University of Maryland Eastern Shore Engineering and Aviation Science Department implementation of the wright state egr 101 model
by i. k. dabipi

- Introduction
- Objectives
- Implementation Strategy
- Initial Results
- Future Direction

introduction

- The **University of Maryland Eastern Shore (UMES)** is a historically black institution and the 1890 Land Grant Institution for the State of Maryland.
- Most Wright State's EGR 101 materials are currently taught in Math 110 by the Math and Computer Sciences Department.
- As a minority serving institution, the ability to retain students who in most cases are first generation students requires both mentoring and motivation that includes an array of methods to reinforce through practice and alternative learning process the concepts of engineering principles.

objectives

- Implement a pilot program on Wright State's EGR 101 materials in ENGR 150 which is Modern Engineering Design.
- Integrate the material in the topical sections of the course syllabus
- The articulated changes in this course include introducing topical concepts from the Wright State model that can be integrated at the appropriate design phases of project being undertaken by the students in this class as a means of reinforcing concepts already acquired in the modified Math 110 specifically for engineering students.

Implementation Strategy

- **Modified grading scheme:**
- **Tentative Point Allocation:**
- Mathematical Preparations (Quizzes) 30%
- Individual Reports 10%
- Group Reports 10%
- Midterm Exam 15%
- Final Project 35%

Implementation Strategy cont'd

- **Material Integration examples:**
- The Design Process; Describing and Prescribing the design process; opportunities and limits, strategies, methods and means; Quadratic equations in Engineering; - current in a lamp; equivalent resistance e.t.c.
- Organizing Design Teams, Constructive conflict, case study and descriptions and project statements; Trigonometry in Engineering; kinematics of one-link robot; Direct kinematics of two-linked robot

Implementation Strategy cont'd

- Understanding the Client's Problem; Translating and clarifying the client's wants; constraints, Measuring achievements and Brainstorming Trigonometry in Engineering; kinematics of one-link robot; Direct kinematics of two-linked robot
- Generating Design Ideas, Taking advantage of Design information; Organizing functions and means to generate designs that work; Complex numbers in engineering

Implementation Strategy cont'd

- **Testing the math concepts:**
- Exam 1 will be held in the regular classroom and time on Tuesday 2/18/2014.
- Midterm will be held in the regular classroom and time on Tuesday 3/11/2014.
- Exam 3 will be held in the regular classroom and time on Thursday 4/3/2014.
- Exam 4 will be held in the regular classroom and time on Thursday 05/08/2014.
- Final will be held in the regular classroom as scheduled.

Implementation Strategy cont'd

- **Design assignments:**
- **Fall 2013 –** Design a heat chamber with a temperature no more than 200 degrees Fahrenheit to kill insects in books. Address all safety issues associated with your design

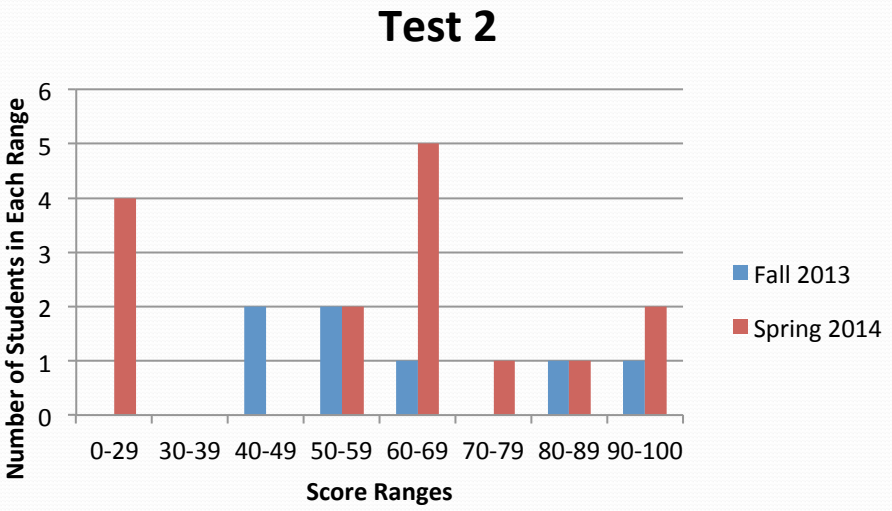
Implementation Strategy cont'd

- **Spring 2014 -** Proper understanding of an Unmanned Aerial Systems' (UAS) physical orientation is essential for proper control, and continuous sight of the vehicle is crucial to ensure separation of UAS from manned aircraft. Further, continuous sight of airborne vehicles and is required by Federal Aviation Administration (FAA) regulations. Small UAS create a small silhouette against the sky or terrain and may be difficult for a pilot to see, track and ascertain orientation at a distance.
- **Goals:**
- Develop color schemes or other designs that improve long-distance visibility of Small UAS.
- Improve pilot perception of UAS orientation at long distances
- Demonstrate improved visibility and orientation awareness through a field test
- **Considerations:**
- Consider various lighting and sky conditions (i.e. blue sky, overcast, terrain as backdrop…)
- There should be no aerodynamic penalty for the proposed solution
- There should be no more than a 2% increase in total vehicle weight

