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Mechatronic Teaching Aids for the Development of Early Childhood Pragmatics

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Abstract
Through the application of Information and Education Technology, particularly Mechatronic teaching tools, this research aims to identify the pragmatic development of young children. The CAR (Classroom Action Research) method was used to determine the percentage rate of early childhood pragmatic development. The analytical technique used is observation and documentation, which is then analyzed quantitatively. This study included 20 children (5-6 years old) from TK Labor FKIP of Riau University. The use of mechatronic teaching aids was successful in developing pragmatics in early childhood, as evidenced by 44.64% results in the Starting to Develop category, 52.98% results in the Developing According to Expectations category, and 72.02% results in Developing Very Well. It can be demonstrated that the seven observed indicators can be stimulated adequately so that children's pragmatic development can develop very well.

Keywords: classroom action research; early childhood; mechatronic; teaching aids; pragmatic development

Introduction

Early childhood is a remarkable period in a person's life, marked by several critical developmental milestones that should be adequately stimulated to prevent difficulties in later stages of life (McCashin et al., 2022). One development that requires special attention is the ability to pronounce (Birner, 2021). This has brought attention to the significance of comprehending the function of liaison discourse as a fully defined speech act theory (Craig & Gallagher, 1988). There are non-formal education services, such as Nursery Education, also known as Early Childhood Education (ECE), to develop various aspects of development. With the ECE services, it is hoped that all aspects of child development can be appropriately stimulated and in the right way (Nath, 2022). One of the most essential facets of a child's development is their ability to communicate, which is why parents' role in this process is so essential. The ECE services are expected to facilitate learning media in order to support the learning process (Panesi & Morra, 2022).

Learning media is a form of method equipment or technique used in conveying messages, helping to reinforce lesson materials, so that they can raise the quality and motivation of students to participate in the teaching and learning process (Guslinda & Kurnia, 2018). Learning media that are well designed and neat, will be used in developing several aspects of child development. In line with the times that have entered Generation Z, it requires a media that follows current technology. Apart from being seen from the usefulness of the designed media, it must also be able to improve aspects that will be developed

in children (Mahyuddin et al., 2022). Furthermore, the utilization of learning resources involving electronic devices aims to create contextual learning that is appropriate for the times that kids are living in (Kurnia et al., 2020).

A pragmatic ability is the pronunciation of words in order to express ideas, thoughts, and emotions; this ability is comparable to speaking and telling stories (Kurnia, 2019). The study of pragmatics can be thought of as a sub-development that is implied in aspects of language that need to be developed. Pragmatics is concerned with the meaning of words in context (the physical and social world), as well as the assumptions of prior knowledge that speakers and listeners share (Cutting & Fordyce, 2021). Language development is important to be stimulated from an early age because language is the key for a person to communicate with his environment, so it requires good language. Pragmatics in early childhood is a way for children to correctly pronounce various things around them (Miller, 1979). This is important because it is generally accepted that incorrect pronunciation will result in an incorrect meaning.

These Pragmatic abilities are a collection of skills that differ by culture and are absolutely necessary for social communication. These abilities can be reduced in many children with neurodevelopmental disorders, leading to educational and psychosocial challenges. Assessing pragmatic talents necessitates the development of credible and reliable measures that take into account cultural differences.

Several factors must be considered when evaluating pragmatic ability. First, because pragmatics are influenced by culture, cultural differences must be acknowledged when evaluating pragmatic language. There is also a need to avoid constructing instruments that are not ecologically valid in order to uncover cultural differences in pragmatics, even if no culture-based instruments exist for testing pragmatic abilities in Farsi-speaking youngsters. Second, valid and reliable instruments for use in children with pragmatic impairment are required. Third, in order to gather data and get a complete picture of children's pragmatic abilities, a good measurement tool must incorporate a variety of perspectives (interviews with family members, teachers, and specialists involved with the child) and contexts (observations in daily and clinical environments). The organization and management of discourse, adapting communication to the social context, understanding nonliteral language, inferring the speaker's intended meaning from their actions, and nonverbal behaviors are all examples of pragmatic abilities. As a result, pragmatic assessment measures must take all of these factors into account rather than just focusing on one or two (Jafari et al., 2019).

