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The Effectiveness of the “Secil” Educational Game on Receptive Language in Early Childhood: An Interdisciplinary Perspective

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ARTICLE INFO

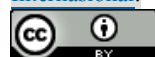
Keywords: Educational Games, Secil, Receptive Language, Early Childhood Education, Educational Technology

Received : 2 May 2026

Revised : 16 June 2026

Accepted : 17 July 2026

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ABSTRACT

This study examined the effectiveness of the Secil educational game in improving receptive language skills among children aged 5–6 years, addressing the limited evidence on its contribution to receptive language development. A quasi-experimental nonequivalent control-group design involved 28 children from TK Babul Ilmi Bulukumba, Sulawesi selatan, Indonesia, assigned to experimental and control groups (n = 14 each). Data were collected over eight sessions (one pretest, six intervention sessions, and one posttest) using observation-based performance assessments. Wilcoxon Signed-Rank and Mann–Whitney U tests indicated significantly higher posttest scores in the experimental group than in the control group (p = .006). These findings support the use of the Secil educational game as an effective digital learning medium for stimulating receptive language development in early childhood education

INTRODUCTION

Language development is a central foundation for learning during early childhood. Before children can express ideas clearly, they need to receive, process, and interpret spoken language. Receptive language refers to the ability to understand words, phrases, instructions, stories, and other messages received through listening and visual symbols. This competence supports later expressive language, early literacy, classroom participation, and social interaction (Khosibah, 2021; Stolt & Vehkavuori, 2021). In the Indonesian early childhood context, language is also one of the development domains that teachers are expected to stimulate through developmentally appropriate learning experiences (Permendikdasmen, 2025).

In practice, however, receptive language is often assessed through children’s spoken answers. Such an approach can obscure children who understand a message but require more processing time or are not yet ready to respond verbally. A child

may follow an instruction by pointing, selecting, matching, moving, or connecting objects even when the child does not immediately explain the answer aloud. Learning activities therefore need to provide clear stimuli, adequate wait time, and meaningful nonverbal response options. Storytelling, flashcards, and language games can support listening and comprehension, yet many activities still combine receptive tasks with a direct verbal-demand component (Fitriani, 2024 ; Husna & Eliza, 2021)

Digital educational games offer an alternative because they can combine spoken instructions, images, animation, repetition, feedback, and child-directed interaction. Secil (Serial Belajar Si Kecil) is an Android-based educational application that presents early learning content through games involving letters, words, pictures, and simple problem-solving tasks. Previous studies have associated Secil with improved early vocabulary and beginning reading skills, but its contribution to receptive language as a distinct construct remains

less frequently examined (Alifah & Pransiska, 2023; Nurjanah et al., 2020 ; Rahmawati & Elise, 2023).

This study positions Secil within an interdisciplinary perspective. It connects early childhood pedagogy, which emphasizes play-based and developmentally appropriate learning; developmental language theory, which treats comprehension as a prerequisite for later expressive use; and educational technology, which designs learning experiences through audio-visual and interactive features. The contribution of this study is its focus on receptive language outcomes that can be demonstrated nonverbally: understanding vocabulary, following one- and two-step instructions, and selecting, pointing to, matching, or connecting objects in accordance with spoken stimuli. The study therefore examined whether the use of the Secil educational game was more effective than conventional learning in improving the receptive language skills of children aged 5–6 years at TK Babul Ilmi. Related Indonesian early-childhood studies likewise show that deliberately designed learning models can support children's problem-solving and participation in structured learning activities, including differentiated learning and natural-material-based numeracy learning (Kurnia & Syamsuardi, et al., 2024 ; Kurnia. R, 2022).

METHODS

This research used a quantitative quasi-experimental approach with a nonequivalent control-group design. The design involved an experimental group that received learning activities using the Secil educational game and a control group that received the school's conventional learning approach, namely storytelling and animated-film activities. Both groups completed a pretest and a posttest. This design was chosen because the study was conducted within existing early childhood classes and did not randomly reassigned children to new groups.

