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Development of an Integrated Aided Language Stimulation (ALS) Intervention Model to Improve Expressive Communication in Autistic Children at UPTD Disability Services Sidoarjo

Andy Eko Setyadi[1], Pamuji[2], Sujarwanto[3]
[1,2,3]State University of Surabaya, Surabaya, Indonesia

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ABSTRACT

Children with autism spectrum disorder (ASD) often experience difficulties in expressive communication, including requesting, responding, expressing needs, initiating interaction, and maintaining communication. This study aimed to develop an Intervention Model Integrated Aided Language Stimulation (ALS) with Augmentative and Alternative Communication (AAC) to support expressive communication among autistic children at UPTD Services Disability Sidoarjo, Indonesia. The study employed a Research and Development approach using the Four-D model comprising Define, Design, Develop, and Disseminate stages. The developed model integrated AAC media, ALS language modeling, functional communication activities, communication opportunities, partner responsiveness, reinforcement, generalization, and evaluation. Expert validation involved four validators representing four areas of expertise: subject matter, special education/autism, communication/AAC, and media. The validation percentage was calculated by dividing the obtained score by the maximum possible score and multiplying by 100%, resulting in 90.5% (very valid). Practicality was assessed through responses from teachers, therapists, and/or companions using the same percentage formula, resulting in 90% (very practical), while implementation was assessed through structured observation and reached 91% (very good). A one-group pretest-posttest limited trial involving five autistic children showed an increase in expressive communication scores from 42/100 (mean = 4.2) to 76/100 (mean = 7.6). The mean N-Gain was 0.65, categorized as moderate improvement according to the study criteria. Because the limited trial involved only five children and did not include a control group, the observed improvement should not be interpreted as definitive evidence of intervention effectiveness. Overall, the findings support the model's feasibility for further investigation with larger samples and more rigorous comparative designs.

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Corresponding Author:

Listy Lestari
English Education Study Program, Faculty of Teacher Training and Education, Tadulako University, Palu, Indonesia
Email: listylestari.id@gmail.com

1. INTRODUCTION

Children with Autism Spectrum Disorder (ASD) are individuals with a neurodevelopmental disorder characterized by delays in social communication and interaction, as well as patterned behaviors, interests, or Restricted and repetitive activities. The characteristics of ASD are very diverse, so abilities and needs support every child differently. WHO [1] confirms that individual autistic people have diverse and necessary needs, requiring customized support for their condition. One important aspect that needs to be developed is communication ability because it plays a role in conveying needs, interacting, learning, and participating in daily life. Keeffe and McNally [2] state that children with ASD can experience obstacles in social communication, while Logan and Logan [3] show that the use of Augmentative and Alternative Communication (AAC) can support various communication functions for children with ASD. Thus, communication development needs to be done individually and sustainably in accordance with the child's characteristics and needs to support independence, social participation, and quality of life.

Children with autism can experience obstacles in receptive and expressive communication. Expressive communication is related to the ability to convey needs, desires, ideas, feelings, and responses through verbal and nonverbal communication. Mués [4] explains that language ability in children with autism is very diverse, including in the expressive aspect. Common obstacles found include speech delay, limited vocabulary, difficulty forming sentences, echolalia, and low initiative in communication. McDaniel [5] shows that responsive intervention can support language development in children with autism. Therefore, expressive communication ability needs to be developed through structured, consistent, individualized, and user - oriented interventions, in a way that is functional in daily life.

Obstacles to expressive communication in children with autism can influence development of social, emotional, and behavioral difficulties. Inability to convey needs, desires, rejections, feelings, and requests for help can cause frustration and trigger behavior that is not adaptive enough. Ghaemmaghami [6] explains that functional communication can be used as replacement behavior for problematic behavior, while Walker [7] shows that Functional Communication Training (FCT) and Augmentative and Alternative Communication (AAC) can help increase communication and, at the same time, reduce challenging behavior. In addition, the ability to communicate socially plays an important role in supporting interaction and participation of children with autism in the educational environment. Therefore, intervention communication should not only focus on ability to produce words or symbols, but also on using communication in a way that is functional in everyday life, such as asking, refusing, choosing, requesting help, and interacting with other people. This is supported by Ganz [8], which shows that augmentative and alternative communication (AAC) interventions can increase various functional communication skills in children with autism, while Chezan [9] emphasizes the importance of functional communication training that can be implemented in a school setting.

The relationship between ALS and Vygotsky's Zone of Proximal Development (ZPD) provides a theoretical explanation for the role of communication partners in this

intervention. Vygotsky's concept of the ZPD emphasizes that learning can occur through appropriate assistance from a more capable partner when a learner performs tasks that cannot yet be completed independently. In the context of ALS, teachers, therapists, companions, and other communication partners provide this assistance by modeling AAC symbols together with spoken language, creating communication opportunities, responding to children's communication attempts, expanding their messages, and providing reinforcement. These actions function as scaffolding because support is provided according to the child's current communication ability and can gradually be adjusted as the child becomes more capable of communicating independently. Thus, ALS can be theoretically understood as a scaffolded communication process in which children receive accessible language input and repeated opportunities to practice communication within meaningful interactions.

