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Title: Enriching Learning through Computational Thinking and Participatory Design: A Robotics Project

Target group: 2.-3. Class secondary school

Introduction:

In the dynamic landscape of educational exploration, the Development Spaces course has been a crucible for understanding and applying Computational Thinking (CT) and Participatory Design (PD). The culmination of our endeavors manifests in a project that harmoniously blends theoretical knowledge with practical application. Leveraging the creative potential of Lego MindStorm, Lego bricks, and the precision of a Laser Cutter, we embark on a journey to recreate a childhood memory involving the moon. This endeavor transcends mere robotics, extending into the realms of creative expression, problem-solving, and collaborative design, encapsulating the essence of CT and PD.

Project Overview:

Our project unfolds against the backdrop of a captivating scenario – the moon seemingly following someone while driving. This enigma served as the catalyst for a comprehensive exploration of CT, where the complexity of the problem was dissected into manageable components. From coding the intricate movements of a Lego Mindstorm-driven car to grappling with the physics of the moon's apparent pursuit, students are immersed in the application of CT principles. PD takes center stage as collaborative design becomes integral to building the moving car, ensuring a harmonious integration of diverse perspectives. The Students will work in groups (4-5 people). They are introduced to Legomindstorm sets. Explanation of how the app, the robots and the coding work and how to use a Laser cutter.

The Story:

It was a memory etched in the fabric of time, a moment vivid and unforgettable. I remember like it was yesterday. I was just seven years old, a passionate football player for Rapid Wien, sitting in the backseat of my dad's car on the way home from practice. I gazed out of the window, losing myself in the moon. The city lights blurred into a distant glow as my mind wandered

beyond the glass. After half an hour of contemplation, a realization struck me like a gentle breeze.

"Why is the moon still here?" I thought to myself. We had been driving past it for the past 30 minutes, yet it remained, a constant companion on our journey. It made no sense. Objects usually appeared on the horizon and vanished in the rear window, following an unwritten rule that governed my perception of the world. But the moon, for some reason, defied this principle. It persisted, a mysterious presence in the night sky that challenged the logic of a curious 7-year-old.

Over the following weeks, I found myself drawn to this celestial enigma. The moon became the subject of my after-practice investigations. To my unbelieving 7-year-old self, a peculiar truth emerged — the moon was following me. And so, with each ride home from football practice, the moon remained my silent companion, challenging the boundaries of what I thought I knew. As the car rolled on and the city lights faded, I clung to the comforting certainty that, in the vastness of the night, the moon continued its quiet pursuit.

Educational Value:

At its core, this project exemplifies the educational value embedded in robotics, design and teambuilding. The infusion of CT hones students' computational skills and sharpens their problem-solving acumen. Concurrently, the immersive PD experience fosters collaboration, creativity, and inclusivity, preparing students for a future where interdisciplinary teamwork is paramount. The amalgamation of Lego, Lego Mindstorm, and the Laser Cutter not only enriches their technological proficiency but also nurtures a holistic understanding of multidimensional problem-solving.

Application of CT and PD:

Lego City Construction (PD): The construction of the Lego cityscape is a testament to PD in action. Students engage in collaborative design, pooling their creative energies to shape a diverse and cohesive urban landscape.

Laser Cutter Moon Design (PD): The creation of the moon involves a collaborative design process where students collectively envision and implement a realistic representation. Precision and attention to detail underscore the value of PD in this phase.

Lego Mindstorm Car Building (CT): The application of CT is palpable in the coding of the Lego Mindstorm to simulate a moving car. Students meticulously break down the task into logical steps, bridging theoretical knowledge with hands-on application.

Video Presentation (PD): The collaborative spirit continues into the final phase as students craft a compelling video presentation. The narrative, visuals, and overall presentation style are products of collective decision-making, embodying the ethos of PD.

Conclusion:

In conclusion, this interdisciplinary project stands as a testament to the transformative power of education when rooted in CT and PD principles. It not only equips students with technical skills but also cultivates a mindset that embraces collaboration, creativity, and adaptability. The resulting video presentation serves as a captivating showcase of their collective efforts, underscoring the educational richness and joy derived from the seamless integration of technology into creative projects.

Evaluation:

At the outset of the semester, as Team Agent P, we found ourselves uncertain about the eventual form our project would take. Initially, we grappled with the challenge of generating ideas and subsequently faced the task of seamlessly incorporating all elements into our final project. Through a process of brainstorming sessions and consultations with our professor and colleagues, we successfully orchestrated the integration of all components, culminating in the creation of our final project.

This comprehensive project not only serves as a valuable resource for future physics lessons but also provides an engaging opportunity for students to delve into the luminosity of the moon. By exploring the brightness of the moon, students gain insights into celestial phenomena and understand the limitations associated with attempting to drive by its light. Moreover, the project encourages creativity, fostering a dynamic and collaborative learning environment. Educators can utilize this innovative project to not only impart scientific

knowledge but also to promote team building among students, thereby cultivating a positive and productive atmosphere within the classroom.