

Promoted Online Tutorial Use in General Chemistry: Effects on subsequent tests and quizzes and on subsequent use of online tutorial resources.

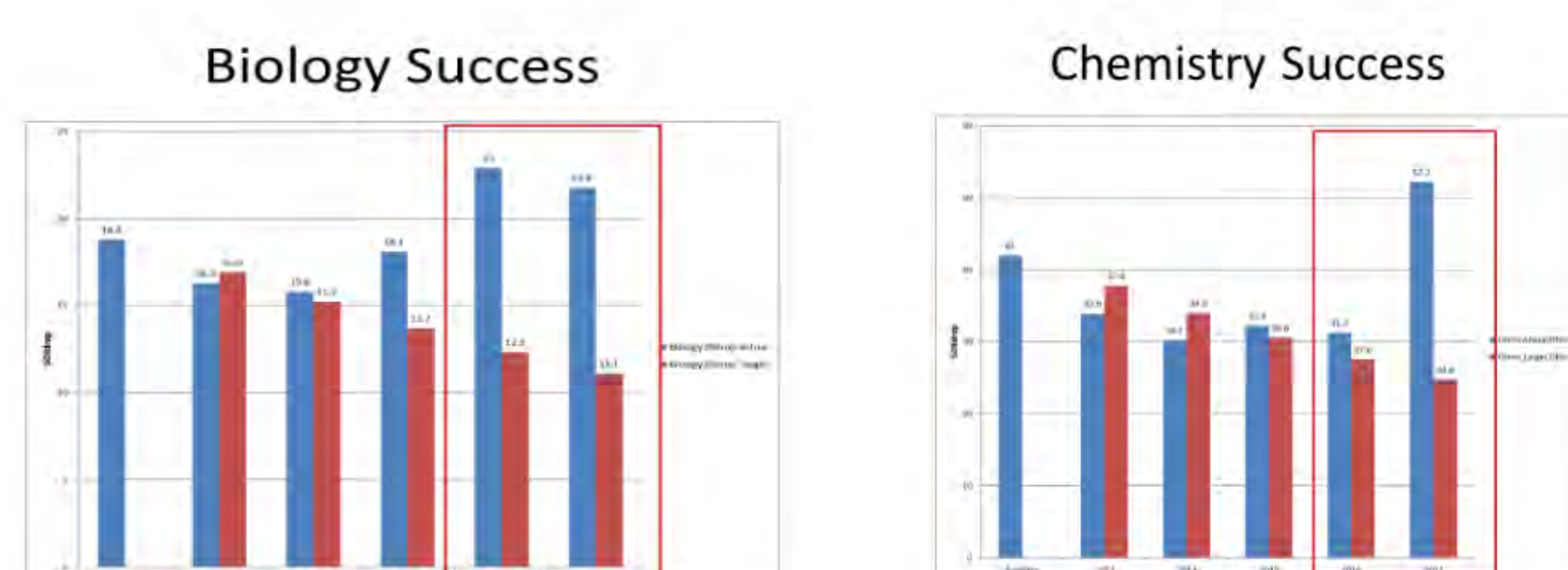
Timothy D. Champion^{1*} and John Bannister²

¹Natural Sciences and Mathematics Department; Johnson C. Smith University ²Division of Information Technology; Johnson C. Smith University