This theoretical connection is particularly relevant because expressive communication development requires more than exposure to communication symbols. Children need opportunities to observe appropriate communication models, attempt communication, receive responsive feedback, and use communication repeatedly in different contexts. Accordingly, the present model positions communication partners as active facilitators rather than passive providers of communication materials. ALS modeling supplies language input, AAC provides an accessible representation of that language, communication opportunities allow children to initiate or respond, partner responsiveness provides immediate interactional support, and reinforcement encourages continued communication attempts. Expansion and generalization subsequently provide opportunities for children to extend their communication from individual responses to broader functional messages and different everyday situations. This sequence provides a direct theoretical link between the principles of scaffolding and the components of the integrated ALS-AAC intervention model. Vygotsky's [10] theory, in particular the concept of the Zone of Proximal Development (ZPD), emphasizes that children develop their abilities through social interaction and assistance (scaffolding) from more competent individuals. This principle is relevant to intervention communication for autistic people who need support in a way that is gradual, consistent, and appropriate to individual abilities. Research previously shows that AAC use, prompting, modeling language, visual support, and parent and partner involvement can support communication development in children with autism [11], [12], [13]. Thus, teachers, therapists, companions, and parents can play a role as partners communication that provide language models, communication opportunities, reinforcement, and meaningful activities to help increase ability of children with autism to communicate expressively.

One relevant approach is Aided Language Stimulation (ALS), which is a strategy in Augmentative and Alternative Communication (AAC) that uses modeling Language with combined verbal and symbolic or communication media. Sennott [14] explains ALS as a strategy undertaken with modeling use of symbol communication during ongoing interaction. Binger and Binger [15] also placed ALS as technique for modeling Language through use of symbol communication simultaneously with speech so that the child gets a concrete example of the connection between language, symbols, and meaning. Beukelman

[16] emphasizes that symbol model provision in a way consistent in various contexts of communication can help children understand and use symbol communication in a more functional way. Thus, ALS not only provides visual media, but also provides language input that can be used by the observed child in real communication situations.

Problems are more important based on condition at UPTD Services Disability Sidoarjo, which shows that a number of children with autism still experience obstacles in expressive communication in the form of limited vocabulary, difficulties disclosing desires and needs, low initiative in communication, as well as dependence on teacher assistance or therapist. This is in line with research that shows that the use of Augmentative and Alternative Communication (AAC) can support functional communication for children with autism [11], especially if combined with naturalistic and activity-based everyday life [17]. Modeling symbols by adults can also increase chance that children can communicate in a functional way [18]. However, the use of communication visual assistance and Aided Language Stimulation (ALS) at UPTD has not yet been implemented optimally and consistently. Therefore, systematic and practical guidelines are necessary for interventions that integrate visual media, modeling symbols through ALS, and daily activities to increase expressive communication as well as independence in children with autism.

Based on this condition, there is a research gap in the form of not-yet-available intervention models integrated with ALS, which are specifically developed based on the needs of children with autism in UPTD Services Disability Sidoarjo and combine AAC media, modeling language, activities communication functional, partner communication, environment intervention, procedure implementation, generalization, and evaluation ability communication expressive. Research this because it not only implements ALS as technique for modeling symbols, but also develops ALS into a systematic and adaptive intervention model. The model developed is directed to increase a child's ability to ask, choose, answer, or respond; convey needs and wants; ask for help; get started with communication; use vocabulary or symbols, as well as maintain interactive communication. Development was done through Research and Development approach with a 4D model that includes Define, Design, Develop, and Disseminate. The resulting product includes intervention models, book guides, visual communication media /AAC, scenario activities, instruments for evaluation of communication and expressive language, observation sheets for implementation, as well as a user response sheet.

Thus, the research "Development of an Intervention Model Integrated Aided Language Stimulation (ALS) for Increasing Communication Expressive Autistic Children in UPTD Services Disability Sidoarjo" is important as an effort to produce a valid, practical, implementable, and effective intervention model in support of developing expressive communication in autistic children. The novelty of the study lies in the integration of ALS with AAC media, functional communication activities, role partner communication, environmental intervention, provision of chance communication, responsiveness, reinforcement, generalization, and evaluation in one customized model with characteristics and needs of autistic children. The model is expected not only to help children use symbols, but to push children to use communication in a way that is functional in real situations, to convey needs, and to build interaction with other people. Thus, this

research is expected to give theoretical contributions to the development of ALS and AAC studies and practical contributions for teachers, therapists, companions, parents, and UPTD Services Disability Sidoarjo in making intervention more communication-systematic and sustainable.

2. METHOD

2.1 Types and Approaches Study

This study is Research and Development (R&D). According to Sugiyono [19], R&D method is used to produce product, specify it, and test the product's effectiveness. This research aims to generate Intervention Model Integrated Aided Language Stimulation (ALS) to increase expressive communication in autistic children in UPTD Services Disability Sidoarjo, which is equipped with a book guide, communication media based on Augmentative and Alternative Communication (AAC), intervention procedures, activity communication functions, and evaluation instruments. The development model used is the 4-D model (Four-D Model) of Thiagarajan [20], which includes Define, Design, Develop, and Disseminate stages. This model was chosen because it has systematic stages starting from needs analysis, design, development, and validation, to testing, revision, and dissemination of the product.