Initial Results

- **Comparison of students' performance between Fall 2013 and Spring 2014**

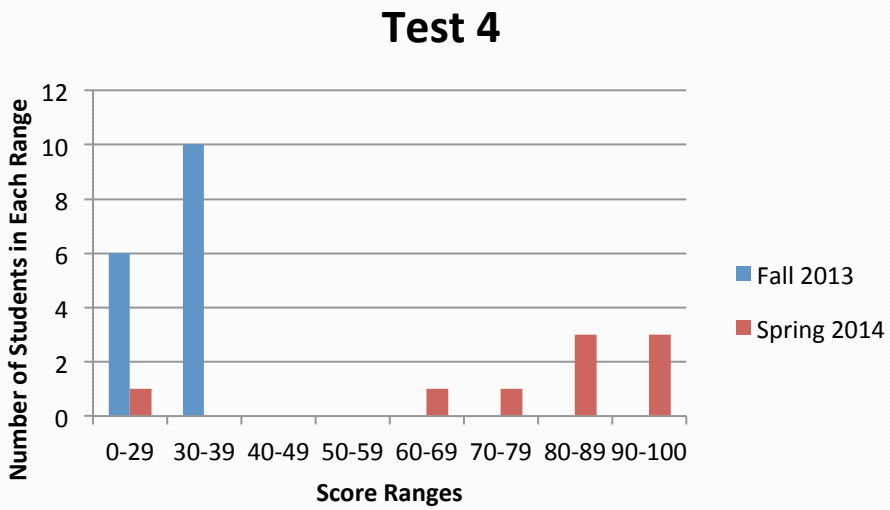




Initial Results Cont'd

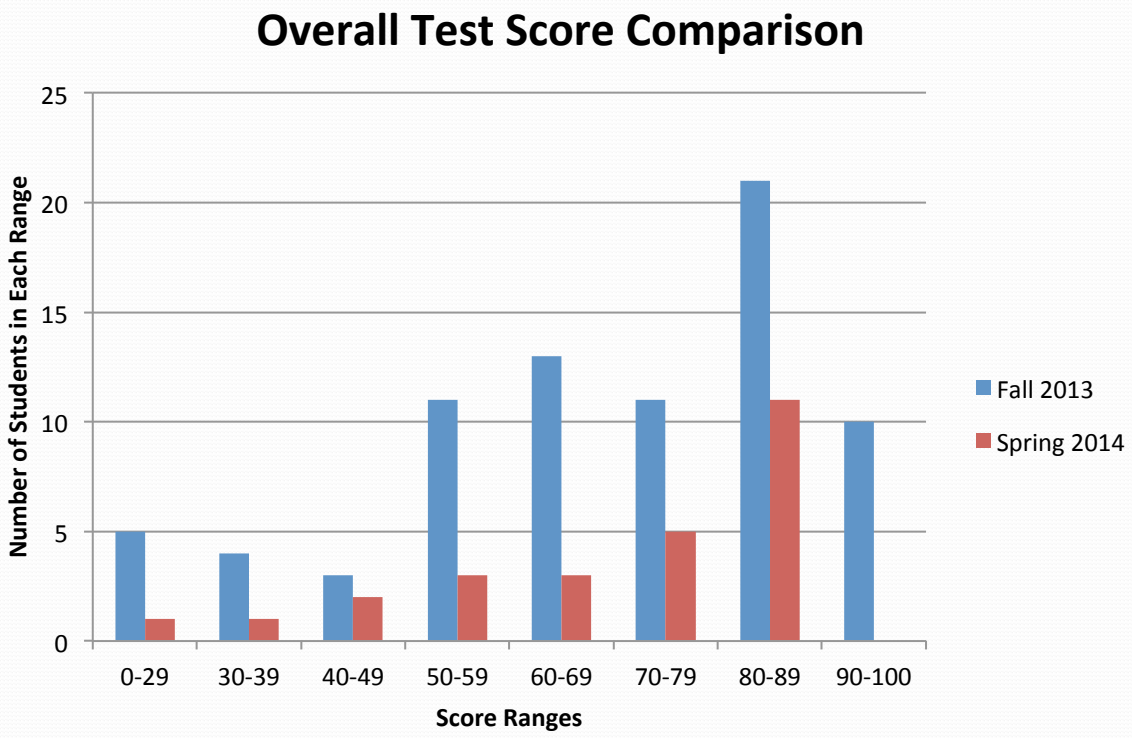
- **Comparison of students' performance between Fall 2013 and Spring 2014**





Initial Results Cont'd

- **Composite Results Comparison**



Future Direction

- Evaluate these students' performance in gateway courses namely Basic Circuits and Statics
- Institutionalize the approach taken in ENGE 150 as a requirement to use the textbook
- After two years of results, initiate the process of having a university-wide conversation armed with the results of the study