The population consisted of 30 children aged 5–6 years at TK Babul Ilmi. Using purposive sampling, 28 children who attended learning activities and required stimulation of receptive language were selected. Fourteen children formed the experimental group and fourteen children formed the control group. The research was conducted across eight meetings in May–June 2026: one pretest meeting, six treatment meetings, and one posttest meeting. The experimental activities used an Android device with the Secil application. Teachers and researchers introduced simple game rules, presented audio stimuli, provided adequate waiting time, observed the child's nonverbal response, and gave positive reinforcement. The control group followed storytelling and animated-film learning activities without Secil.

The dependent variable was receptive language. It was measured through a performance-based observation instrument containing nine items across three indicators: (1) understanding vocabulary; (2) understanding and carrying out one- and two-step instructions; and (3) responding nonverbally by pointing, selecting, matching, and connecting. Each item was scored on a four-point developmental scale: 1 = not yet demonstrated, 2 = emerging with assistance, 3 = independently demonstrated, and 4 = consistently and optimally demonstrated. The possible total score ranged from 9 to 36. The instrument was reviewed by expert validators before use. Observation, performance testing, and documentation were used to support the data collection process.

Descriptive statistics were used to summarize the score distribution, minimum and maximum scores, means, and standard deviations. Because the study used a small sample and ordinal developmental assessment data, nonparametric analyses were applied. The Wilcoxon Signed Rank Test compared pretest and posttest scores within each group. The Mann–Whitney U Test compared posttest results between the experimental and control groups. The decision criterion was $p < .05$.

Tabel 1. Teacher-Guided Secil Intervention Flow

Stage	Secil Features / Activity	Target Receptive-Language Evidence	Teacher Role
Preparation	Choose level and feature; explain simple rules	Readiness to attend to language stimuli	Prepare device and create a safe, low-pressure learning environment
Vocabulary comprehension	Guessing animals, fruits, vegetables, or transportation	Select the picture that matches the audio prompt	Replay audio when necessary and observe responses
Following instructions	Balloon, color-dressing, and puzzle activities	Carry out one- and two-step oral instructions	Give clear instructions and wait time before assistance
Nonverbal response	Matching letters/cards and railway-building activities	Point, choose, match, drag, or connect items correctly	Provide positive reinforcement and record performance

RESULTS AND DISCUSSION

The implementation of Secil was organized as a teacher-guided play-based activity. At the beginning of each session, children were welcomed, prepared for the activity, and given simple rules without being pressured to answer orally. The teacher then selected a feature matched to the target indicator and played

or repeated the audio instruction. Children were given time to process the information and responded by touching, dragging, selecting, matching, or connecting images on the screen. The sequence was designed to make receptive-language evidence visible through actions. Table 1 summarizes the intervention flow used in the experimental group.

Table 2. Receptive-Language Category Distribution Before and After Learning

Phase	Category (Score)	Exp. n	Exp. %	Ctrl. n	Ctrl. %
Pretest	Low (9–15)	7	50	6	43
Pretest	Developing (16–22)	6	43	5	36
Pretest	Good (23–29)	1	7	3	21
Pretest	Very good (30–36)	0	0	0	0
Posttest	Low (9–15)	0	0	1	7
Posttest	Developing (16–22)	1	7	7	50
Posttest	Good (23–29)	3	21	4	29
Posttest	Very good (30–36)	10	72	2	14

Before the intervention, both groups showed similar descriptive patterns: the largest proportions of children were in the low and developing categories, and no child was in the very good category. After the intervention, the experimental group showed a clear distributional shift. Ten of

fourteen children (72%) were categorized as very good, while the control group had two children (14%) in that category. The control group also improved, but half of the children remained in the developing category. The distribution is presented in Table 2.