2.2 Place and Subject Study

The study was implemented at the Service UPTD Disability Sidoarjo. Selection location was based on suitability characteristics for service with objective of model development, namely availability of services for autistic children who have need for expressive communication development. The study consists of one subject: validation experts and test subjects of the model. Subject selection was done based on competencies, characteristics, and suitability for objective model development.

a. Subject Expert Validation Validators are selected purposively, based on competence, academic or professional experience, as well as relatedness to the field and skills with developed products. Validators consist of:
    i. Subject matter experts, who assess the suitability of the intervention material with objectives and indicators for communication in children with autism.
    ii. Special Education/autism specialist, who assesses model suitability with characteristics, needs, and principles of service for children with autism.
    iii. Communication /AAC specialist, who assesses accuracy of AAC use, modeling strategies, language, selection of symbols, as well as functional communication.
    iv. Media experts, who assess quality, readability, appearance, clarity of symbols, and convenience of use of communication media.
b. Test Subject: Test subjects are children with autism aged 6–12 years who participated in services at UPTD Services Disability Sidoarjo. Subjects were chosen based on characteristics targeted by the research and the existence of obstacles in expressive communication. The trial was used to obtain data regarding model feasibility, practicality, user response, as well as changes in expressive communication ability after the model is applied.

b. Procedure Model Development

Intervention Model Development: Integrated ALS uses a 4-D model, which consists of four stages: Define, Design, Develop, and Disseminate. Fourth stage is explained as follows.

i. Stage (Definition): The definition stage aims to identify the condition's beginning, characteristics, needs, and communication problems in expressive child autism that become the target of research. Analysis needs to be done through observation and interviews with teachers, therapists, and/ or companion.

ii. Aspects analyzed cover the child's ability to communicate, the forms of communication used, communication obstacles, AAC use, vocabulary or symbols that are known, activity communication with children, abilities to respond, ability to start communication, roles of communication partners, as well as need for the intervention model. Analysis results need to become the basis for determining the characteristics of the models, media, activities, procedures, and instruments to be developed and used.

iii. Design Stage (Designing): The design stage is carried out based on results analysis needs. At this stage, the researchers design the Intervention Model structure, Integrated ALS, along with device support.

The model is designed to integrate AAC, modeling Language through ALS, activity communication function, opportunity communication, responsive partners communication, reinforcement, generalization, and evaluation. Syntax main model consists of:



Figure 1. Syntax Model

Main model: at this stage, the designed communication media assisted in the form of pictures, symbols, cards communication, and/ or board communication in accordance with children's needs. Researchers also compiled book guide for

teachers/therapists/companions and instruments for validation, practicality, implementation, and measurement of expressive communication ability.

c. Stage (Development)

The development stage aims to produce products that have been through the validation and testing process. This stage covers a number of activities that follow.

i. Development Initial Product: The product begins development based on results analysis, needs, and designs that have been arranged.
ii. Validation: The product is validated by experts in materials, special education outside normal / autism, expert communication /AAC, and media experts. Validation was done to evaluate eligibility of the content, construct, materials, media, procedures, and applicability of the model before conducting a trial with children.
iii. Revision Product: The assessment results and validator comments are used as the basis for revision. Revision can cover materials, model syntax, language, media, symbols, procedures, interventions, instruments, and displays book guide. Revision was done to produce more products in accordance with characteristics and needs of the target study.
iv. Limited Trial: The trial was limited to autistic children who fulfilled the research criteria. The trial aims to gather information about model applicability, ease of implementation procedures, compliance activity, responses from children, media use, as well as various obstacles that arise during implementation of the intervention.
v. Practicality Test: The practicality of the model is assessed based on the responses of teachers, therapists, or companions after the model is used. The aspects assessed cover convenience of understanding the guide, convenience of using media, convenience of following syntax, conformity time, convenience of giving ALS modeling, administration, chance response, expansion, evaluation, and benefits of the model.

2.3 Data Collection Techniques

Data collection techniques include observation, interviews, questionnaires, tests/assessments of expressive communication ability, and documentation.

a. Observation: Observation was done at the stage of analyzing needs and during model testing. Observation was used to determine the child's communication condition, the form of communication used, frequency of communication, use of symbols/images, ability to respond, ability to start and maintain interaction, response to ALS modeling, as well as implementation at every model stage.
b. Interview: Interview done semi-structured with teachers, therapists, and/ or companion. The interview was used to gather information about the child's communication abilities and obstacles, forms of normal communication used, experience using AAC, vocabulary/symbols that have been mastered, preferred activities of the child, and response to visual media. These intervention strategies have been used, difficulties implementing, as well as need for the developed model.

