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Pedagogical And Logopedic Foundations Of Using Computer Games In The Development Of Dialogic Speech In Preschool Children

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Abstract: The rapid penetration of digital media into early childhood presents both opportunities and risks for language development. This article systematizes the pedagogical and logopedic foundations for employing computer games to stimulate dialogic speech in preschool children. Drawing on sociocultural and dialogic pedagogy, multimedia learning, and cognitive load theory, as well as clinically grounded logopedic practice, we develop an integrated framework that explains how specifically designed computer games can support turn-taking, pragmatic intent, lexical-grammatical expansion, phonological shaping, and prosodic regulation in children aged four to six. Methodologically, the paper combines a scoping review of empirical and practitioner literature with design-based reasoning to derive principles for game-mediated interaction in both inclusive kindergarten settings and individual speech therapy. The results synthesize conditions under which digital play is most facilitative: adult-guided joint media engagement; narrative and rule structures that elicit genuine conversational responses; adaptive, low-load feedback loops; and tightly coupled off-screen consolidation routines. We map core logopedic targets to game mechanics such as avatar-mediated dialogue, microphone-based repetition with visual spectrogram feedback, and cooperative quests that require contingent speech acts. The proposed framework enables teachers and speech-language therapists to make principled, evidence-informed decisions about when and how computer games can advance dialogic competence rather than merely entertain.

Keywords: Dialogic speech; preschool; computer games; speech therapy; logopedics; game-based learning; scaffolding; joint attention; multimedia learning; cognitive load.

Introduction:

Dialogic speech in preschool years is not a mere accumulation of words but a dynamic orchestration of social cognition, pragmatic motives, and linguistic form. In the everyday life of a child, dialogue stabilizes self-regulation, cultivates perspective taking, and anchors vocabulary and grammar to meaningful action. Contemporary childhood unfolds under conditions of pervasive digitalization: tablets, smart boards, and conversational agents have altered the ecology of early communication. This shift has sparked a debate in which concerns about distraction and passive consumption stand alongside claims that interactive media—especially well-designed computer games—can enliven language practice, expand the child's field of joint attention, and diversify communicative situations beyond what is feasible in a classroom alone.

A principled answer requires theoretical clarity. From a sociocultural lens, dialogic competence grows within the zone of proximal development through adult scaffolding and peer collaboration. Dialogic pedagogy interprets learning as entering ongoing discourse, where utterances respond to other utterances and anticipate new ones. Multimedia learning and cognitive load theory, in turn, caution that digital stimuli must be structured so that essential linguistic processing is not drowned out by extraneous features. Logopedics contributes the clinical precision to identify and sequence targets—articulation placement, phonemic awareness, syllable structures, morphosyntax, and prosody—and to verify that progress transfers from supported contexts to spontaneous conversations.

Yet practice often lags theory. Many "educational" games are not built around conversational contingencies; they reward tapping rather than talking,

fragment attention, and treat language as labeling rather than as social action. Conversely, therapists and teachers who see promise in digital play may lack a coherent framework to choose or adapt games, integrate them into therapy cycles, and measure dialogic gains. This article addresses that gap by articulating pedagogical and logopedic foundations for using computer games to develop dialogic speech in preschoolers and by translating these foundations into implementable principles.

The study aims to formulate an integrated, theoretically grounded and practice-oriented framework for the use of computer games in the development of dialogic speech in preschool children. Specifically, it seeks to explicate design and implementation principles that align game mechanics with speech therapy targets and with classroom routines, and to outline feasible procedures for assessment and progress monitoring that respect developmental, ethical, and cultural considerations.

The inquiry proceeds in two complementary strands. First, a scoping review aggregates insights from studies on game-based learning in early childhood, multimedia learning, and logopedic interventions for preschool speech and language disorders. Sources include peer-reviewed articles, clinical manuals, and policy statements that cover children aged three to six, with particular attention to research on conversational turn-taking, pragmatic skills, and phonology. While the evidence base is heterogeneous and methodologically varied, it is sufficiently convergent to support an analytic synthesis of design-relevant patterns.

Second, the article applies design-based reasoning to derive a practical framework, treating computer games as mediational tools embedded in human interaction rather than standalone content. The method here is abductive: we map logopedic goals to specific interactive affordances—voice recording, avatar dialogue trees, cooperative tasks—and iteratively refine recommended session structures and feedback strategies in light of theoretical constraints from cognitive load management and dialogic pedagogy. The result is not a single product but a set of decisions that educators and therapists can localize: selection criteria for games, adult roles during play, articulation of on-screen with off-screen routines, and measures that capture changes in dialogic competence such as mean length of utterance, diversity of communicative functions, and stabilized articulation in conversational contexts.

The synthesis converges on several findings about why and when computer games can facilitate dialogic development. Dialogue does not arise from screens; it emerges in the relational field around them. When an adult co-plays, models contingent responses, and subtly revoices the child's speech into expanded forms, the game becomes a stage for social-pragmatic rehearsal. The child's utterance gains a real interlocutor and a goal beyond "getting the right answer," transforming language from labeling objects to coordinating minds and actions.