The findings of the researchers' observations revealed multiple issues, including the fact that some children still did not correctly pronounce consonant sounds, made errors when pronouncing syllables, and still struggled to differentiate between the correct and incorrect pronunciation of the letters b and d in their speech. They claimed that a number of variables, including the parent's education level and the child's non-verbal intelligence, might predict the language development of youngsters (evaluated through language-free tasks) (Hilviu et al., 2021). Given these problems, researchers feel it is important to develop pragmatics/pronunciation in early childhood to improve and correct speech errors that children have conveyed. According to the types of test questions utilized, practically all of the studies from this body of research share the same fundamental premise: that children's comprehension of these connectives depends on just one specific type of pragmatic meaning (Lemen et al., 2021). It is hoped that using this mechatronic teaching aid can develop pragmatics in early childhood. Furthermore, the mechatronic system's implementation also directly affects intelligent systems' encroachment into the processes of production (Semykina et al., 2015).

Literature Review

The development of language skills is a process that starts with listening, then speaking, reading, and writing (Kurnia & Zulkifli, 2016). Speech acts/pragmatics are actions of a form of language, while the factors that exist are linguistic and non-linguistic factors that significantly influence language actions (Siddiq, 2019). Good speech is speech that contains meaning and the language can be conveyed and

understood correctly (Lemen et al., 2021). Eye contact, body language, and facial expressions are examples of non-linguistic aspects of pragmatics (Ferrara et al., 2020).

Language development should be encouraged from an early age because language is the key for a person to communicate with his environment, so good language is required. Early childhood pragmatics is a method for children to correctly pronounce various things around them. The incorrect pronunciation will result in incorrect meaning (Pennington & Rogerson-Revell, 2019). According to Sari (2021), there are several indicators to measure pragmatics in early childhood; 1) pronouncing vowels correctly; 2) pronouncing the consonant sound correctly; 3) distinguishing the pronunciation of the letter b and the letter d; 4) being able to pronounce the letter g correctly; 5) clarity in mentioning syllables; 6) completeness of pronouncing the letters of the alphabet in mentioning basic words; 7) pronounce the sound of the letters CVCV (there are two syllables in the root word) for example catfish and teeth. It can be illustrated from the opinions of several experts above, pragmatic abilities are closely related to language skills in early childhood; good pronunciation is speech that can be understood by people around when someone is communicating.

Pragmatics is the branch of linguistics that uses context as the primary instrument for interpreting meaning. Pragmatics, according to Kasper and Blum-Kulka (1993), is the study of the relationships between language and context that are fundamental to an account of language understanding. In addition, Pragmatics can also be defined as the study of the grammaticalized or encoded relationship between language and context in the structure of language, as well as the ability of language users to pair sentences with the context in which they would be appropriate. Language users' ability to adapt sentences to context so that they can be used appropriately and relate meaning to conversational situations. Language use, language use, and context are all important concepts in pragmatics. In other words, pragmatics is the study of how people use language in a specific context. Pragmatics investigates the speaker's intention in the speech used, rather than the meaning of the speech or sentences (Fraser, 2010). Grammar knowledge is necessary for analyzing the meaning of words or sentences, but understanding what the speaker is trying to say requires knowledge or experience that is known to underlie the story.

According to pragmatics, without context, speech (also known as text) loses all meaning. Text without context is meaningless. The term "text" used here refers to more than just written discourse; it also refers to speech that is both written and spoken within a given discourse (Siddiq, 2019).

Furthermore, the development of early childhood literacy skills can be helped by the utilization of learning materials. In general, educational media is a tool for the teaching and learning process. Learning media also include anything that can be used to arouse a learner's emotions, thoughts, or abilities in order to draw their attention and facilitate learning. This restriction is quite thorough and covers the knowledge of the resources, environment, people, and training/learning methods (Rosmiati et al., 2020). Learning media, on the other hand, is a tangible way to transmit educational content and materials like books, movies, videos, and so forth. The National Education Association (1969) then claimed that learning media is a form of communication that includes hardware technology and the place of learning media. This communication takes the form of print and view-listening. The learning media plays a significant role as one of the components of the learning system because learning is a communication process that occurs within a system. Without the media, communication cannot take place, and learning cannot function as a communication process at its best. The learning system's learning media is a crucial element.

From the aforementioned viewpoint, it can be inferred that learning media includes anything that can convey messages and stimulate students' thoughts, feelings, and willingness in order to support the development of a learning process in them (Wijaya et al., 2021). The learning media's goals include streamlining the teaching and learning process, improving efficiency, maintaining relevance to learning goals, aiding in student concentration, and motivating students to learn. The use of learning media is based on four principles (Luh & Ekayani, 2021), specifically;

Psychological Basis: Learning is a complex and special process that involves a person's entire personality, including both his physical and mental aspects. The differences in characteristics that make up the learning behavior itself—such as learning style (visual vs. auditive), cognitive style (field independent vs. field dependent), talent, interest, level of intelligence, intellectual maturity, and others that can be mentioned—are what give this learning behavior its singularity. regarding the distinctive qualities of each student;

Technological Basis: The ultimate goal of learning technology is to facilitate student learning. To achieve this final goal, technologies in the field of learning develop various learning resources to meet the needs of each student according to their characteristics. All these activities are carried out by technology based on the principle that a media only has advantages over other media when used by students who have characteristics according to the stimuli generated by the learning media. Thus, the learning process of each student will be greatly facilitated by the presence of learning media that are in accordance with their character;

Empirical Basis: According to a number of research findings, the use of learning media and student learning characteristics interact to influence student learning outcomes. This means that using media that is appropriate for their needs will give students a significant advantage when learning. Using visual media, such as movies, videos, pictures, or diagrams, will be more beneficial for students who have a visual learning style. The use of auditory learning media, such as voice recordings, radio, or teacher lectures, is more advantageous for students who prefer this type of learning; and

Philosophical basis: By taking into account the complexity and individuality of the learning process, it is possible to ensure that the media and learning methods chosen accurately will have a significant impact on student learning outcomes. Furthermore, student perceptions have a significant impact on learning outcomes. As a result, in order to ensure that the learning process is successful, it is important to pursue optimal understanding of the meaning of perception as well as the variables that affect how perceptions are explained when choosing media.

One of the learning media that can be used is mechatronics-based media. This learning media development project's goal is to create a cutting-edge educational medium for young children as well as to investigate whether or not it is feasible to develop educational mediums for young children that make use of mechatronic systems (Kurnia et al., 2020). How young children learn and interact with their surroundings has been transformed as a result of the introduction of learning technology (Rad et al., 2022). In order to contribute to the development of children's education in Indonesia, further innovations in learning technology such as this one must be developed (Istiana, 2022).

Methods

The research method explains clearly how the research was conducted to enable readers to evaluate the work performed. State the research design used in the study. Describe precisely what you did, what and how experiments were run, what, how much, how often, where, when, and why equipment and materials were used. Define the population and the methods of sampling or participants were used in the study. Describe what, how and to whom the instruments were used in the study. Describe any approaches to ensure validity and reliability. Describe how the data were collected and analyzed. Describe statistical tests and the comparisons made [Times New Roman 11, single space].

Research Design

Classroom Action Research (CAR) is the method that is utilized in this study. Over the last two decades, action research has increased in prominence (Harkavy et al., 2000). It is becoming a more widely regarded tool for teachers to assess and reflect on their teaching practices. McNiff (1999) characterized action research as "a growing movement in educational research that encourages teachers to be reflective of their own practices in order to improve the quality of education for themselves and their students."