Table 3. Descriptive Statistics of Receptive-Language Scores

Group	Time	n	Min	Max	Mean	SD	Mean Gain
Exp.	Pretest	14	9	29	15.93	6.855	—
Exp.	Posttest	14	16	36	29.50	5.984	13.57
Ctrl.	Pretest	14	9	29	14.93	5.704	—
Ctrl.	Posttest	14	15	34	21.79	5.673	6.86

The descriptive statistics in Table 3 show that the experimental group's mean score increased from 15.93 at pretest to 29.50 at posttest, a mean gain of 13.57 points. The control group's mean increased from 14.93 to 21.79, a gain of 6.86 points. Thus, both

learning arrangements were associated with improvement over time, yet the gain in the experimental group was almost twice as large. The experimental group also achieved the higher posttest mean and the maximum possible score of 36.

Table 4. Nonparametric Test Results

Test	Comparison	Stat.	Value	p	Result
Wilcoxon Signed Rank Test	Experimental: pretest vs. posttest	Z	-3.308	.001	Significant increase
Wilcoxon Signed Rank Test	Control: pretest vs. posttest	Z	-3.309	.001	Significant increase
Mann–Whitney U Test	Experimental vs. control posttest	U	38.500	.006	Experimental group higher
Mann–Whitney U Test	Experimental vs. control posttest	Mean rank	18.75 vs. 10.25	—	H1 supported

The within-group Wilcoxon analyses found significant pretest–posttest differences for both groups ($p = .001$). This finding indicates that children's receptive-language scores changed after their respective learning experiences. The crucial between-group comparison was the Mann–Whitney U Test of posttest scores. The experimental group had a mean rank of 18.75, compared with 10.25 for the control group. The test produced $U = 38.500$, $Z = -2.755$, and $p = .006$. Because p was below .05, H_1 was supported: children who participated in the Secil

activities achieved significantly higher posttest receptive-language scores than children in the conventional-learning group.

The results should be interpreted in the context of this quasi-experimental study. The pretest means were close descriptively, but the groups were not randomly assigned. The evidence therefore supports the educational effectiveness of the implemented Secil-based learning arrangement in this setting rather than claiming that the application alone explains every difference in language development.

Discussion

The results indicate that Secil-based learning was more effective than the conventional approach used in the control class for improving the receptive language skills of the participating children. The largest practical difference was visible in the posttest distribution: 72% of the experimental group reached the very good category, compared with 14% of the control group. This pattern is consistent with the substantially higher mean gain in the experimental group and with the significant posttest difference between groups. The finding extends previous work on Secil, which has primarily examined early vocabulary and beginning-reading outcomes, by showing that the application can also be used to assess and stimulate receptive language through children's nonverbal responses (Alifah & Pransiska, 2023; Nurjanah et al., 2020; Rahmawati & Elise, 2023).

An interdisciplinary explanation helps clarify why the intervention may have been effective. From the perspective of early childhood education, Secil placed children in a learning-through-play environment. The tasks were short, interactive, and connected to pictures and actions, which are appropriate for young learners who are still developing sustained attention. Rather than merely listening to a teacher for an extended period, children were invited to act on information. Play-based action can make a task feel manageable and can sustain participation without making the child feel tested.

From the perspective of developmental language, the intervention gave children repeated opportunities to connect spoken words to concrete visual representations and purposeful actions. A child who hears an audio prompt and then selects an animal, matches a letter, or connects a railway path must process the message before responding. The activity therefore targets comprehension, not just recall. The use of wait time is especially important: it recognizes that silence is not necessarily a lack of understanding. Children can require time to process language before displaying their understanding through pointing, choosing, or moving an object. This approach is compatible with sociocultural

accounts in which adults scaffold language-rich activity by structuring the task and adjusting support (Etnawati, 2022; Vygotsky, 2020).