Game mechanics matter to this transformation. Narrative-based games that require characters to negotiate access, ask for help, plan sequences, and repair misunderstandings naturally elicit adjacency pairs such as questions and answers, requests and acknowledgments, and offers and acceptances. When these mechanics are implemented with adjustable pacing and minimal extraneous animation, they lower cognitive noise and free resources for linguistic formulation. Avatar-mediated dialogue trees can be tuned to present plausible options rather than single correct choices, thereby rewarding pragmatic adequacy—polite forms, clarity, and relevance—over brute accuracy. Microphone-based tasks that record the child's productions and offer visualizations of rhythm and pitch provide immediate, interpretable feedback for prosody and articulation without shaming. Cooperative quests where two children jointly solve a puzzle nudge them toward turn-taking and perspective sharing; the digital artifact coordinates attention, while the social problem supplies a reason to speak.

The logopedic component strengthens this ecology by specifying targets and sequences. When a child struggles with consonant clusters, the game's lexicon and storyline can be curated to increase the frequency of relevant syllable structures without monotony. For phonemic awareness, mini-challenges may ask the child to distinguish minimal pairs as part of a diegetic task, such as choosing the correct spoken password to open a door. Prosody can be woven into play by requiring the child to match emotional intonation to narrative circumstances; success is acknowledged by in-game consequences that depend on the listener's understanding. Morphosyntactic expansion is supported by quests that are solvable only through multiword utterances that include temporal connectives, causal markers, or plural morphology, while the adult subtly models expansions that the child can appropriate in the next turn.

To prevent cognitive overload, the visual and auditory channels must be disciplined. Background music should not compete with speech perception; animations should signal turn transitions and highlight the gist of the linguistic task. Instructions are most effective when they are short, spoken at a natural tempo, and paired

with sparse visual cues that point to the next action. Rewards should be meaningful enough to sustain engagement but not so salient that they eclipse the satisfaction of successful communication. These constraints follow from multimedia learning principles that favor temporal contiguity, coherence, and signaling, all of which help young children allocate attention to the central linguistic thread.

The adult's role is pivotal and changes across the session. At the outset, the teacher or therapist calibrates the task to the child's zone of proximal development by selecting difficulty and pre-teaching key forms embedded in a brief story stem. During play, the adult orchestrates joint attention, exaggerates prosodic contours that the child is targeting, and uses contingent recasts—brief, natural reformulations that add a missing morpheme or clarify structure without breaking the conversational flow. When the child's production wanders, the adult declines intrusive correction in favor of prompt types that cue the next relevant move in the dialogue. In inclusive group settings, the adult can distribute roles so that each child's linguistic strengths scaffold peers' weaknesses, thereby turning the game into a micro-community of practice.

Closing routines away from the screen consolidate learning. Children retell the game episode using physical props or drawings, anchoring vocabulary and syntax in sensorimotor memory and ensuring decontextualization beyond the digital interface. The adult listens for the day's targets in spontaneous retellings and, when needed, elicits a second version with subtle prompts. Parents are briefed with simple scripts to reproduce key conversational moves at home without replicating the game. In this way, computer games become catalysts for social language that travels.

Progress monitoring must capture dialogic change rather than only discrete skill acquisition. Short audio samples of semi-structured conversation before and after a six- to eight-week cycle reveal growth in number of conversational turns sustained, latency of response, and mean length of utterance. The proportion of utterances fulfilling specific pragmatic functions—requesting, clarifying, repairing—should increase alongside accuracy in targeted phonological or morphosyntactic forms. When recordings are paired with therapist field notes on attention and affect, the picture of progress becomes sufficiently multifaceted to inform next steps. Importantly, transfer from the digital to the physical environment is the criterion of success; the child must deploy new forms in free play and daily routines.

Concerns about screen time are legitimate, but dosage and quality are decisive. Short, focused sessions embedded in a broader language-rich day can augment, not replace, books, blocks, and dramatic play. Co-play with adults mitigates risks of passivity and over-stimulation, while intentional off-screen consolidation prevents dependency on digital prompts. Ethical guardrails include data minimization, transparent storage of voice samples when used for feedback, and culturally sensitive content that reflects children's lived worlds and home languages. For bilingual children, games can be configured for code-sensitive scaffolding in which the adult honors the child's full linguistic repertoire while gently steering toward the school language in task-relevant moments. Such practice aligns with dialogic views that treat translanguaging as resource rather than deficit.

For teachers and therapists, the framework yields practical selection criteria. Games should generate authentic reasons to speak, accept multiple adequate utterances, and supply adjustable pacing with simple, interpretable feedback on speech. They should foreground characters and purposes over points and badges, and they should publish clear data footprints. When these criteria are met, three benefits recur in the literature and in practitioner reports: expanded conversational stamina, richer pragmatic repertoires, and improved intelligibility within ongoing talk rather than only in isolated drills. The most convincing accounts arise where professionals treat the game as one tool among many, weave it into familiar routines, and keep the conversational relationship at the center.

Computer games can either drain attention from language or concentrate it, depending on how they are designed and enacted. When guided by coherent pedagogical and logopedic foundations, digital play becomes a space in which preschool children rehearse the moves of dialogue—listening, taking turns, clarifying meanings, and shaping sounds and sentences to fit purposes. The framework presented here integrates sociocultural and dialogic theories with multimedia and cognitive load constraints and translates them into concrete choices for classroom and therapy practice. The emphasis on adult co-play, narrative tasks that demand contingent speech, adaptive and modest feedback, and off-screen consolidation situates computer games within a humane pedagogy that honors play while pursuing measurable language goals. Future work should refine assessment tools for dialogic growth in digital contexts, explore culturally specific adaptations, and deepen collaborations between game designers and speech-language professionals so that the next generation of "educational games" can be judged by the

conversations they ignite.

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