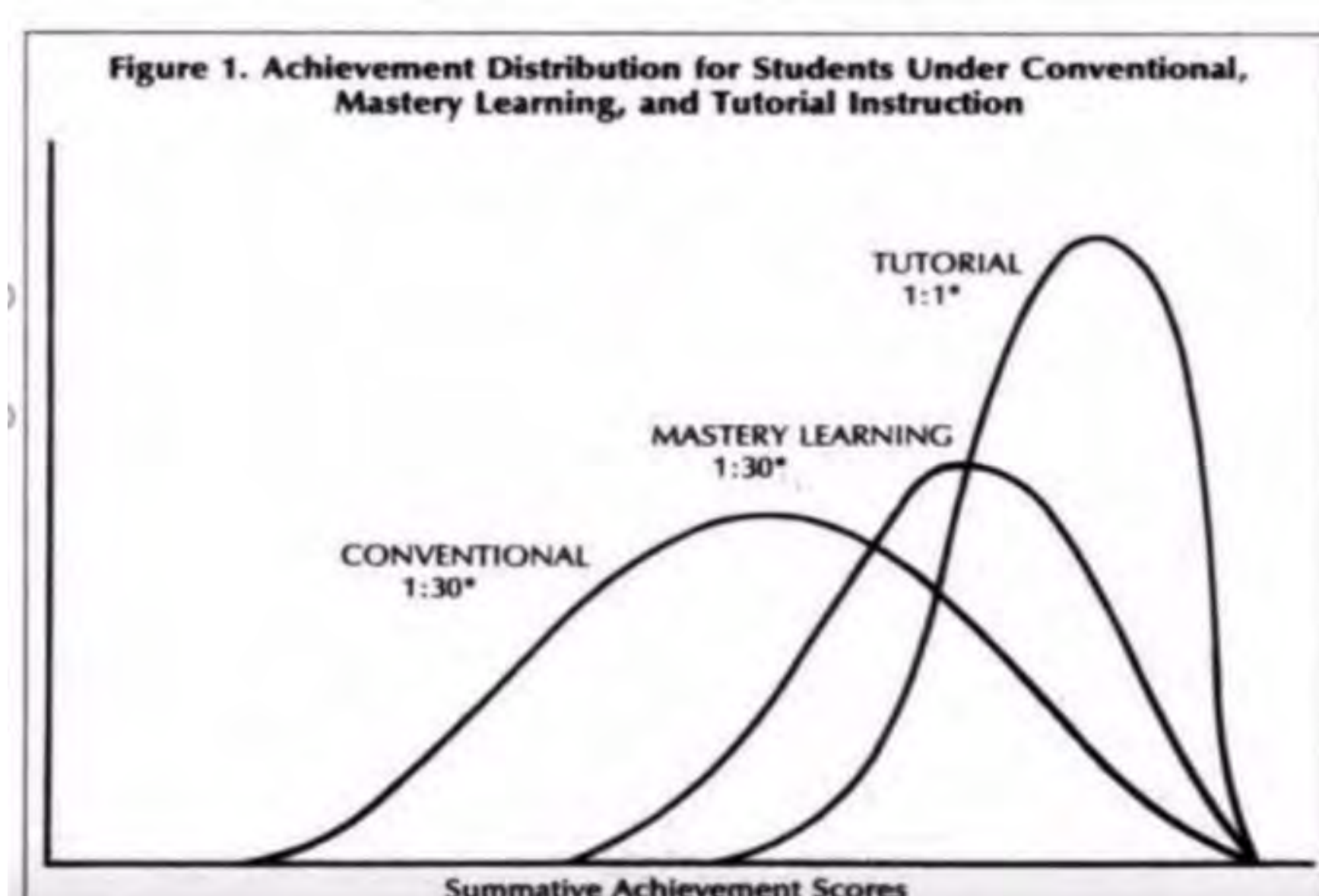
*presenting and corresponding author tchampion@jcsu.edu

Introduction

Promoting student success in entry-level STEM courses is a continuing area of national and international interest. While JCSU has made great strides in promoting student success and retention, recent data suggest a rise in the DFW rates for key courses (Champion & McNair, 2017. Title III Activity 6 Presentation):



The urban small university where these studies were conducted has a contract that allows students to utilize an online tutorial service. While the success of tutoring is well-documented as a “two-sigma” improvement over group instruction (Bloom, 1984),



it is our perception that students do not utilize this resource as effectively as they might. (N.B. The PI of this proposal has over 2 years of experience as a Lead Tutor for this company in 2010-2012)

The purpose of these studies was to apply strategies to promote student utilization of online tutoring resources and examine the resulting data for increased student success on course-based tests, parallel quizzes, and increased utilization of tutorial resources. The hypothesis was that better utilization of tutoring will improve student success in classes.

Methods

In General Chemistry I and II classes taught by the lead author of this study, a series of online tutoring quizzes were developed. Usually based on questions released for public use by the American Chemical Society Division of Chemical Education Examinations Institute, these quizzes required students to have an synchronous online tutorial session. The student received full credit for the quiz for uploading the record of the tutoring interaction (a “whiteboard” printout).

This study spanned four semesters and involved 173 students. This resulted in 323 online tutoring quiz-in class quiz pairs and 893 online tutoring quiz-exam score pairs for analysis.

These online quizzes were correlated to subsequent specific in-class quizzes and to subsequent specific mid-semester exams. The effect of participation in the tutoring experience on the grades on these subsequent assignments are analyzed below.

