9MNX NX FS T[JW[NJ\ TK YMJ FIFUYN[J FHYN[NY^ IJXNLS GJXY U
VitalSource Research and Development team as published in July 2021 and presented at the 23rd International Conference on Human-Computer Interaction. You can read the entire paper here.

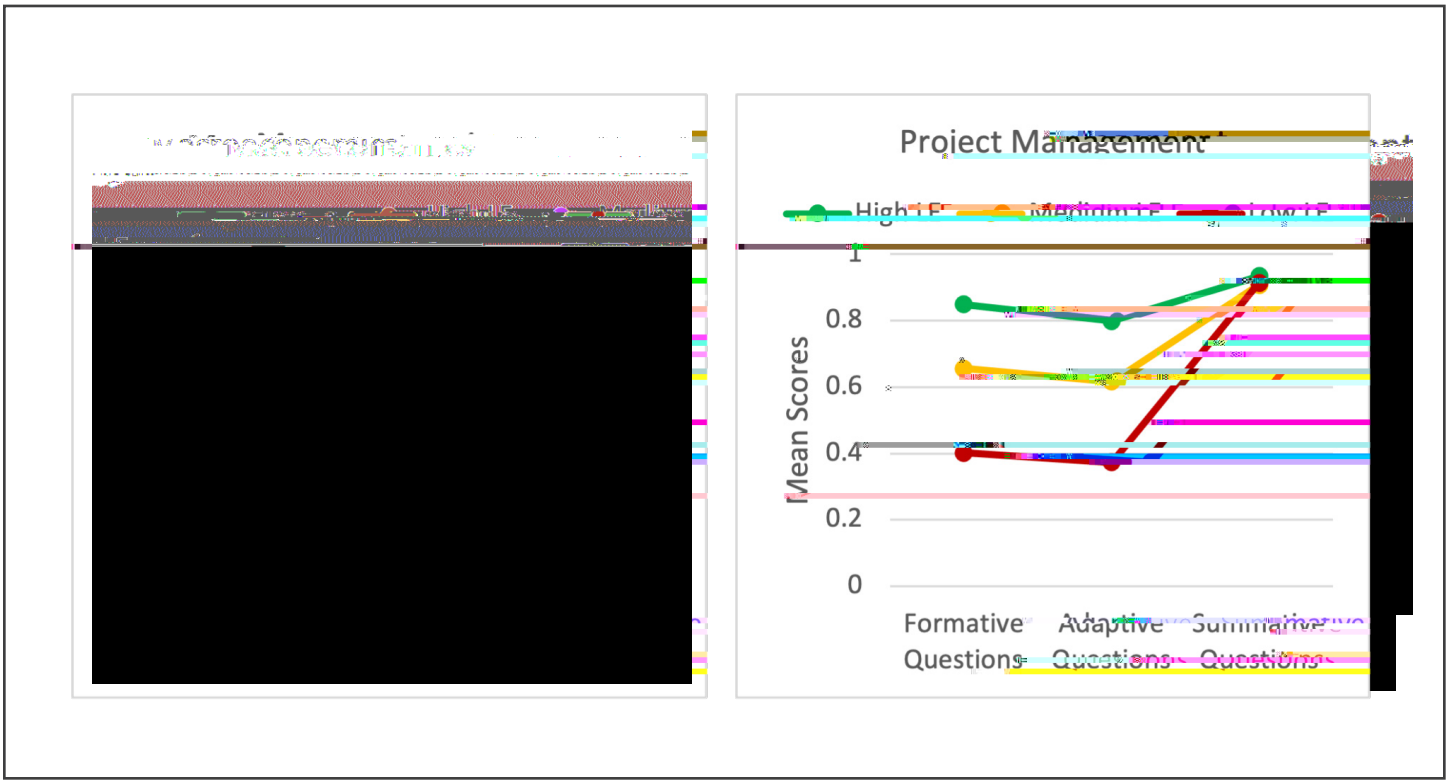
A learning estimate is a predictive measure generated by Acrobatiq's Analytics Engine for each student on each learning objective. It is primarily based on how well a student performs on the formative practice for each learning objective. The learning estimate is categorized as low, medium, and high.

Formative practice

RESEARCH QUESTION 3:

In order to investigate course features, we analyzed several different components of the course.

&QNLSRJSY INK*HZQY^ FQNLSRJSY TK YMJ KTWRFYN[J FIFJUYNS[JNRUSFIHX on the success of the adaptive activities. We found that the alignment for all courses showed lower mean scores on adaptive questions, while much higher mean scores on summative assessments, with all students scoring nearly the same no matter their learning estimate category. These results are surprising, as the summative VZJXYNTSX \JWJ \WNYYJS YT GJ YMJ RTXY INK*HZQY FX F MNLM XYFP circumstances in the classroom that may have led to high scores for all students, such as group-testing or practice in class.



&RTZSY TK 8HFKKTQ 1 we analyzed the amount of scaffolded practice questions for the adaptive activities. We found that Probability and Statistics had an average of 14.05 adaptive questions available per learning objective, Project Management had an average of 6.69, Finance had an average of 5.17, and Macroeconomics had an average of 4.89 questions. This indicates the total number of adaptive questions per learning objective questions matters.

<J KZWYMJW GWTPJ IT\S YMJ SZRGJWX TK QT\ RJINZR FSI MNLM INK we looked at the 75th percentile (meaning 75% of learning objectives had fewer questions) the results showed a clear trend—the three non-STEM courses had very few scaffolded questions for most learning objectives. Students who needed scaffolding were not getting very much help.

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Adaptive practice available at the 75th percentile for each scaffold level.

This scaffolding ratio was further supported when looking at the learning objectives that had the largest learning estimate decreases after completion of the adaptive activities. Those objectives had zero to one questions at the low or medium level and up to 27 at the high level. The learning objectives that increased learning estimates the R T X Y M F I R T W J X H F K K T Q I N S L V Z J X Y N T S X Y M F S M N L M I N K * H Z Q Y ^ V Z J X

) N K * H Z Q Y ^ T K 8 H F K K T Q I J I * S F Q X N S [J S X Y N L F Y N T S X M T \ J I Y M F Y K T W Y \ T H
M N L M V Z J X Y N T S X \ J W J F Q Q U J W K T W R N S L F Y Y M J X F R J I N K * H Z Q Y ^ Q J [
S T Y Y W Z Q ^ U W T [N I N S L F S ^ X H F K K T Q I N S L G J S J * Y X Y T X Y Z I J S Y X

CONCLUSION

While there were likely course implementation choices that obscured some lines of investigation around the summative assessments, the features of the adaptive activities themselves were largely related to their effect on student learning estimates. Adaptive activities with more questions per learning objective and high ratios of X H F K K T Q I J I V Z J X Y N T S X Q T \ F S I R J I N Z R I N K * H Z Q Y ^ Y T M N L M I N K * H Z Q Y learning estimates. The adaptive activities were developed based on research principles, but continued data analysis provides important insights into optimal design based on student use and therefore is a critical part of educational technology. The analysis of their performance in practice is necessary to identify problems and the best practices that can improve their effectiveness for students.

Van Campenhout R., Jerome B., Dittel J.S., Johnson B.G. (2021) Investigating Adaptive Activity Effectiveness Across Domains: Insights into Design Best Practices. In: