Problem: Among 5.63 million learners, only 3.13%completed their e-courses in 2017-18 (Reich & Ruipérez-Valiente, 2019). Self regulation in completing work is a challenge students experience in online-based learning scenarios based on our interviews and will continue to accelerate as a problem after the COVID e-Learning boom; online education enrollment is projected to reach $350 billion by 2025 (Li & Lalani, 2020). However, massive evidences has suggested that learners often struggle to self-regulate their learning process in online environments successfully (Azevedo & Cromley, 2004; Bol & Garner, 2011; Dunlosky & Lipko, 2007; Peverly, Brobst, Graham, & Shaw, 2003).
Goal: We aim to provide a tool to improve self-regulated learning for learners struggling with a e-Learning environment by reinforcing various self-regulatory skills as demonstrated below.
Rationale and Solution: Self-regulation refers to the act of controlling one's behavior by planned action in the pursuit of goals (Schunk & Zimmerman, 2011). We target the three cyclical phases of self-regulation (forethoughts[1], volitional control[2], self-reflection[3]) proposed by Boekaerts et al using three design concepts:

Productivity Techniques - Goal setting and planning in the forethought phase are supported by a to-do list section in our design where the user breaks down tasks into subtasks to increase the likelihood of success in pursuing goal-oriented actions (Gollwitzer, 1999). The Pomodoro method, which requires users to fully concentrate in manageable time intervals, is implemented as a countdown timer to support the high level of focus required by the volitional control phase for its ability to effectively reduce external distraction (Cirillo, 2018). This design decision further resolves our users' needs as most respondents expressed in our surveys and interviews that they would highly appreciate a method to keep them accountable and focused on getting through their work.	***Gamification*** - We incorporated the productivity methods in the context of city-building simulation, where the actual learning process is synchronized with the in-game progress using timer. The user receives rewards such as coins and city buildings upon completion of the real-world task as well as the in-game building construction. Such visualization of accomplishment triggers the perception of high individual performance and helps improve the motivation and self-efficacy of the user to support the forethought phase (Banfield & Wilkerson, 2014; Buckley, 2014; Karimi & Nickpayam, 2017). We received positive feedback from our potential users in our interviews about implementing game elements to support establishing good working habits.	***Personal Informatics*** - PI systems, which helps people collect and reflect on personal information, are effective approaches towards self reflection (Li & Forlizzi, 2010). Our PI system tracks time, log entries, performs analysis in time expenditure, and provides comparisons between personal stats and global average. To help people collect and reflect on their performance, we implemented an achievement/reflection journal that provides users with stats and updates about their progress, and using the reflection journal, users will better understand their learning behavior (Boekaerts et al, 1999; Kim et al, 2019). PI has been shown to be successful in fostering self-insight and reinforcing positive behaviors to support the self-reflection stage.

Market and Competitive Analysis: With the tremendous growth of E-learning market size which is projected to continue to grow and reach US$499 billion by the year 2020, trailing a post COVID-19 CAGR of 10.3% over 2020 to 2027 (Wadhwani and Gankar, 2020), self-regulated learning assisting tools, such as Pomodoros, Any.DO and Doit.im, have shown a rise to 13.3% CAGR until 2026 in the task management software market (Fortune Business Insights). On the other hand, the adoption of gamification in education is also increasing: the global gamification in education market size reaches a CAGR of 46.3% in 2020 and is expected to reach USD 7,200 Million by 2028 (Technavio, 2020). While we found the products that apply gamification in education, such as Virtonomics, usually take it as a trigger of evoking the users' motivations in learning and isolated the game factors from self-regulation. Filling the blank, our product takes gamification into account in all the aspects of self-regulation improvement of our user, including: motivation, engagement and reflection.

[1] The forethought phase of self-regulation includes the action of goal setting, planning, and developing self-efficacy.
[2] The volitional control phase refers to the performance stage that requires attention focusing and task strategies.
[3] The self reflection phase consists of performance assessment and comparing the status of oneself with a standard or goal.

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