Level 3 | Gamestorming with Purpose! (Beat the Boss!)

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Advanced Designing Games for Learning

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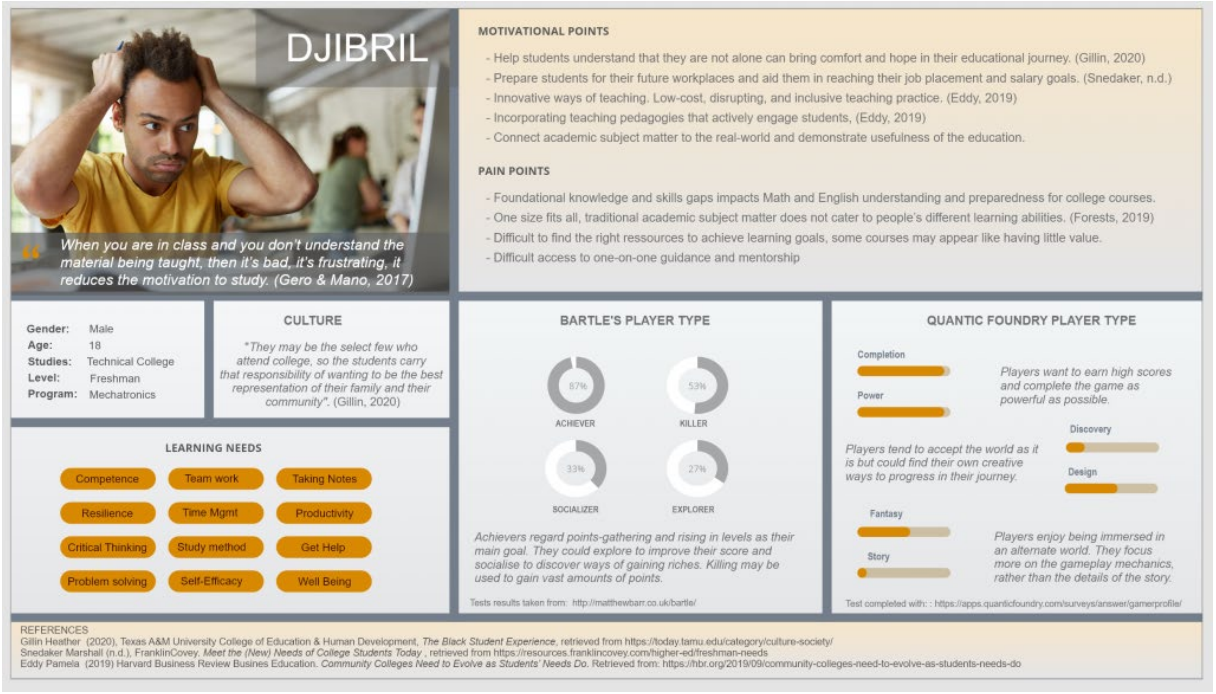
Part 1: Share your Learner-Player Persona Blog

I published my learner-player persona in my blog at: https://kahinamorisset.com/learner-player-persona/. I shared my blog link within my independent project and with a researcher outside class. This could lead to interesting feedback. I have already received comments from my Gaming Guide providing insights into how this research work will be useful for aligning game mechanics and objectives to my target audience. The iterative game design process will provide opportunities to improve and refine my first version. See below an image of the card I created as a first version. I used my preferred design tool (adobe XD) and a licensed photo from Adobe Stock to create my persona card. As per Brown (2023) recommendations, I used a publishing process that enables convenient sharing over the web and practical updates with "future iteration in mind" (para. 5).



Part 2: Individual GameStorming!

- **Game, simulation, or simulation-game**: A well-designed simulation game could offer my target audience the best of two worlds. Learner-players could experience the physics

and mathematics concepts they have yet to understand and need to get more familiar with in a safe, rigorous, and realistic environment. In addition, they could benefit from a game format departing from the traditional teaching methods they have been struggling with. A simulation alone could provide for the learning needs but might miss the motivation points and not consider the learner-player's paint points. For example, the game component could include customization, various paths, and different ways to progress to cater to diverse learning styles. Learner-players may have already been exposed to instructional physics simulations in high school and perceive them as academic, one-size-fits-all educational material. On the other hand, games offer a unique, innovative, and original format, aesthetically appealing. Learner-players could engage and connect with real-world problems and appreciate the innovative nature of the learning experience, resulting in a better overall fit for them.

