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# What's *what* PSPM

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UNDERSTANDING AND OVERCOMING MATH ANXIETY:  
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# LEARNING HEAT EQUATION THROUGH GAMES

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Students have difficulty comprehending the heat equation's topic since standard teaching approaches frequently fall short of making the connection between mathematical ideas and actual world [1]. According to [2], many students believe that mathematics is challenging, which reduces their excitement and weakens their ability to solve problems. This intensifies emotional tiredness and blocks the growth of critical thinking skills necessary for solving problems in the real world (Kartika et al., 2020). To address these issues, the study adopts a proactive action by seeking to determine the suitable partial differential equation (PDE) models emphasising the heat equation and its complex elements. This phase is essential for giving students a basis for a more useful and applied comprehension of the heat equation. Furthermore, the study intends to use the separation of variables (SOV) methods to solve the heat equation and include it in an instructional game. This approach is aligned with the potential of mobile mathematics resources combined with game-like aspects to improve comprehension [4].

Learning applications are more than just gamified textbooks; they are immersive mediums that promote a stronger connection between students and the subject matter. Incorporating interactive components is not a gimmick, but a purposeful decision that caters to different learning styles, ensuring that students connect with the learning application and serve as conduits for learning one-dimensional heat equations. For that purpose, a game learning application is developed using the Scratch Platform by focusing on a) Interface Development, b) Game Elements, c) Visual Illustration, d) Interactive features and finally, e) Testing and Debugging.

Creating a user-friendly interface for the Scratch platform, including screens, buttons, and interactive components, to allow for seamless engagement with educational content. Integrating the Separation of Variables (SOV) method while using game features like stages and scoreboards aimed to boost user engagement and provide an interactive learning experience within the application. The interactive learning experience can be improved by incorporating graphical representations, animations, and visual clues into the game learning app to effectively demonstrate heat transfer principles. The final step of testing and debugging plan to identify and resolve potential defects or issues, ensuring the application's functioning and dependability. Make the learning app accessible and user-friendly. The interface design of the game is shown if Figure 1 while Figure 2 shows the students that created the game.



Figure 1: Game Interface Design



Figure 2: From left Nur Anis Natasha Zahurin, Aida Afrina Khusli, Dr. Siti Hidayah Muhad Saleh, Ts. Dr. Ratna Zuarni Binti Ramli, Nur Anis Izzati Abdull Razak

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