maximum of 60).

Analyzing each of the items, 10 of the 12 cases have averages greater than 4 points. Only items 1, 2, 3, and 4 belonging to factor 1 "Importance of the communication environment" exceed 4.5 points.

The lowest results are located in the items of factor 2 "Needs of the students who use AAC", specifically in item 5 (with $x=3.94$), and item 8 (with $x=3.52$).

Analysis of factors that influence the perceptions on the inclusion of students who use AAC

The following are the results obtained from the comparisons made. Due to the non-normality of the data (KS $p= .005$), non-parametric analyses were carried out in the group comparisons using the Mann-Whitney U test, as they were independent groups (De Diego; Vega, 2013).

First, the influence of working in schools with SUMC/SULC is analyzed, the data is collected in Table 3. The existence of significant differences in the scores of factors 1 and 3, as well as the total score is confirmed. In all three cases, the group with experience in centers with special units shows a more adjusted perception of the use of AAC. The Hedges' G statistic shows, on the total scores, a medium effect size (Hedges' $G =0.426$).

Table 3 - Influence of experience in schools with SUMC/SULC

Factors	I have experience in schools with SUMC/SULC (n= 64)		I do not have experience in schools with SUMC/SULC (n= 58)		Mann-Whitney U	Z	Q asymptotic sig. (bilateral)
	Mdn	IQR	Mdn	IQR			
F1	20.00	1.00	19.00	3.00	1394,000	-2,551	.011
F2	17.00	5.00	16.00	4.00	1507,500	-1,798	.072
F3	9.00	2.00	8.00	3.00	1449,000	-2,174	.030
F4	8.00	2.75	8.00	2.00	1575,500	-1,491	.136
TS	52.50	8.75	50.00	8.25	1368,000	-2,506	.012

F1: Importance of the communication environment; F2: Needs of the students who use AAC; F3: Usefulness of AAC; F4: Teaching functions and roles; TS: Total score.

Source: Research data.

Regarding the comparison of the groups with and without previous experience with students who use AAC, Table 4 shows significant differences in the 4 factors, as well as in the total score, so that the group that has previous experience with students who use AAC presents a more adjusted perception of the use of AAC. The effect size suggests, at the total score level, a medium-high effect (Hedges' $G =0.622$).



Table 4 - Influence of previous experience with students who use AAC

Factors	Previous experience with students who use AAC (n= 79)		No previous experience with students who use AAC (n= 43)		Mann-Whitney U	Z	Q asymptotic sig. (bilateral)
	Mdn	IQR	Mdn	IQR			
	F1	20.00	1.00	18.00			
F2	17.00	4.00	16.00	4.00	1261,000	-2,360	.018
F3	9.00	2.00	8.00	3.00	1105,000	-3,314	.001
F4	8.00	2.00	8.00	1.00	1088,500	-3,388	.001
TS	53.00	7.00	50.00	7.00	1085,500	-3,291	.001

F1: Importance of the communication environment; F2: Needs of students who use AAC; F3: Usefulness of AAC; F4: Teaching functions and roles; TS: Total score.
Source: Research data.

Finally, regarding the influence of AAC training on teachers’ perceptions of the use of these systems in schools, Table 5 shows that participants with previous training obtained significantly higher scores in the 4 factors of the questionnaire and in the total score. The effect size, once again, exceeds 0.5, which is why it is considered between medium and high (Hedges’ $G = 0.59$).

Table 5 – Influence of training in AAC

Factors	Training in AAC (n= 56)		No training in AAC (n= 66)		Mann-Whitney U	Z	Q asymptotic sig. (bilateral)
	Mdn	IQR	Mdn	IQR			
F1	20.00	1.00	19.00	3.00	1479,000	-2,042	.041
F2	17.00	3.00	16.00	4.00	1244,000	-3,123	.002
F3	9.50	1.75	8.00	2.25	1226,000	-3,329	.001
F4	8.00	2.00	8.00	1.25	1227,000	-3,307	.001
TS	54.00	9.50	50.00	7.00	1179,000	-3,443	.001

F1: Importance of the communication environment; F2: Needs of students who use AAC; F3: Usefulness of AAC; F4: Teaching functions and roles; TS: Total score.
Source: Research data.