- **Potential title**: From my initial research, most titles I found about my topic reflected the nature of the game, such as "the moving man", "train sim world", "snowtopia", "traffic sim", "traffic command". However, a title such as "practical engineering" used on the YouTube channel resonates better with my target audience because it links the play-learn experience with the future workplace and career prospects. First, as a first version, I will use the tentative title "*Engineer your way*". This title talks directly to the learner-player and aims to empower them. It says you can create your way using engineering skills. It can also make them feel they are not alone. There is also a connection to the simulation game content, which will become more apparent as learner-players discover the game. There are roads and traffic lights managing car flow problems and creating possible "ways" and solutions.

I also want my title to convey critical positive emotions that will be experienced by players. For example, I want the gameplay to elicit specific "emotional responses" (Kultima, 2010, p. 38) such as feelings of excitement and empowerment. This emotional response will make them more susceptible to benefit from the learning experience. My first version of the title was a work done in solitude. Because I cannot only rely on my perspective, I will also have to collect feedback from others, mostly from individuals aligning well with my player-person. I could also organize brainstorming sessions and use specific tools and "formal techniques" (Kultima, 2010, p. 35) to reach my goals and revisit the title as I iterate during my game design phase.

Core dynamic: According to the learner-player persona card's player types, the game dynamics must primarily cater to achievers. The core dynamic has to satisfy the needs for completion, instill feelings of competence, and empower learners in the educational journey. Looking at all possible core dynamics from Boller & Kapp (2017), I found that "escape" and "solution" are best suited. For example, the simulation game could offer different levels of puzzles to solve and escape from a bad situation. Another core dynamic of interest is the "construct" paradigm. With this dynamic, I could embark on players to create new ways to solve problems, but that would require lower levels of Bloom's taxonomy have been covered. From the player-learner person, I also know that my target audience lacks foundational knowledge and skills. However, they would benefit from using their creativity and skills to solve real-world problems. This link between academic knowledge and skills and how it is used and applied in the real world is critical for a successful learning experience. The game simulation will include several levels, and I could envision the core dynamics evolving from the first to the last level. To conclude about core dynamics, my simulation game could start with enticing the player to find "solutions" to

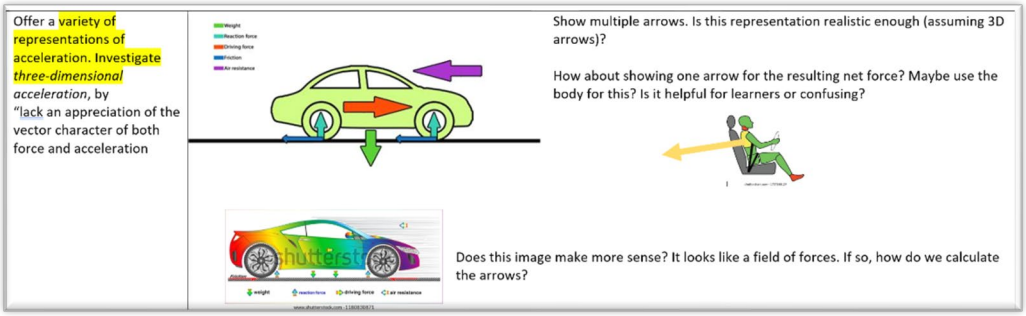
various problem statements, then lead to a situation from which to escape, and finally, offer opportunities to create new ways to conquer the highest levels and win the game. The transition from one core dynamic to another must be subtle and not disrupt the habits formed by the players and their confidence to achieve the game challenges. I foresee the primary core dynamic will be “solution” with touches of “escape” and “construct” conveyed by the background story.