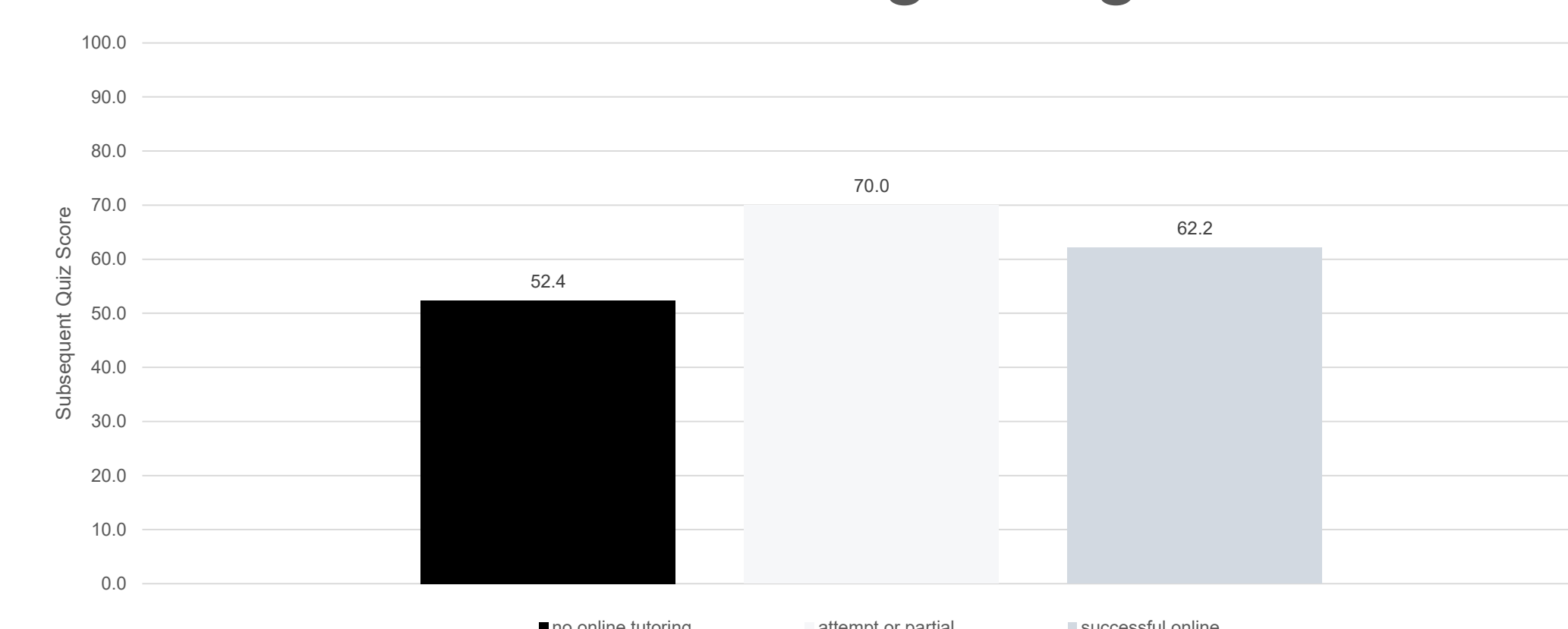
Finally, the effect of the experience on students use of the online resource was examined by comparing students use between two sections of General Chemistry I (CHE 131), where one did not use the assignments that required online tutoring.

Observations

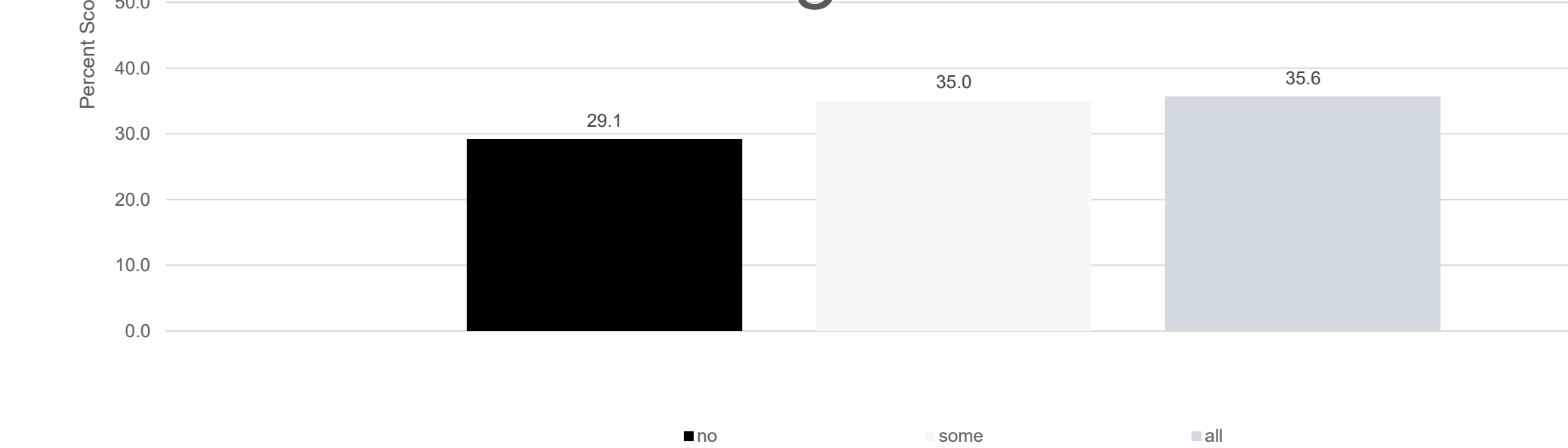
- Students struggled with use of online tutoring using mobile devices; these required the use of the browser to get a token to authenticate access and then the use of an app to access tutoring.
- Wait times for drop-in sessions were very long; students were encouraged to plan weekly reserved tutoring sessions well in advance.
- While we desired to evaluate impact on subsequent semester use between our comparison CHE 131 sections, subsequent enrollment in CHE 132 sections in this study confounded that analysis.

Results

General Chemistry students scored higher on subsequent quizzes if they attempted the online tutoring assignment



General Chemistry Subsequent Exam Scores Were Higher If Students Attempted The Prior Online Tutoring Assignments



Online Tutoring Assignments Significantly Increased Online Tutor Use