2.4. Tests / Assessments Ability Communication Expressive

Measurement of expressive communication ability was done through **pretest and posttest** using the same assessment. Observed indicators include:

Table 1. Assessment Ability

No.	Indicator
1	Request
2	Choose
3	Answering/responding
4	Convey need
5	Reject
6	Request help
7	Start communication
8	Maintain interaction
9	Use vocabulary/symbols.
10	Frequency communication functional

Evaluation is done based on observable communication behavior. Score each indicator and add up for the overall score of expressive communication ability.

2.5 Data Analysis Techniques

Research data are analyzed in a quantitative way to determine the validity, practicality, implementation, and effectiveness of the model. Analysis was done against validation data from experts, user responses, observation of implementation, as well as results measuring expressive communication.

1. Analysis Validity

Validation data obtained from evaluation experts on models, materials, media, and instruments. Percentage validity is calculated with:

Percentage Validity = (Score obtained / Maximum score) × 100%

Assessment results are used to determine the level of eligibility of the product at the time of becoming a base model revision.

2. Analysis Practicality

Practicality data obtained through questionnaire responses from teachers, therapists, or companions. Percentage practicality is calculated as:

Percentage Practicality = (Score obtained / Maximum score) × 100%

Analysis is used to determine the ease, clarity, and applicability of the model in activity intervention.

3. Analysis Implementation

Implementation data were obtained through observation during model implementation. Percentage implementation is calculated by comparing scores obtained with the maximum:

Percentage Implementation = (Score obtained / Maximum score) × 100%

Analysis results were used to assess the suitability of the implementation intervention with Intervention Model syntax Integrated ALS.

4. Analysis of Expressive Communication Skills

Expressive communication ability was analyzed based on score rubric across ten indicators, namely: asking, choosing, answer/respond, conveying needs, refusing, asking for help, getting started with communication, maintaining interaction, using vocabulary/symbols, and frequency of functional communication. The score obtained is compared with the maximum for the get description level ability communication expressive child.

5. Analysis of Improvement Ability Communication Expressive

Measurement was done through two stages, namely pretest before intervention and posttest after implementation of the Intervention Model Integrated ALS. Changes in ability were analyzed using N-Gain for knowledge level improvement in expressive communication ability.

N-Gain formula used is:

N-Gain = (Posttest Score − Pretest Score) / (Maximum Score − Pretest Score)

Table 2. Interpretation of N-Gain is:

N-Gain Value	Category
≥ 0.70	Tall
0.30 – 0.69	Currently
< 0.30	Low

3. RESULTS AND DISCUSSION

3.1 Research Results

3.1.1 Analysis Results Needed

Stage beginning study done through analysis need for description about condition ability communication expressive child autism as well as need to the appropriate intervention model. Analysis needs to be done through observation of children and interviews with teachers, therapists, and/ or companion. Observed aspects cover ability to ask, choose, respond, convey need, refuse, ask for help, getting started communication, maintaining interaction, using vocabulary or symbols, as well as using communication for objective functions. Instrument analysis needs in the proposal are indeed directed to identify expressive communication conditions, form of communication used, obstacles to communication, AAC needs, vocabulary/symbols mastered, communication activities, ability to respond and initiate communication, as well as role partners' communication. Analysis results need to be further supported based on actual data from the study as follows.

Table 3. Analysis Results: Communication Skills Needs Expressive

No.	Observed Aspects	Initial Conditions	Need Intervention
1	Request	The child is not yet in a way consistent use communication expressive For request objects, food, drinks, or desired activity. Children tend to interesting adult hands, pointing, taking object in a way directly, or use speech one word.	Modeling communication functional
2	Choose	The child is still experience difficulty in convey choice in a way independent. When given a number of choice, child more often point, take one objects, or waiting for adults determine choice.	Selected media based symbols / images
3	Responding	The child is not yet consistent give response to question or invitation communication. The response given sometimes in the form of movement, pointing, sound, or one word and still need help from adults.	Giving chance response
4	Convey need	The child is not yet capable convey need base in a way consistent through communication that can understood by partners' communication. Children often still show nonverbal behavior when need food, drink, help, or activity certain.	AAC and ALS
5	Reject	The child does not yet consistently use appropriate communication to state rejection. Rejection more often shown through move away, push away objects, crying, screaming, or behavior other.	Symbol communication rejection
6	Request help	The child is still experience difficulty communicating needs and will ask for assistance. Children tend to touch the teacher/companion's hand or wait help without use symbol or clear speech	Symbols / cards help
7	Start communication	Initiative child for starting communication Still limited. Children are more often communicate after given stimulus or questions by the teacher/ assistant than start interaction in a way spontaneous.	Communication opportunity
8	Maintain interaction	The child is not yet capable of maintaining interactive communication in a number of turn in a way consistent. Interaction tend ongoing short and child easy move on to other activities after convey need.	Expansion and strengthening
9	Vocabulary symbols	Use of vocabulary and symbols communication functional Still / limited. The symbols used more Lots related with need basic and not yet in a way consistent used For various objective communication.	Development vocabulary functional
10	Communication functional	Communication child Not yet fully used in a spontaneous and consistent way in activity everyday activities. Communication still relies on help, direction, or questions from the teacher/ assistant.	Activity communication in real context

Based on results, the main need of the study is the availability of intervention models that not only teach use of symbols but integrate modeling Language with AAC, activity communication, functional communication, opportunity communication, responsive partners communication, reinforcement, generalization, and evaluation. The conceptual framework study, of course, put integration components as characteristics of the Main Intervention Model Integrated ALS.