According to Vogelzang and Admiraal (2017), the CAR's objectives are as follows: enhance instructor teaching patterns, improve student conduct, and improve and improve learning methods. Changing the teaching framework so that there is an increase in teacher professional services. The following benefits will be obtained from the Classroom Acion Research for both teachers and students: improving the

quality and quality of learning in the classroom, developing teacher professionalism performance, training teachers to be reliable problem solvers, training teacher creativity, cultivating the teacher's self-confidence, and improving the quality of a school institution (Parnawi 2020).

Moreover, Classroom Action Research is utilize to discover what works best in a teacher's own classroom in order to improve student learning. There are numerous strategies to improve one's teaching knowledge. Many teachers reflect on their teaching on a personal level, while others do rigorous empirical studies on teaching and learning.

This study is undertaken by the teacher (educator) in the classroom and focuses on enhancing the learning process and praxis. Classroom Action Research can be used to solve classroom problems and in-service training, where teachers can learn new skills and approaches and improve their analytical skills (Meesuk et al., 2020). Furthermore, CAR is utilized as a tool to develop innovative learning, improve the connection between teachers and scientific researchers, and provide an alternative to difficulties that arise in the classroom. CAR is carried out through a cycle consisting of four stages, starting with action planning, followed by learning action and observation activities and ending with reflection to analyze the data obtained through action. CAR is different from formal or scientific research, covering the training required by teachers, research objectives, methods in identifying the problem to be studied, establishing the basic theory, determining research samples, research design, measurement procedures, data analysis, and application of research results (Mettetal, 2001).

Sample and Data Collection

In this research, CAR is used to cultivate pragmatics in early childhood. Within the context of this classroom action research, collaboration takes the form of the teacher acting in the role of research partner. Teachers as learning practitioners, and researchers as designers and critical observers, each focus on aspects of classroom action research that are in accordance with their respective areas of expertise (McNiff & Whitehead, 2005).

The study was carried out throughout two cycles, each consisting of a period of two weeks during which there were three meetings. The research was conducted in two cycles with a period of 2 weeks in each cycle conducting 3 meetings. This classroom action research puts Kurt Lewin's model into practice by following its instructions, which state that one cycle consists of four main steps, namely: (1) planning, (2) acting, (3) observing, and (4) reflecting (Coghlan & Jacobs, 2005).

The subjects of this study were Class B of TK Labor FKIP of Riau University with a total of 20 children, consisting of 12 boys and 8 girls.

Analyzing of Data

In order to investigate and experiment with data, data analysis in science employs a more sophisticated methodology and cutting-edge technology. This is the process of gathering, modeling, and evaluating data in order to derive knowledge that supports decision-making. Various analytical techniques and methodologies exist, depending on the field of study and the objectives.The utilization of data in a corporate setting, on the other hand, enables decision-making that is data-driven and will help the organization perform better overall. In this article, we'll discuss data analysis from a business perspective while also reviewing the scientific and statistical underpinnings that are crucial for comprehending the fundamentals of data analysis.

The techniques of observation and documentation are utilized in this data analysis method. The formula that will be used to determine pragmatic development in early childhood based on the obtained data, which will be analyzed using quantitative analysis techniques, is as follows:

$$P = \frac{posrate - baserate}{baserate} \times 100\%$$

(Aqib, 2010)

Findings

The first step to develop pragmatics in early childhood is before starting learning, as usually, the teacher starts from the opening activity, the main activity, to the closing activity. The teacher reads the story in the mechatronic props first. There are four stories in the mechatronic props; the Story of Tuna, the Story of Catfish, Princess Kaca Mayang, and The Seven Princesses. The teacher will read the story in turn at each meeting. In the early years of a child's life, when they enthusiastically engage with storytelling, they are provided with opportunities through wordplay and the creation of tales, to foster solid dispositions for storying expertise and support their early reading practices (Bateman, 2022). In stimulating pragmatic development in early childhood by using mechatronic teaching aids, the researchers made an activity plan for each meeting. There is pragmatic development in early childhood in each cycle, which is marked by three indicators: Starting to Develop, Ability, Developing According to Expectations, and Developing Very Well

