

Punchi Panchi: gamified platform for kindergarten using affordances in constructivist teaching-learning with mood recognition

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Kindergarten learning is the basic and most important stage of education. Lack of proper primary education can hinder a child's secondary education. In the traditional method, the teacher provides all the knowledge to the children, and the opportunity for children to learn independently is limited. Therefore, the ability of children to learn by making mistakes and to think critically is limited. To overcome this problem, this research introduces Punchi Panchi, an intelligent e-learning system designed for Sri Lankan children aged 4 to 6. The platform integrates gamification, affordances, constructivist learning approaches, and mood recognition to foster a captivating and adaptive educational experience. To the best of knowledge, Punchi Panchi is the first Sinhala-language educational platform to integrate these features for early learners in Sri Lanka. It offers both cultural relevance and educational innovation. The system provides continuous voice guidance throughout interactive game-based learning activities, making it easier for young learners to navigate independently. The research methodology involved 40 kindergarten children using a stratified random sampling technique. The engagement and learning outcomes were compared between those using the platform with full features (gamification, constructivist learning, affordance, and mood recognition) and those using traditional learning methods. The average Normalized Gain (g) score for the platform; 0.72, is significantly higher than the traditional group's 0.46. The average usability score of the platform is 81.25, which exceeds the industry benchmark of 68. The observed engagement level was consistently high among platform users. The research determined that the playful and interactive learning platform, Punchi Panchi, provides significant educational benefits to young children. It helps build confidence by creating a mistake-friendly environment. The platform promotes self-directed exploration and problem-solving. It allows children to take an active role in their educational progression. Overall, Punchi Panchi improves both engagement and learning effectiveness, turning into a valuable tool for early childhood education.

Keywords: *Gamification, Constructivist learning, Affordances, Mood recognition, Kindergarten*