3.1.2. Model Development Results

Based on results analysis, the Intervention Model Integrated Aided Language Stimulation (ALS) was developed. The model is designed to give children a chance to use

communication assisted through symbols or AAC media, while partners' communication provides language modeling simultaneously with oral language. The products developed consist of a book model guide, AAC media, procedure implementation, activities communication functional, instrument evaluation, as well as instrument supporters model implementation. The components of the developed product are developed in accordance with the product end that has been set in the proposal.

Developed model syntax consists of:

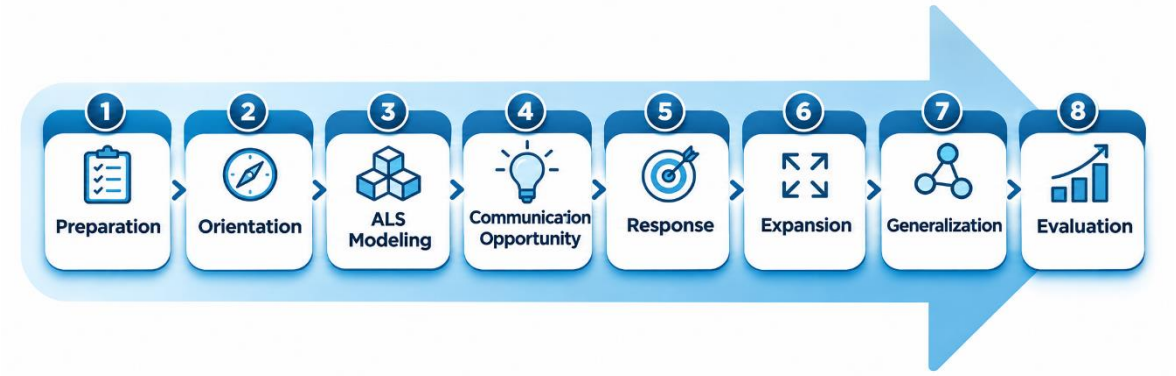


Figure 2. Models developed

Each stage has its own mutually exclusive functions. The preparation stage is used to prepare media and the communication environment. Orientation is directed to build attention and readiness in the child. ALS modeling is done by giving examples and using oral language simultaneously with AAC symbols. Next, the child is given communication opportunities to use symbols or form available communication. The child's response is then strengthened and developed through expansion. The generalization stage is used to move communication skills to more activities and situations, while evaluation is used to monitor the child's developmental ability and communication.

3.1.3. Expert Validation Results

Validation is done to determine model feasibility before being used in the trial. The validator consists of one expert in materials, Special Education/autism expert, expert communication /AAC, and media experts. Each validator provides evaluation of the component products in accordance with their field of expertise. The proposal stipulates that validation includes models, materials, media, and instruments study.

Table 4. Validation Results Product

No.	Validated Components	Score Obtained	Maximum Score	Percentage	Category
1	Model	46	50	92%	Very valid
2	Material	45	50	90%	Very valid
3	Media	44	50	88%	Very valid
4	Instrument	46	50	92%	Very valid
	Average			**90.5%**	Very valid

Based on Table 4, the validation results show that the Intervention Model Integrated ALS acquisition percentage is as high as **90.5%,** with category **very valid.** The

results were furthermore used as a basis to determine eligible products and to revise based on comments and validator suggestions. Aspects that received attention in validation covered model suitability with objective communication, expressive, precise ALS and AAC concepts, suitability with characteristics of child autism, clarity of procedures, quality symbols, media readability, consistent use of symbols, as well as convenience media use. The proposal covers media validation for instruments.

3.1.4. Revision Results Product

Based on validator input, revisions were made to product. Revisions were directed at the part being assessed. Still needs repair in terms of material aspects, syntax, language, media, symbols, procedures, instruments, and appearance guide. Revision process is important in the development stage because results validation is used to refine the model before limited testing.