From the educational-technology perspective, Secil presented the same learning content through complementary modalities. Audio provides the language stimulus, pictures and animation make the stimulus concrete, and touch-based actions make comprehension observable. Such multimodal design may be useful for early learners because it reduces the need to rely on a single form of representation. It may also help teachers see where a child experiences difficulty—for example, in identifying vocabulary, following a sequence of instructions, or matching objects—so that feedback can be targeted. The result supports the view that interactive multimedia can contribute to early-language learning when it is selected for a clear pedagogical purpose rather than used simply because it is digital (Alwan, 2020; Putu et al., 2021).

Teacher facilitation remained essential throughout the intervention. The teacher chose the relevant game feature, introduced rules in simple language, repeated audio instructions when required, protected children from verbal pressure, and gave reinforcement after their actions. This reflects Bruner's idea of structured interaction and scaffolding: technology can enrich the learning environment, but the adult still organizes meaningful participation (Noviyanti & Millah, 2019). In other words, the effectiveness observed in this study should be understood as the effectiveness of teacher-mediated Secil learning, not unsupervised screen exposure.

The control group also improved significantly from pretest to posttest. This is an important finding because storytelling and animated-film activities can provide useful language input. However, the lower mean gain and posttest mean rank suggest that the conventional activities did not provide the same intensity of active, individualized nonverbal response opportunities as the Secil sessions. In a story-based activity, children may listen and understand but have fewer repeated chances to select, match, drag, or connect items in direct response to a

prompt. The Secil intervention therefore appears to have added an interaction layer that made comprehension practice more frequent and observable.

For practice, early childhood teachers may use educational games as one component of a balanced language program. The game should be linked to a specific developmental target, used in short guided sessions, and followed by communication or play beyond the screen. Teachers can adapt the selected features to children's current needs: vocabulary features for word comprehension, command-based features for following instructions, and matching or puzzle features for nonverbal response. The observation rubric used in this study can also help teachers document progress without requiring every child to respond verbally in the same way. This is particularly useful for children who are quiet, cautious, or still developing expressive fluency. Guided technology use also benefits from collaboration with families, because digital-age parenting initiatives have emphasized the importance of adult guidance when young children engage with technology (Kurnia, Lismayani, et al., 2024).

The findings should not be generalized beyond the study context without caution. The sample was small, purposively selected, and drawn from one kindergarten. The treatment lasted six sessions, and the study did not examine whether the gains were sustained over a longer period. In addition, because the research used intact groups, unmeasured classroom differences may have contributed to outcomes. Nevertheless, the statistically significant posttest difference and coherent implementation evidence provide a meaningful basis for using Secil as a promising, teacher-supported medium for receptive-language stimulation in comparable early childhood settings.

CONCLUSION

The Secil educational game was effective for improving receptive language skills among children aged 5–6 years at TK Babul Ilmi. Children in the experimental group showed a larger increase in receptive-language scores than the control group,

and their posttest results were significantly higher. The intervention supported vocabulary comprehension, following one- and two-step instructions, and nonverbal responses such as pointing, selecting, matching, and connecting.

The study demonstrates the value of integrating early childhood pedagogy, developmental language principles, and educational technology. Secil is most useful when teachers use it purposefully: provide clear language stimuli, allow adequate processing time, observe nonverbal understanding, and offer positive scaffolding. Schools can support implementation by providing suitable devices, supervised access, and teacher preparation for developmentally appropriate use of educational games.

ADVANCED RESEARCH

Further research should involve larger and more diverse samples, multiple early childhood centers, and longer intervention periods. Future studies could include a baseline statistical comparison, follow-up assessments to examine retention, and measures of other development domains such as expressive language, early literacy, attention, or social-emotional engagement. Researchers may also compare different kinds of teacher facilitation to determine which instructional supports most effectively complement educational games.

ACKNOWLEDGMENT

The authors thank the leadership, teachers, children, and families of TK Babul Ilmi for supporting the study. Appreciation is also extended to the instrument validators and all parties who contributed to the completion of the research. This article was developed from an undergraduate research project in Early Childhood Teacher Education at Universitas Negeri Makassar.

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