Discussion

The first objective of this study was to examine teachers' perception on various factors related to the role of AAC in promoting inclusive education for the students who use it. The analysis of the results leads to conclusions that can be considered, in general terms, as positive, given that the average of all the items is at high values (10 of the 12 items with an average greater than 4 out of a maximum of 5). This result suggests that teachers harbor favorable perceptions towards the inclusion of students who use augmentative and/or alternative communication systems, which coincides with previous studies that have analyzed these same perceptions (Lacruz-Pérez; Fernández-Andrés; Tárraga-Mínguez, 2022; Van Steen; Wilson, 2020).

The highest scores are found in the items grouped under the communication environment. Combined work is perceived as relevant, in line with various previous results (Lillehaug; Klevberg; Stadskleiv, 2023; Perfect *et al.*, 2020; Romski; Sevcik, 2005), which may favor coordination between professionals, a key aspect in the successful implementation of AAC (Aldabas, 2019; Andzik *et al.*, 2019).

The factor "needs of students who use AAC" collects the lowest scores, possibly due to a lack of understanding of the potential of these systems or the complexity involved in their implementation (Berenguer *et al.*, 2022).

The second objective of the study, which we consider to be the richest contribution of this work, was to analyze whether experience in schools with SUMC/SULC, previous training in AAC, and/or previous experience with students who use AAC influence the perceptions on the inclusion of students who use these systems.

The results indicate that previous work in schools with SUMC/SULC has a certain impact on shaping these perceptions. In this regard, the perceptions on the use of AAC by teachers with experience in these schools were higher than those of teachers with no experience in two of the four factors of the questionnaire, specifically those referring to the importance of the communication environment and the usefulness of the AAC systems. Several previous studies show that having worked in this type of school gives teachers basic notions to deal with students enrolled in the SUMC/SULC (Marín; Lizcano; García, 2016). This can lead to interpreting AAC as being more useful and giving more importance to the communication environment of the students. However, different studies indicate that these schools do not offer a total inclusion of the students (Mascarell-Borreda; Grau-Rubio, 2014), due to the presence, still, of numerous barriers. The lack of knowledge among the generalist teachers at these centers about how these units operate is one of the barriers (Arnaiz-Sánchez *et al.*, 2021; Lacruz-Pérez *et al.*, 2021). This may explain the lack of significant differences between teachers with and without experience in this type of schools in the factors related to the needs of the students who use AAC and to the teachers' own functions regarding the use of these communication support systems.

The second variable, prior training, constitutes a facilitator of more appropriate perceptions on the inclusion of this student body. The lack of knowledge regarding students with special educational needs (both at a general level and in reference to AAC) is one of the biggest obstacles to inclusion (Eklund *et al.*, 2020; Lorang *et al.*, 2022; Ravenscroft *et*



al., 2019), given that it results in the lack of tools to respond to diversity (Arnaiz-Sánchez *et al.*, 2023). Having the necessary training contributes to the development of more positive attitudes towards inclusion (Pegalajar; Colmenero, 2017). This helps with the correct implementation of AAC systems (Radici *et al.*, 2018; Soto *et al.*, 2001; Suhr *et al.*, 2023), which plays a key role in the inclusion of students who use AAC in mainstream schools. The results of this study confirm the importance of teacher training in the use of AAC as a predictor of favorable perceptions on the use of these systems as a tool for inclusion.

Finally, regarding the analysis of the influence of previous teaching experience with students who use AAC, the results show that this experience is significantly associated with a more favorable perception of the use of AAC. These results coincide with previous studies in which teachers with previous experience with individuals with functional diversity had greater confidence working with students with disabilities (Stavroussi; Didaskalou; Green, 2020). Likewise, other studies confirm the existence of more positive attitudes towards inclusion in teachers who have had previous contact with students with special educational needs (Ravenscroft *et al.*, 2019; Lacruz-Perez; Fernández-Andrés; Tárraga-Mínguez, 2022; Tárraga-Mínguez *et al.*, 2021). More specifically, in the area of AAC there are also studies that confirm the influence of previous life experiences on teacher perceptions (Radici *et al.*, 2018).

The current study shows that training and prior experience with students who use AAC (directly or as being part of a school that attends to this type of student) are significant factors in shaping perceptions favoring the inclusion of these students.

The research conducted has some limitations that must be taken into account when interpreting the obtained results. First, the need for part of the sample to have previous experience with students who use AAC means that the sample size is relatively small. Furthermore, the sample is only from the Valencian Community, so the results are not generalizable to other autonomous communities. Furthermore, it should be noted that only a quantitative instrument was used, and was evaluated at a single point in time.