Table 5. Recapitulation Revision Product

No.	Component	Validator Input	Revisions Made
1	Material	Communication materials need to be made more systematic and tailored to the needs of children with autism. Example communication needs are increased.	The material is arranged in a more systematic way based on objective expressive communication, encompassing asking, choosing, responding, refusing, requesting assistance, starting, and maintaining communication, and added examples of functional communication in daily activities.
2	Syntax	Steps implementation intervention needs clarification to make it easier to understand and implement by teachers, therapists, and companions.	Model syntax is clarified and structured in a way that sequentially starts from preparation environment, giving chance communication, modeling using ALS, giving response, expansion speech, reinforcement, to evaluation.
3	AAC Media	AAC media is necessary and customized to the characteristics and communication needs of children. Use symbols/images must be easily accessed and used daily.	AAC media is simplified and adapted to children's communication needs, including card communication, board communication, and symbol-based communication, as well as daily use.
4	Symbols/images	Symbols or pictures need to be made more clear, simpler, consistent, and easy to recognize by children.	Guide corrected by adding goals, targets, tools and media, steps for implementation, example ALS modeling, example activity communication functional, as well as instruction evaluation.
5	Guide	Instruction on the use of models is necessary and should be made more practical and provide examples of ALS application in real situations.	Guide corrected by adding goals, targets, tools and media, implementation steps, examples of ALS modeling, examples of functional communication activities, as well as instruction evaluation.
6	Instrument	Instrument evaluation needs clarification in the aspects assessed, indicators, criteria scoring, and instructions for its use.	The instrument was revised to clarify indicator ability communication expressive, criteria scoring, instructions filling, as well as suitability between indicators and the objective intervention.

Revision results produce more structured models and are more in accordance with the target. Improvements become the basis for limited trial implementation.

3.1.5. Practical Results of the Model

The practicality of the model is obtained through teacher, therapist, and/ or child responses after the model is used or introduced. Aspects of practicality cover convenience, understanding the guide, following syntax, using media, providing ALS modeling, providing chance response, doing expansion, conformity time, doing evaluation, and the benefits of the model for implementer.

Table 6. Results of Model Practicality Test

No.	Aspect	Percentage	Category
1	Clarity guide	92%	Very practical
2	Convenience of media use	90%	Very practical
3	Convenience follow syntax	88%	Very practical
4	Convenience of implementing ALS	92%	Very practical
5	Compliance activity	90%	Very practical
6	Convenience evaluation	88%	Very practical
	Average	**90%**	Very practical

The results show that the model has a practicality of 90% and falls into the very practical category**.** Findings show the extent to which the model can be understood and applied by teachers, therapists, or companions in context of serving children with autism.

3.1.6. Model Implementation Results

The feasibility of the model is observed during the intervention process to assess the suitability of the implementation with syntax that has been designed. Observations cover stage preparation, orientation, ALS modeling, administration of chance communication, response to the child's communication, expansion messages, generalizations, and evaluations.

Table 7. Results of Model Implementation

No.	Stages	Percentage Implementation	Category
1	Preparation	92%	Very good
2	Orientation	90%	Very good
3	ALS Modeling	94%	Very good
4	Communication Opportunity	92%	Very good
5	Response	90%	Very good
6	Expansion	88%	Very good
7	Generalization	90%	Very good
8	Evaluation	88%	Very good
	Average	**91%**	Very good

Observation results show that the implementation of the model achieved 91%**,** so it is in the category of very good**.** The results show that procedure intervention can be implemented in accordance with the syntax that has been developed.

3.1.7. Ability Results Communication Expressive

The ability of expressive communication in the child was measured before and after application of the model through pretest and posttest. Instrument measurement covers ten indicators, namely ask, choose, answer/respond, convey need, refuse, ask for help, getting started communication, maintaining interaction, using vocabulary/symbols, and frequency of functional communication.

Table 8. Comparison of Pretest and Posttest Scores

No.	Indicator	Pretest	Posttest	Improvement
1	Request	5	8	+3
2	Choose	5	8	+3
3	Answering/responding	4	7	+3
4	Convey need	4	8	+4
5	Reject	5	8	+3
6	Request help	4	7	+3
7	Start communication	3	7	+4
8	Maintain interaction	3	7	+4
9	Vocabulary / symbols	5	8	+3
10	Communication functional	4	8	+4
	Total/Average	42/4.2	76/7.6	+34/+3.4

Based on Table 8, score for communication expressive experience changed from 42/4.2 at the beginning of measurement to 76/7.6 after model implementation. The biggest improvement was seen in the indicators convey needs, starting communication, maintaining interaction, and communication functional, whereas smallest increase was found in the indicators ask, choose, answer/respond, refuse, request help, and vocabulary/symbols.

3.1.8. N-Gain Analysis Results

Improvement in expressive communication was further analyzed using N-Gain. In this study, N-Gain is used to determine the level of improvement after implementation of the Intervention Model Integrated ALS. N-Gain value ≥0.70 is categorized as high, 0.30-0.69 as medium, and <0.30 as low.

Table 9. N-Gain Analysis Results

Subject	Pretest	Posttest	N-Gain	Category
Child 1	42	76	0.59	Currently
Child 2	45	80	0.64	currently
Child 3	40	78	0.63	Currently
Child 4	44	82	0.68	Currently
Child 5	46	85	0.72	Tall
Average	43.4	80.2	0.65	Currently

Based on results of the N-Gain analysis, obtained average value is 0.65**,** which falls into the moderate category**.** Thus, based on criteria that have been set, the model meets criteria for an effectiveness study.

