Learning analytics are a powerful tool for understanding what online learning behaviors are beneficial for achievement. However, little research in learning analytics has sought to validate the inferences researchers make from trace data to actual student behavior. This project situates self-regulated learning (SRL) theory with emerging methods to digitally trace student behaviors in naturalistic, STEM learning contexts, to better understand how students regulate their learning in online learning environments. To do this, we observed the behavior of fifty undergraduate students as they engaged with online learning materials and thought-aloud while they were learning. Ultimately, the goal of this research is to align student's think-aloud data (i.e., verbal traces), with trace data and understand these behaviors through SRL theory. This research will allow education researchers to make validated inferences about student online learning behaviors.