Likewise, the confirmation of the factorial grouping of the instrument at a theoretical level leads us to think that carrying out a CFA would not be a priority (Pérez-Gil; Chacon; Moreno, 2000). However, we consider that it could be a limitation of the study, and it would be interesting to conduct this type of analysis in future studies.

Therefore, future avenues of research could include the analysis of teachers' perceptions of the role of AAC systems in other autonomous communities, using qualitative tools and longitudinal designs. Similarly, in the current study we have focused particularly on teacher perceptions. In this regard, future lines of research could analyze what these same perceptions are like in other relevant agents in the communication context of students who use AAC, such as other educational professionals or the families themselves.

Conclusions

The results of this study lead us to conclude that, although teachers' perceptions on the use of AAC are, in general terms, positive, there are two variables that contribute



to optimizing these perceptions and, therefore, can become catalysts for good practices. These two variables are training and previous experience with AAC.

We believe that these conclusions provide a strong argument to support the investment in additional resources to enhance the training of teachers in using AAC. This training can result in increasing teaching self-efficacy and, most importantly, improving the educational inclusion of students who use AAC. Additionally, we consider it crucial to share successful practical experiences demonstrating the use of AAC systems. This would encourage an increasing number of professionals to learn about the potential of these systems when they are well designed and implemented.

These efforts must be based on a thorough analysis of the training curricula for generalist teachers (not just specialists) and the design of training policies in accordance with the principles of inclusive education.

References

ALDABAS, Rashed. Barriers and facilitators of using augmentative and alternative communication with students with multiple disabilities in inclusive education: special education teachers' perspectives. **International Journal of Inclusive Education**, London, v. 25, n. 9, p. 1010-1026, sep. 2019. <https://doi.org/10.1080/13603116.2019.1597185>

ANDZIK, Natalie R. *et al.* AAC services in schools: A special educator's perspective. **International Journal of Developmental Disabilities**, London, v. 65, n. 2, p. 89-97, sep. 2019. <https://doi.org/10.1080/20473869.2017.1368909>

ARNAIZ-SÁNCHEZ, Pilar *et al.* Formación del profesorado para la construcción de aulas abiertas a la inclusión. **Revista de Educación**, Madrid, v. 393, p. 37-67, jul./sep. 2021. <https://doi.org/10.4438/1988-592X-RE-2021-393-485>

ARNAIZ-SÁNCHEZ, Pilar *et al.* Barriers to educational inclusion in initial teacher training. **Societies**, Basilea, v. 13, n. 2, p. 31-44, ene. 2023. <https://doi.org/10.3390/soc13020031>

BERENQUER, Carmen *et al.* Parents' perceptions and experiences with their children's use of augmentative/alternative communication: A systematic review and qualitative meta-synthesis. **International Journal of Environmental Research and Public Health**, Basilea, v. 19, n. 13, p. 8091-8110, jul. 2022. <https://doi.org/10.3390/ijerph19138091>

BEUKELMAN, David R.; LIGHT, Janice C. **Augmentative & alternative communication**. Supporting children and adults with complex communication needs. 5. ed. Baltimore: Paul H Brookes, 2020.

BOOTH, Tony; AINSCOW, Mel. **Index for inclusion**. Bristol: Centre for Studies on Inclusive Education, 2000.

CHINER, Esther. **Las percepciones y actitudes del profesorado hacia la inclusión del alumnado con necesidades educativas especiales como indicadores del uso de prácticas educativas inclusivas en el aula**. Alicante: Universidad de Alicante, 2011.



COSTIGAN, Aileen; LIGHT, Janice. A review of preservice training in augmentative and alternative communication for speech-language pathologists, special education teachers, and occupational therapists. **Assistive Technology**, London, v. 22, n. 4, p. 200-212, nov. 2010. <https://doi.org/10.1080/10400435.2010.492774>

DARROW, Alice-Ann. Barriers to effective inclusion and strategies to overcome them. **Journal of General Music Education**, Reston, v. 22, n. 3, p. 29-31, abr. 2009. <https://doi.org/10.1177/1048371309333145>

DE BOER, Anke; PIJL, Sip J.; MINNAERT, Alexander. Regular primary schoolteachers' attitudes towards inclusive education: A review of the literature. **International Journal of Inclusive Education**, London, v. 15, n.3, p. 331-353, mar. 2011. <https://doi.org/10.1080/13603110903030089>