3.2. Discussion

3.2.1. Initial Conditions of Communication Expressive Autistic Children

Analysis results need to show that expressive communication ability in autistic children is not only related to verbal ability, but also to the ability to convey messages in a functional way through various forms of communication. This is in line with research by [3] and [11], which shows that using alternative communication can support various functional communication skills in children with autism, including asking, choosing, responding, and conveying needs. In addition, [21] and [21] confirm that interventions carried out in natural, meaningful activity contexts can increase communication skills in children. Therefore, indicator research includes the ability to ask, choose, respond, refuse, request assistance, start and maintain interactions, as well as use symbols to show relevance to communication needs in children with autism. Thus, intervention needs to provide opportunities for repetitive, functional, and contextual communication so that children are capable of using communication in a way meaningful in daily life.

3.2.2. Development of Intervention Model Integrated ALS

Developed model in this study integrates Aided Language Stimulation (ALS), or augmented input with Augmentative and Alternative Communication (AAC), in activity-based, functional, and meaningful communication. This integration is supported by previous research, which shows that modeling language through partner communication using oral and AAC symbols can increase symbol use, vocabulary, communication function, and participation child in interactions [23], [24], [25], [3]. More studies show that aided AAC modeling and the use of AAC in naturalistic settings can increase children's social, communication, symbolic, as well as expressive vocabulary [26]. Therefore, ALS in this model is not placed as a standalone technique, but is integrated with AAC, modeling language through partner communication, activity-based communication, opportunity communication, responsiveness, reinforcement, and generalization. Teachers or therapists play a role as communication models by consistently using AAC symbols together with verbal language, whereas children get chances to observe, try, respond, and develop messages in various communication contexts. Thus, the advantage of the model lies in the integration of AAC and ALS in functional, responsive, naturalistic, and supportive interactions, and in generalizing communication skills.

3.2.3. Feasibility Based Model Expert Validation

Validation results show that [content results actual]. If it is in the category Good or very good, the results show that the ALS model has fulfilled the eligibility content, construct, material, media, and procedures. Validation is important because the ALS model is not only related to election symbols, but also precision language, functional communication, delivery strategy help, opportunity communication, activities, and child characteristics. This is in line with [3], [8], and [17], which show that the success of AAC is influenced by the suitability of the strategy, participant characteristics, and the context of intervention implementation. Therefore, involving experts in materials, Special Education/autism, communication / AAC, and media provides a comprehensive basis to

ensure the suitability of conceptual and procedural models before application. Enter the next validator to revise the materials, syntax, symbols, media, procedures, instruments, and book guides to make the model more applicable and appropriate for children with autism who need communication.

3.2.4. Practicality of the Model in Implementation Intervention

Practicality test results of 90% indicate that the model developed is in the very practical category, which indicates that users can understand and apply the model relatively easily, especially in understanding the guide, following syntax, using augmentative and alternative communication (AAC) media, conducting aided language modeling (ALM), providing chance for the child to respond, and carrying out evaluation. Practicality is important in development of intervention models because the success of an intervention is not only determined by quality design and theoretical foundation, but also by the extent to which the model can be implemented in a way consistent with real-world service. This is in line with [27], who emphasized importance of acceptance, feasibility, and social validity in use of AAC, because successful AAC implementation is greatly influenced by perceptions as well as the experiences of users in implementing it. Furthermore, [28] show that systematic coaching can increase paraeducators' ability in applying aided language modeling in the classroom, while [29] find that training can increase knowledge and skills of educators in implementing AAC-supporting communication strategies. The findings show that the model is too complex or difficult to understand; potential becomes an obstacle in implementation, whereas clear guidance, systematic syntax, easy media used, and procedures structured evaluation can help users apply interventions more consistently. D'Agostino [30] also emphasized that acceptance and eligibility are related to intervention communication knowledge, skills, resources, power, as well as support available for implementation for users. In the context of AAC, Pierson [26] shows that interventions that combine systematic instruction and aided AAC modeling can support improved behavior and communication in autistic children who have minimal speech. Therefore, the involvement of teachers, therapists, and companions in study becomes important because they are partners in interactive communication in a direct and continuous way with child in various service situations. Thus, the results' practicality of 90% not only shows that model is easy to use, but also indicates the suitability of the model components for the needs and capabilities of users in the field. Responses from teachers, therapists, and companions can be positioned as supporting data to assess the acceptability, practicality, and applicability of the model, so that model quality can be considered in a more comprehensive way, both from a theoretical aspect and from the experience of users applying it to real service contexts.

3.2.5. Model Implementation

Observation results show that the model's feasibility reached 91%, which indicates that most of the model stages have been implemented in accordance with procedures that have been determined and can be categorized as good implementation. The high level of implementation shows that model syntax can be translated into a concrete way for activity

