

Figure R1: The advantage of sequence information in explaining the consistency between students' knowledge states and learning processes. Here, the horizontal axis represents the order in which target concepts are answered, and the vertical axis represents the mastery level of concepts by users obtained by SPKT under a specific perturbation ratio.

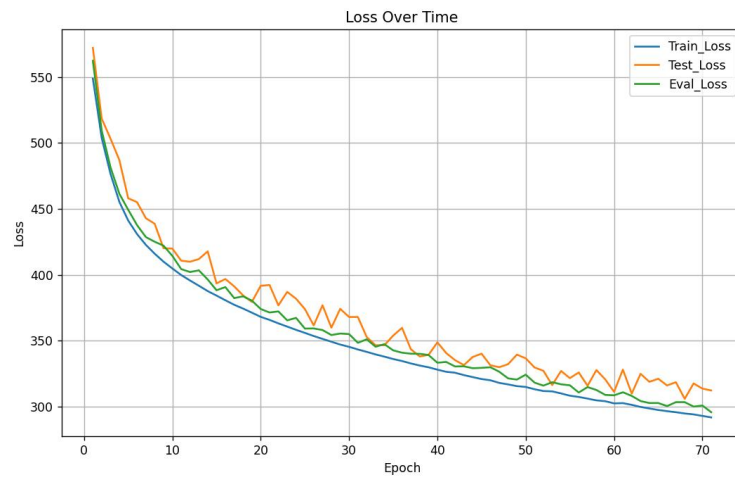


Figure R2: Changes of Train_Loss, Test_Loss, Eval_Loss with the increase of epochs.

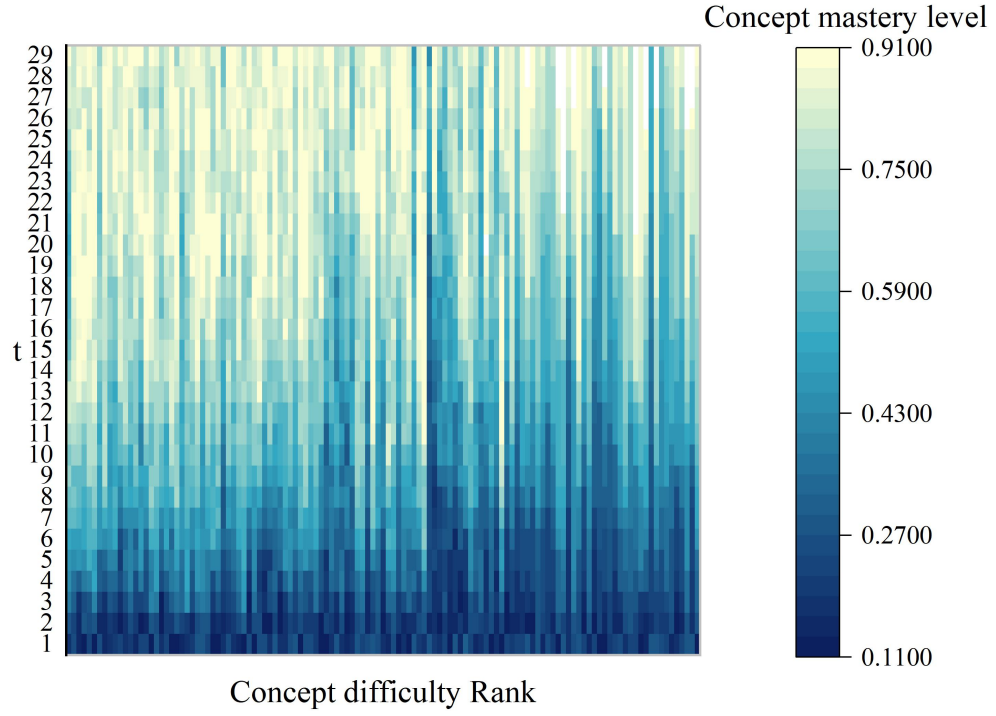


Figure R3: Students' mastery of different concepts changes with the increase of time steps. The horizontal coordinate is the time step, and the vertical coordinate is the concept id. The difficulty of concepts has been sorted, and the number with less difficulty is preferred.

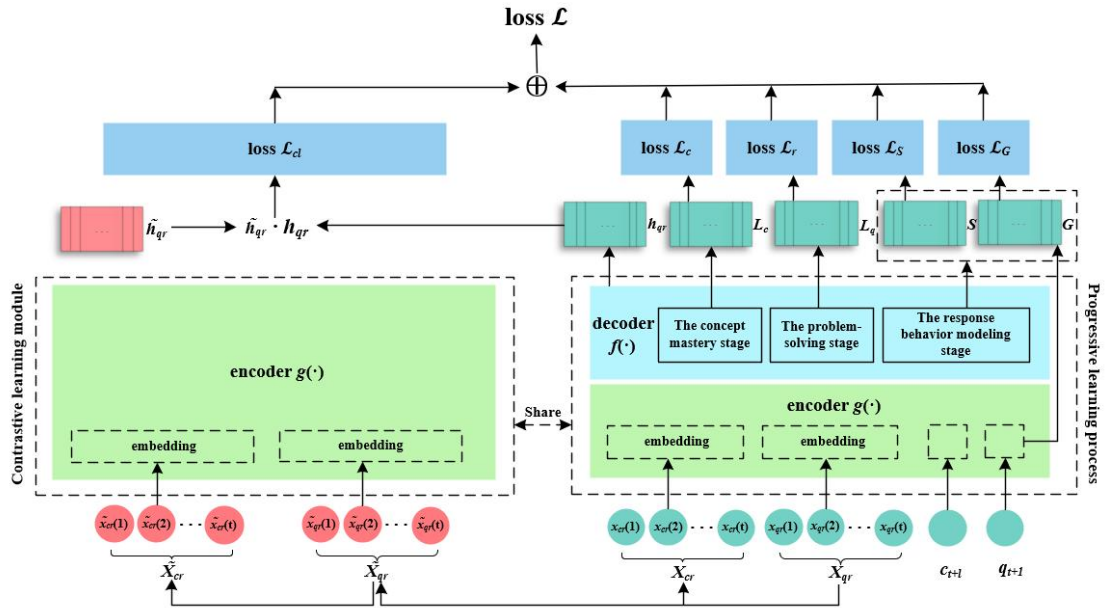


Figure R4: The SPKT Framework.