DE DIEGO, Raquel; VEGA, José. Contraste de hipótesis comparación de dos medias independientes mediante pruebas no paramétricas: Prueba U de Mann-Whitney. **Revista Enfermería Del Trabajo**, Madrid, v. 3, n. 2, p. 77-84, abr. 2013. <https://dialnet.unirioja.es/descarga/articulo/4327652.pdf>

EKLUND, Gunilla *et al.* A study of Finnish primary school teachers' experiences of their role and competences by implementing the three-tiered support. **European Journal of Special Needs Education**, London, v. 36, n. 5, p. 729-742, mayo 2021. <https://doi.org/10.1080/08856257.2020.1790885>

FÄLDT, Anna *et al.* "All of a sudden we noticed a difference at home too": parents' perception of a parent-focused early communication and AAC intervention for toddlers. **Augmentative and Alternative Communication**, London, v. 36, n. 3, p. 143-154, oct. 2020. <https://doi.org/10.1080/07434618.2020.1811757>

FLOYD, Candra B. Organizational barriers to equity: stories from Virginia Gifted education coordinators. **Roeper Review**, London, v. 44, n. 4, p. 212-230, oct. 2022. <https://doi.org/10.1080/02783193.2022.2115177>

GINÉ, Climent *et al.* Early childhood inclusion in Spain. **Infants & Young Children**, Alphen aan den Rijn, v. 29, n. 3, p. 223-230, jul./sep. 2016. <https://doi.org/10.1097/IYC.0000000000000068>

GÓMEZ-MARÍ, Irene; SANZ-CERVERA, Pilar; TÁRRAGA-MÍNGUEZ, Raúl. Teachers' knowledge regarding autism spectrum disorder (ASD): A systematic review. **Sustainability**, Basilea, v. 13, n. 9, p. 5097-5120, mayo 2021. <https://doi.org/10.3390/su13095097>

GÓMEZ-TAIBO, María Luisa. **Comunicación simbólica: comunicación aumentativa y alternativa**. Madrid: Pirámide. 2020.

HERNÁNDEZ, Laura; MARCHESI, Álvaro. Actitudes de los maestros ante la inclusión educativa en Colombia, Guatemala y España. **Ciencia y Educación**, Santo Domingo, v. 5, n. 1, p. 7-24, mar. 2021. <https://doi.org/10.22206/cyed.2021.v5i1.pp7-24>

JOGINDER, Susheel J.; DIONG, Zhi Z.; KAMAL, Rahayu M. Malaysian teachers' experience using augmentative and alternative communication with students. **Augmentative and Alternative Communication**, London, v. 36, n. 2, p. 107-117, jul. 2020. <https://doi.org/10.1080/07434618.2020.1785547>

JOHNSTON, Susan S. *et al.* Opportunity barriers and promising practices for supporting individuals with complex communication needs. **Current Developmental Disorders Reports**, Cham, v. 7, n. 3, p. 100-108, sep. 2020. <https://doi.org/10.1007/s40474-020-00195-w>



KAKHUTA-MATERECHERA, Ellen. Inclusive education: why it poses a dilemma to some teachers. **International Journal of Inclusive Education**, London, v. 24, n. 7, p. 771-786, jul. 2020. <https://doi.org/10.1080/13603116.2018.1492640>

LACRUZ-PÉREZ, Irene; FERNÁNDEZ-ANDRÉS, Inmaculada; TÁRRAGA-MÍNGUEZ, Raúl. Actitudes de los docentes hacia la educación inclusiva. Análisis de las variables que influyen en su configuración. **Universidad-Verdad**, Cuenca, v. 1, p. 44-57, jun. 2022. <https://doi.org/10.33324/uv.vi80.515>

LACRUZ-PÉREZ, Irene; SANZ-CERVERA, Pilar; TÁRRAGA-MÍNGUEZ, Raúl. Teachers' attitudes toward educational inclusion in Spain: A systematic review. **Education Sciences**, Basilea, v. 11, n. 2, p. 58-74, feb. 2021. <https://doi.org/10.3390/educsci11020058>

LACRUZ-PÉREZ, Irene *et al.* Análisis de conocimientos sobre aulas de comunicación y lenguaje de futuros/as maestros/as. **Revista Fuentes**, Sevilla, v. 23, n. 1, p. 53-63, ene. 2021. <https://doi.org/10.12795/revistafuentes.2021.v23.i1.12291>