- **Description of the idea**: The simulation game aims to offer learner-players opportunities to drive a test car in and outside a city, set intersections’ traffic signals, and create the best ways to escape traffic jams while preventing accidents. The environment provides a real-world setting where civil engineers have worked behind the scenes for decades.
    - First, this idea addresses the client's problem as learner-players will experience first-hand how physics principles and mathematics are critically used to solve engineering problems. As a client, I want my simulation game to demonstrate the need to acquire solid foundations to succeed in STEM careers. I want the game to provide the enjoyment of solving problems with sufficient fluency in mathematics and physics. I believe that underlying concepts must be made visible in a complex but simplified real-world setting to help learners realize the amount of knowledge and skills required under the hood. The game will feature levels that allow for scaffolding essential to guide without telling and empower learners.
    - Second, the idea can align with the learner-player personas if the design considers the learning needs identified. For example, my learners need to acquire more resilience and enhanced time management skills. There have to be design details that will address these. All sorts of failures will be present and not necessarily penalized

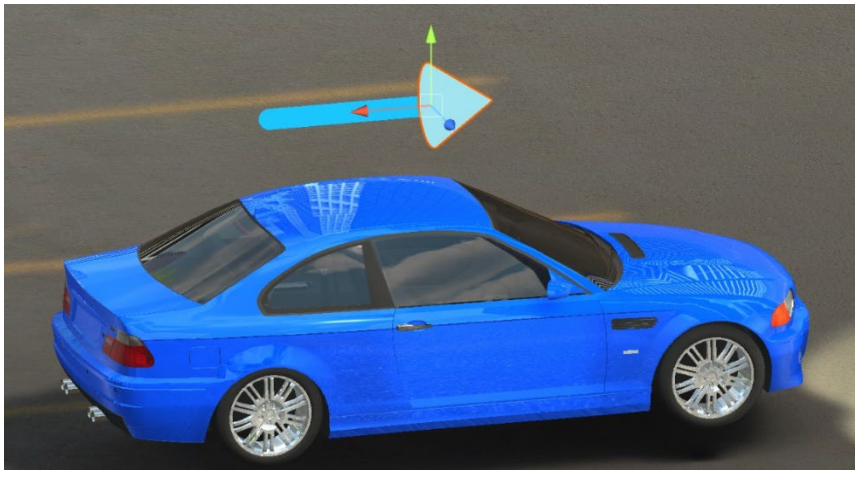
for the first levels. A learner could crash the car test multiple times, but some incentive could be implemented to guide players to manage the time allotted to this fun experience and keep the end goal in mind. When the traffic intensifies, other cars will appear at intersections that may not have been present before, changing the focus from driving alone to driving with all sorts of dangers of collision. Finally, if a learner player wants to succeed in the final levels, they will have to focus more and more on the tasks at hand and play less as engineers do in real life. They can have fun, but they know when and how to concentrate and solve a problem. These final levels could target self-efficacy. Well-being can also be addressed by introducing game breaks and healthy practices. As the game design progresses, returning to the player-learner persona will guide my choice of which ideas to keep and which let go. The iteration process will also let me refine the player persona as some ideas might pop up that are not aligned with the player persona as it is and could impulse a necessary update.

Part 3: Share your ideas with your Team

- I started developing more ideas to address the concept of velocity and acceleration. How to convey these to students in a practical, visual, and intriguing way to elicit their curiosity? I researched teaching ideas, and I came across the work of Ann-Marie Pendrill (2019). She wrote several papers about the difficulties students experience with traditional teaching of these specific concepts. I identified five critical points and started developing ideas on addressing these items. For example, see below some ideas I developed on how to offer a variety of representations of acceleration.

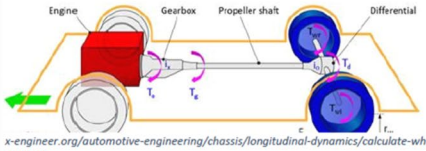


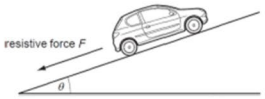
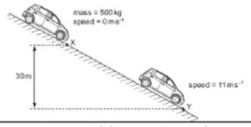
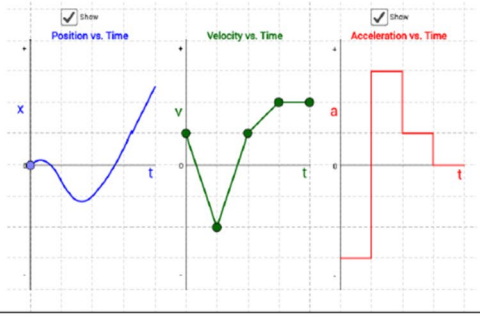
- I also started to test other ideas about visualizing the three-dimensional acceleration and velocity. I experimented with my prototyping tool as it can help show various solutions and ask around to see which ones make more sense and work best and if it is feasible. See the screenshot below. I used a 3D arrow made of a cylinder and a cone. I think it has not been done before in any simulation I have seen, so I need to take the time to find an excellent way to represent this velocity concept. I want to make it intriguing, so players must guess what this is about and feel empowered by this discovery.

