Announcing the Final Examination of Mr. Ryan H. Kasha for the degree of Doctor of Philosophy

Date: October 29, 2015

Time: 10:00 a.m.

Location: Partnership II, Room 301 (3100 Technology Parkway Orlando, FL 32826)

Dissertation title: An Exploratory Comparison of a Traditional and Adaptive Instructional Approach for College Algebra

This research effort compared student learning gains and attitudinal changes through the implementation of two varying instructional approaches on the topic of functions in College Algebra. Attitudinal changes were measured based on the Attitude Towards Mathematics Inventory (ATMI). The ATMI also provided four sub-scales scores for self-confidence, value of learning, enjoyment, and motivation. Furthermore, this research explored and compared relationships between students’ level of mastery vs. their actual level of learning. This study implemented a quasi-experimental research design using a sample that consisted of 56 College Algebra students in a public, state college in Florida. The sample was enrolled in one of two College Algebra sections, in which one section followed a self-adaptive instructional approach using ALEKS (Assessment and Learning in Knowledge Space) and the other section followed a traditional approach using MyMathLab. Learning gains in each class were measured as the difference between the post-test and pre-test scores on the topic of functions in College Algebra. Attitude changes in each class were measured as the difference between the holistic scores on the ATMI as well as each of the four sub-scale scores, which was administered once in the beginning of the semester and again after the unit of functions, approximately eight weeks into the course. Utilizing an independent t-test, results indicated that there was not a significant difference in actual learning gains for the compared instructional approaches. Additionally, independent t-test results indicated that there was not a statistical difference for attitude change holistically and on each of the four sub-scales for the compared instructional approaches. Also, correlational analyses revealed a strong relationship between students’ level of mastery learning and their actual learning level for each class with the self-adaptive instructional approach having a stronger correlation than the non-adaptive section, as measured by a r-to-z Fisher transformation test. The results of this study indicate that the self-adaptive instructional approach using ALEKS could more accurately report students’ true level of learning compared to a non-adaptive instructional approach. Overall, this study found the compared instructional approaches to be equivalent in terms of learning and effect on students’ attitude. While not statistically different, the results of this study have implications for math educators, instructional designers, and software developers. There is much potential for intelligent tutoring to supplement different instructional approaches, but should not be viewed as a replacement for teacher-to-student interactions.

Outline of Studies:

Major: Modeling and Simulation

Educational Career:
B.S., 2000, Florida Atlantic University
M.S.T., 2001, Florida Atlantic University
M.Ed., 2002, Florida Atlantic University
Ed.S., 2004, Florida Atlantic University

Committee in Charge:
Dr. Peter Kincaid
Dr. Richard Hartshorne
Dr. Paul Wiegand
Dr. Cliff Morris

Approved for distribution by Peter Kincaid, Committee Chair, on October 13, 2015.
The public is welcome to attend.