LAWSHE, Charles H. A quantitative approach to content validity. **Personnel Psychology**, Malden, v. 28, n. 4, p. 563-575, dic. 1975. <https://doi.org/10.1111/j.1744-6570.1975.tb01393.x>

LILLEHAUG, Hilde Aven; KLEVBORG, Gunvor Lilleholt; STADSKLEIV, Kristine. Provision of augmentative and alternative communication interventions to Norwegian preschool children with cerebral palsy: are the right children receiving interventions. **Augmentative and Alternative Communication**, London, p. 1-11, mayo 2023. <https://doi.org/10.1080/07434618.2023.2212068>

LORANG, Emily *et al.* Speech-language pathologists' practices in augmentative and alternative communication during early intervention. **Augmentative and Alternative Communication**, London, v., 38, n. 1, p. 41-52, abr. 2022. <https://doi.org/10.1080/07434618.2022.2046853>

MARÍN, Diana; LIZCANO, Laura; GARCÍA, Cristina. Las aulas de comunicación y lenguaje: Características y formación del profesorado. **Quaderns digitals: Revista de Nuevas Tecnologías y Sociedad**, Valencia, v. 83, n. 1, p. 55-65, nov. 2016. <https://dialnet.unirioja.es/servlet/articulo?codigo=5794965>

MASCARELL-BORREDA, Alba; GRAU-RUBIO, Claudia. Aula de comunicación y lenguaje en los centros de educación infantil y primaria: un estudio de caso. **Quaderns Digitals**, Valencia, v. 78, n. 4, p. 1-10, abr. 2024. <https://roderic.uv.es/handle/10550/40838>

MUCCIO, Leah S. *et al.* Head Start instructional professionals' inclusion perceptions and practices. **Topics in Early Childhood Special Education**, Austin, v. 34, n. 1, p. 40-48, ene. 2014. <https://doi.org/10.1177/0271121413502398>

NUNNALLY, Jum C. **Psychometric theory**. 2. ed. New York: McGraw-Hill, 1978.

ODOM, Samuel L. *et al.* Social acceptance and rejection of preschool children with disabilities: A mixed-method analysis. **Journal of Educational Psychology**, Washington, DC, v. 98, n. 4, p. 807-823, nov. 2006. <https://doi.org/10.1037/0022-0663.98.4.807>



PEGALAJAR, María del Carmen; COLMENERO, María Jesús. Actitudes y formación docente hacia la inclusión en educación secundaria obligatoria. **Revista Electrónica de Investigación Educativa**, Mexicali, v. 19, n. 1, p. 84-97, ene. 2017. <https://doi.org/10.24320/redie.2017.19.1.765>

PEIRATS, José; CORTÉS, Silvia. El proceso de inclusión en un aula de comunicación y lenguaje: percepciones de la comunidad educativa. **Revista Electrónica Interuniversitaria de Formación del Profesorado**, Murcia, v. 19, n. 3, p. 91-102, sep. 2016. <https://doi.org/10.6018/reifop.19.3.267271>

PEREIRA, María M.; PÉREZ-IZAGUIRRE, Elizabeth; APAOLAZA-LLORENTE, Dorleta. Systems of Augmentative and Alternative Communication (SAACs) in Spain: A systematic review of the educational practices conducted in the last decade. **Social Sciences**, Basilea, v. 8, n. 1, p. 15-25, ene. 2019. <https://doi.org/10.3390/socsci8010015>

PÉREZ-GIL, José Antonio; CHACÓN, Salvador; MORENO, Rafael. Validez de constructo: el uso de análisis factorial exploratorio-confirmatorio para obtener evidencias de validez. **Psicothema**, Oviedo, v. 12, n. 2, p. 442-446, 2000. <https://www.psicothema.com/pdf/601.pdf>

PERFECT, Erin *et al.* A systematic review investigating outcome measures and uptake barriers when children and youth with complex disabilities use eye gaze assistive technology. **Developmental Neurorehabilitation**, London, v. 23, n. 3, p. 145-159, mar. 2020. <https://doi.org/10.1080/17518423.2019.1600066>

RADICI, Elena *et al.* Teachers' attitudes towards children who use AAC in Italian primary schools. **International Journal of Disability, Development and Education**, London, v. 66, n. 3, p. 284-297, mayo 2019. <https://doi.org/10.1080/1034912X.2018.1495321>