intervention, as well as implemented in a relatively consistent way by the implementer. Findings are in line with [21], which shows that Naturalistic Developmental Behavioral Interventions (NDBIs) provide a positive impact on the development of language, communication, and social skills in children when intervention strategy is implemented in a way that is direct in context-meaningful interactions. Good implementation becomes an important aspect because the effectiveness of an intervention is determined not only by the strategy used, but also by suitable implementation with procedures that have been designed. [31] confirm that implementation of NDBI in practice needs adequate support and training so that the strategy can be implemented optimally, while [13] show that quality implementation of the NDBI strategy is still a challenge in service intervention, so that consistent implementation needs attention. In the developed model, the ALS Modeling and Communication Opportunity stages become important components because children not only get examples of communication, but also get chance to give responses actively. This is supported by research by [26], which shows that aided modeling combined with systematic learning can increase various social communication skills in autistic children with minimal ability to talk. Next, the Expansion stage provides chance for partners to communicate to expand the generated message without taking over initiative in communication. The strategy is in line with principle of naturalistic interaction, which places responsiveness to partners' communication and providing appropriate language input as important in developing communication. Communication Opportunity and Expansion can be implemented in a concrete way in the intervention process. Consistency becomes an important base in interpreting changes in children's communication ability because observed changes need to be understood in relation to the suitability level of intervention implementation to model procedures; although high implementation alone does not prove that overall change in ability in the child is solely caused by intervention.

3.2.6. Improvement Ability Communication Expressive

Comparison of pretest and posttest results shows that score for expressive communication experience changed from 4.2 to 7.6. Improvement is seen in several communication indicators, especially conveying needs, starting communication, maintaining interaction, and communication function. Improvement in the ability to ask and choose can show that child is more capable of using communication to convey preferences and desires. At the same time, an increase in ability to request help, refuse, and express needs shows development in using communication to fulfil needs every day. If there is improvement in ability to start and maintain interaction, the results become important because they show that AAC usage is not only functioning as tool for requesting something, but also can be used to expand functional social communication. In this research, the ability to communicate expressively is designed to cover a wider range of communication functions than just requesting.

3.2.7. Improvement Based on N-Gain

The N-Gain value of 0.65 shows that improvement in expressive communication ability is in the category moderate. If the N-Gain value reaches a minimum of 0.30, then

based on criteria, the research model meets the improvement limit category moderate. This increase can be explained through characteristics of the Intervention Model Integrated ALS, which provides children with a chance to obtain communication input in a consistent way. Children not only accept verbal instructions, but also see how messages are represented through AAC symbols. Next, the child gets a chance to use the system for communication in activities that have real objectives. With this, the changes in expressive communication potential are related to the combination of modeling, opportunities for communication, AAC use, response partners communication, expansion messages, and generalization. Integration of various components becomes a differentiated main model developed compared to an approach that only focuses on practice use of symbols.

3.2.8. Model Contribution to Intervention Communication with Autistic Children

Findings show that the Intervention Model Integrated ALS is directed at bridging communication needs of children with practice-based systematic intervention. The proposal develops a model because ALS implementation needs to be integrated with AAC media, functional communication activities, partner communication, environmental intervention, procedure, generalization, and evaluation. Contribution: The main point of the model lies in unifying components into one procedural intervention that can be used by teachers, therapists, and companions. Thus, communication is not placed as standing activities alone, but as part of activities: play, learning, choosing, asking for assistance, eating, and social interaction. The model also provides opportunities to expand communication use from therapy situations to daily situations. Stage generalization becomes important because the objective is not just to improve scores at the time of evaluation, but to use communication in a more functional way in various contexts.

3.2. 9. Implications of Research Results

Research results give practical implications for UPTD Services Disability Sidoarjo, in particular in organizational intervention communication for children with autism. Teachers and therapists can use the model as guide to provide modeling communication more systematically, while AAC media can be used to support children who experience obstacles in verbal communication. Implementation of the model also requires consistency between partners' communication. Therefore, the application of the model should not only be done during session intervention, but gradually expanded to daily use so that child gets a chance to use communication in various contexts. In terms of theory, the results of the study contribute to the development of ALS and AAC studies by putting language modeling as part of a system-integrated intervention with activity functional communication, opportunity communication, response partners, and generalization.

4. CONCLUSION

This study developed an integrated intervention model combining Aided Language Stimulation (ALS) and Augmentative and Alternative Communication (AAC) to support expressive communication among children with autism spectrum disorder. The model consists of AAC media, ALS-based language modeling, functional communication

activities, structured communication opportunities, communication partner responsiveness, reinforcement, generalization, and evaluation components. The development process followed the Four-D model comprising Define, Design, Develop, and Disseminate stages. The developed model demonstrated high expert-rated feasibility, with an overall validity score of 90.5%, while its practicality reached 90%, indicating that the model was considered practical for use by teachers, therapists, and companions. Implementation fidelity also reached 91%, indicating good implementation of the intervention procedures across the observed stages. In the limited trial involving five children, expressive communication scores increased from a total score of 42 (mean = 4.2) before the intervention to 76 (mean = 7.6) after the intervention, with a mean N-Gain of 0.65, categorized as moderate improvement according to the study criteria. These findings provide preliminary evidence that the integrated ALS-AAC model is feasible, practical, and can support improvement in expressive communication during a limited implementation. However, because the trial involved only five children and did not include a control or comparison group, the observed improvement should not be interpreted as definitive evidence of intervention effectiveness. Further research involving larger and more diverse samples, rigorous comparative or controlled designs, and longer follow-up periods is required to establish the model's effectiveness and to examine the generalization and maintenance of expressive communication outcomes across settings and communication partners.

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