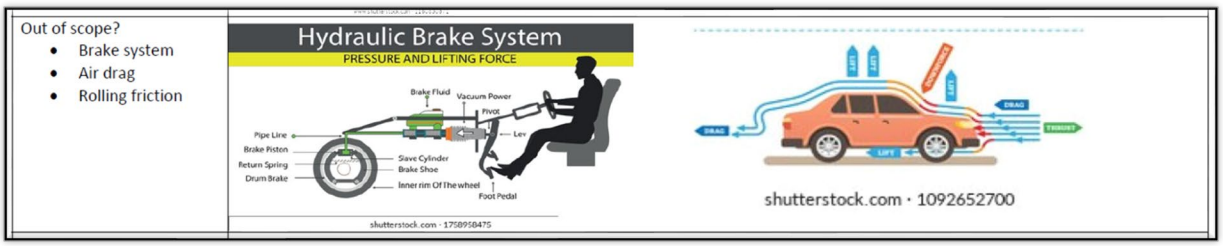


- Other items and ideas about the concept of acceleration and velocity are presented below.

Acceleration concept

Learning objectives - Teaching strategy	Game mechanics - Game Goal Brainstorming as many *visual ideas* as possible then will be reduced to what is making the most impact and also possible to implement. We will create our own graphic 3D assets, the images presented below are just for brainstorming purpose.
perceive acceleration "in their body", experience the "g-force",	Will not feel it in city driving except when there is abnormal super-fast acceleration, or the car has an accident ?   Use an incline and have the vehicle become unstable?  Use crash test silhouette to visualize areas of tension/pressure: use color coding (red, yellow, green). 
relate acceleration to external forces. make critical real-world aspects of acceleration accessible to the students such as "a car comes to rest unless the **engine** continues to provide energy"	 a car comes to rest unless the engine continues to provide energy relate acceleration to **engine's rpm** display meters  introduce a visual model of the *invisible happening* in the car and use wheel torque. Research formulas *x-engineer.org/automotive-engineering/chassis/longitudinal-dynamics/calculate-wheel-torque-engine/*

approach the concept from the relation a=F/m rather than from a=dv/dt	How to make learners understand proportional relationships. How about using the acceleration of a vehicle on a slope, with the engine stopped? The force of gravity explains the motion. What experiment to do and how to challenge learners?  
use accelerometers to help develop insights for the understanding of force and acceleration.	Not sure yet how to do this. Unity (the game engine I use) has a 3D accelerometer-built in. I will investigate this.
Use an interactive graph displaying the displacement, velocity and acceleration versus time	The graph is interactive, players will interact and create parts or all of it (scaffolding). Interactions are to be determined. 



- I look forward to hearing back from the course's Game Guide and other individuals I will connect with as I progress through my game's design. I look forward to refining the ideas presented below and making them exist in the game if possible.

Part 4: Generate a Gamestorming Report

- Summarize the Team's learner-player persona: see above.
- Individual Team Member Contributions: see above.
- Compile a summary of all listed ideas and generate a player matrix. Describe how the ideas are similar or dissimilar: does not apply to an independent project? Please let me know otherwise.

REFERENCES

Boller, S. & Kapp, K. (2017). Chapter 1 The Basics. In Everything You Need to Know About Designing Effective Learning Games Play to Learn. pp. 6-8.

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Kultima, A. (2010). The organic nature of game ideation: Game ideas arise from solitude and mature by bouncing. (Future Play 2010: Research, Play, Share - International Academic Conference on the Future of Game Design and Technology), 33-39. https://doi.org/10.1145/1920778.1920784

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