RAVENSCROFT, John *et al.* Factors that influence elementary school teachers' attitudes towards inclusion of visually impaired children in Turkey. **Disability & Society**, London, v. 34, n. 4, p. 629-656, abr. 2019. <https://doi.org/10.1080/09687599.2018.1561355>

ROMSKI, MaryAnn; SEVCIK, Rose A. Augmentative communication and early intervention: myths and realities. **Infants & Young Children**, Alphen aan den Rijn, v. 18, n. 3, p. 174-185, jul. 2005. <https://doi.org/10.1097/00001163-200507000-00002>

RYAN, Stephen E. *et al.* Functional impact of augmentative and alternative communication scale: development of an outcome measure for educators of students with complex communication needs. **Disability and Rehabilitation**, London, v. 18, n. 2, p. 215-226, mar. 2023. <https://doi.org/10.1080/17483107.2020.1842917>

SANCHO, Elvira *et al.* **Comunicació augmentativa en un context escolar inclusiu**. El procés educatiu d'un alumne amb discapacitat intel·lectual. Barcelona: Universitat de Barcelona. 2018.

SOTO, Gloria. Special education teacher attitudes toward AAC: preliminary survey. **Augmentative and Alternative Communication**, London, v. 13, n. 3, p. 186-197, jul. 1997. <https://doi.org/10.1080/07434619712331278008>

SOTO, Gloria *et al.* Professional skills for serving students who use AAC in general education classrooms: A team perspective. **Language, Speech, and Hearing Services in Schools**, Rockville, v. 32, n. 1, p. 51-56, ene. 2001. [https://doi.org/10.1044/0161-1461\(2001/005\)](https://doi.org/10.1044/0161-1461(2001/005))



STAUTER, Donna W.; MYERS, Sarah R.; CLASSEN, Audra I. Literacy instruction for young children with severe speech and physical impairments: A systematic review. **Journal of Occupational Therapy, Schools, & Early Intervention**, London, v. 10, n. 4, p. 389-407, oct. 2017. <https://doi.org/10.1080/19411243.2017.1359132>

STAVROUSSI, Panayiota; DIDASKALOU, Eleni; GREEN, Jennifer. Are teachers' democratic beliefs about classroom life associated with their perceptions of inclusive education? **International Journal of Disability, Development and Education**, London, v. 68, n. 5, p. 627-642, sep. 2021. <https://doi.org/10.1080/1034912X.2020.1716961>

SUHR, Meredith *et al.* The influence of classroom context on AAC device use for nonspeaking school-aged autistic children. **International Journal of Speech-Language Pathology**, Sydney, p. 1-11, jul. 2023. <https://doi.org/10.1080/17549507.2023.2220992>

TAMARIT, Javier. Uso y abuso de los sistemas alternativos de comunicación. **Comunicación, Lenguaje y Educación**, Madrid, v. 1, n. 1, p. 81-94, ene. 1989. <https://doi.org/10.1080/02147033.1989.10820868>

TÁRRAGA-MÍNGUEZ, Raúl *et al.* Educación inclusiva en Ecuador: perspectiva de directores, familias y evaluadores. Magis, **Revista Internacional de Investigación en Educación**, Bogotá, v. 14, n. 1, p. 1-21, ene. 2021. <https://doi.org/10.11144/Javeriana.m14.eiep>

TÖNSING, Kerstin M.; DADA, Shakila. Teachers' perceptions of implementation of aided AAC to support expressive communication in South African special schools: A pilot investigation. **Augmentative and Alternative Communication**, London, v. 32, n. 4, p. 282-304, oct. 2016. <https://doi.org/10.1080/07434618.2016.1246609>

VAN STEEN, Tommy; WILSON, Claire. Individual and cultural factors in teachers' attitudes towards inclusion: A meta-analysis. **Teaching and Teacher Education**, Amsterdam, v. 95, n. 1, p. 103127-103137, oct. 2019. <https://doi.org/10.1016/j.tate.2020.103127>

WERNER, Shirli *et al.* Can self-efficacy mediate between knowledge of policy, school support and teacher attitudes towards inclusive education? **PloS One**, San Francisco, v. 16, n. 9, p. e0257657-e0257674, sep. 2021. <https://doi.org/10.1371/journal.pone.0257657>

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