Table 1. Recapitulation of Early Childhood Pragmatic Development

No	Indicators	Cycle I			Cycle II		
		Day1	Day2	Day3	Day1	Day2	Day3
1	Able to pronounce vowels correctly (a, i, u, e, o)	23	25	26	29	32	37
2	Able to pronounce consonants correctly	17	19	21	24	27	33
3	Able to distinguish the pronunciation of b and d	19	22	24	27	31	38
4	Able to pronounce the letter g correctly	18	21	21	22	27	33
5	Clarity in pronouncing syllables	20	22	23	23	28	34
6	Completeness of pronouncing the alphabet in mentioning basic words	17	20	22	22	25	32
7	Pronounce the sound of the letters CVCV (there are two syllables in the root word	20	22	23	23	26	31
Total		134	151	160	170	196	238
Average		19,14	21,57	22,86	24,29	28,00	34,00

Source: Processed Data of Research Findings, 2021

The use of mechatronic teaching aids in cycle I meeting 1 in developing pragmatics in early childhood is that children are asked to come forward one by one to pronounce consonants and vowels clearly, by looking at the letters on the mechatronic teaching aids. Cycle I meeting 1 got the highest score at meeting 1 is indicator one, namely pronouncing vowels correctly, getting a score of 23 with a percentage number of 57.5%, and entering the category of Developing According to Expectations. There are two indicators, the lowest score is 17 with a percentage of 42.5% in indicator 2 (two) and indicator 6 (six). The overall results from the first cycle of the first meeting got a total of 134 with an average of 19.14 with an overall percentage figure of 47.86% indicators in the Starting to Develop category. Cycle I meeting 2 to develop pragmatics in early childhood obtained a score of 151. The results from this score showed an increase

in the seven indicators that were being observed, the average result at meeting 2 obtained 21.57 with a percentage rate of 53.93% (Starting to develop). Furthermore, in the first cycle of meeting 3 still using the same activities, there was an increase in each observed indicator obtaining a total score of 160 with an average of 22.86 and obtaining a percentage of 57.14% (Developing According to Expectations).

After reflection, the researcher saw that to increase the percentage of pragmatic abilities of early childhood, the researchers added activities for cycle II. Learning activities in cycle II the researchers plan to add activities from cycle I, namely the teacher points to a word that is on the mechatronic props, then asks the children to name the syllables, mentions the letters in the word. The teacher points to the letters b and d to see if the child has understood the difference in terms of pronunciation and the shape of the letters.

The pragmatic development of early childhood has increased before using mechatronic teaching aids and after using mechatronic teaching aids, to see the increase in pragmatic development of early childhood can be seen in the table below.

Table 2. Recapitulation of Early Childhood Pragmatic Development

No	Indicators	Pre-action	Cycle I	Cycle II
1	Able to pronounce vowels correctly (a, i, u, e, o)	52,5	61,67	81,7
2	Able to pronounce consonants correctly	40	47,5	70
3	Able to distinguish the pronunciation of b and d	45	54,17	80
4	Able to pronounce the letter g correctly	45	50	68,33
5	Clarity in pronouncing syllables	45	54,17	70,83
6	Completeness of pronouncing the alphabet in mentioning basic words	37,5	49,17	65,83
7	Pronounce the sound of the letters CVCV (there are two syllables in the root word	47,5	54,17	67,5
Total		312,5	370,8	504,2
Average		44,64	52,98	72,02
Category		Starting to Develop	Developing According to Expectations	Developing Very Well

Source: Processed Data of Research Findings, 2021

It can be illustrated from table 2 that pragmatic development in early childhood experienced an increase in each cycle before the action was taken to get an average percentage of 44.64% in the 1st cycle, 52.98% in the 2nd cycle, and 72.02% in the second cycle. After analyzing the pragmatic development of early childhood during pre-action to cycle I increased by 18.65%, pre-action to cycle II increased by 61.34%, and increased cycle I to cycle II by 35.97%.

Result and Discussion

The results of the learning activities succeeded in increasing significantly in the second cycle, it can be seen from the scores obtained. It can be illustrated that in cycle II meeting 1 there are indicators that have not increased in cycle I meeting 3, this is because the activities carried out in cycle II meeting I have not been maximized so that at this meeting the total score is 170 with an average of 24.29 and produces an average The average percentage of 60.71% is in the category of Developing According to Expectations. Furthermore, in the second cycle of meeting 2, there was an increase in each of the observed indicators. Obtained a total of 196 with an average of 28 and produced an average percentage of 70% (Developing According to Expectations). Cycle II meeting 3 all indicators increased significantly to 238 with an average of 34, resulting in an average percentage of 85% in the Developing Very Well category. The use of teaching aids, in this case, mechatronics, by researchers in the learning process has succeeded in increasing pragmatics development in early childhood (Valentine Hacquard, 2012)

The use of teaching aids technology, such as mechatronics, can develop pragmatics in early childhood (Mertala, 2019). The development of pragmatism in early childhood occurs regardless of the treatment that is given. Because the researchers included children's activities in the use of mechatronic teaching aids to improve the pragmatic development of early childhood, significant developments were more visible when the second cycle was carried out. This was due to the fact that the second cycle was carried out. An improvement was seen in the pre-action stage of children's pragmatic development across all seven indicators that the researchers monitored. After taking action in the first cycle and getting results that increased by 44.64% (Starting to Develop) and 52.98% (Developing According to Expectations), the researchers continued their work in the second cycle and obtained a percentage result of 72.02% (Developing Very Well). According to the findings of the research, the rate of success from the pre-action to the first cycle was 18.65%, the rate of success from the pre-action to the second cycle was 61.34%, and the rate of success from the first cycle to the second cycle was 35.97%.

Recommendations

The discussion of this research enlightens us regarding the pragmatic approach to language learning, particularly Indonesian. The only way to acquire adequate language competence is to study the structure of the language. Still, this study must be supplemented by research into non-linguistic factors that frequently have an impact on the process of communication. Students will be brought closer to the practical conditions of being communicated both orally and in writing if a pragmatic approach is taken. In addition, taking into account that Indonesia is home to a large number of cultures, one of which is language, adopting a pragmatic approach to the study of languages will allow for the accommodation of most, if not all, of the challenges that may arise. What is also supported by a curriculum in which the majority of policies are submitted to each level of the education unit, the learning (especially language) that emerges will be better able to accommodate the needs of students.

This research is desired to continue in accordance with the theory discovered for additional research. Future studies can look at how media can be used to analyze pragmatic skills in young children, particularly in regions where the native tongue is still heavily spoken.

Limitations

This investigation is inextricably linked to a number of restrictions, all of which have been identified as a result of observations made during the course of the study. In the interest of advancing the quality of future research, it is necessary, within the same discussion, for researchers to disclose any perceived weaknesses in their work. In addition to this, the research sample was collected using a non-probability sampling method combined with a convenient sampling technique. As a result, it is challenging to

generalize the findings of the study, and there was insufficient time available for the study due to the restricted number of classroom hours available to preschoolers.

The study of pragmatics and its application in language learning is only scratched the surface in this particular piece of research. In order to delve even deeper into the study of pragmatics, there are a great deal of additional topics that should be researched. Therefore, the paper that we can compile, any input, criticism, or anything else about this paper, we really hope that it can be used as a guide towards better accomplishments.

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