

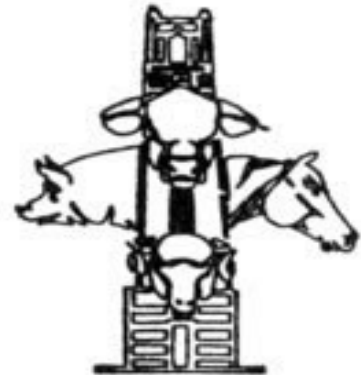
# Promoting Student Learning via Automated Individualized Feedback

Abstract # 95

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## Introduction:

- All students benefit from individually tailored feedback about their performance to increase their success.
- As class size increases, the instructor can lose touch with individual students.
- It can be challenging for **instructors of large courses to provide each individual student with detailed feedback and guidance on improvement strategies.**

- *Our Goal is to develop the analytic tools to digitally capture student performance and provide immediate feedback to the student and instructor*

## **Development of the SCHOLAR program (Student Course Help On Line And Reporting)**

- *Implementation of this technology provides a means for instructors to successfully **monitor individual student progress** to facilitate student learning and comprehension of the course information in a more direct manner, regardless of the class size.*

# SCHOLAR Program

- A computer program that creates automatic feedback for student and faculty.
  - For students, missed questions are linked to relevant core course concepts and well as a Bloom's profile of missed concepts
  - For instructors, this provides a tool to easily track individual student lapses, as well as review progress and problems in the class as a whole.
- Analyze quiz results (for each student) to find deficiencies in performance on a concept by concept level of the learning trajectory

# SCHOLAR Program Setup

## 1. Development of Core Course Concepts

Ovary

Resource Page(s): 24-26

Relevant Predecessor Concept(s): Female reproductive anatomy ; Endocrine; Estrogen; Progesterone

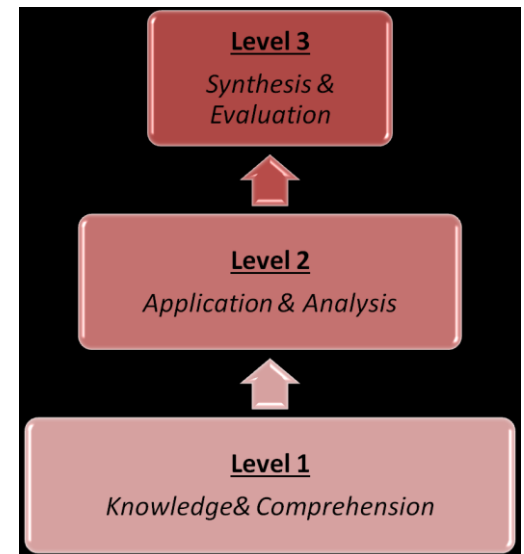
Steroid Hormone Synthesis

Resource Page(s): 112

Relevant Predecessor Concept(s): Steroid Hormones; Ovary; Testicles

## 2. Develop question bank

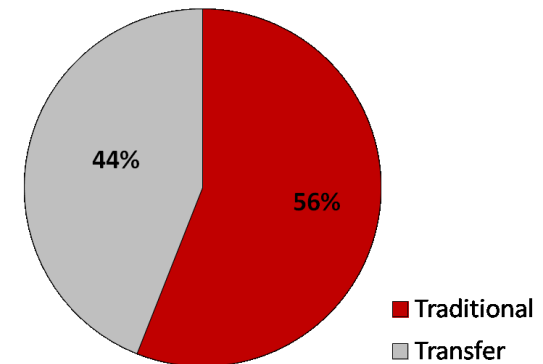
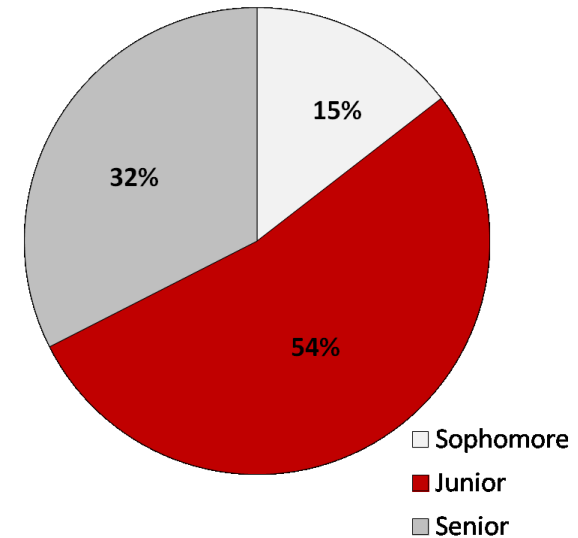
- Ranked each question according to Bloom's Cognitive Levels of Learning



# Implementation of **SCHOLAR**

- Reproductive Physiology course in Fall 2014 and Fall 2015
  - n=117 students ( 21% male : 79% female)
- Weekly online quizzes (13/semester) were administered
  - Each quiz was worth 10 points
- Quizzes were available for 36 hrs
  - Students had 20 minutes and 1 attempt to complete each quiz
- Single answer multiple choice
  - Ranked as either Low, Med, or High according to Bloom's Taxonomy

Academic Ranking



# Methods:

- Following the completion of each quiz:
  - Students immediately learned their score
  - Students received an email with their individual **SCHOLAR** report
  - Instructor received summary **SCHOLAR** report
- Student progress was correlated to the quiz outcome and student performance based on cognitive level of understanding.
- Data was analyzed using Proc GLM and Proc Mixed of SAS 9.2 (SAS Inst. Inc., Cary, NC)
  - Significant differences were determined by  $p < 0.05$ , and  $0.05 > p > 0.1$  was declared a statistical tendency

## Example of **SCHOLAR** output

Quiz 1 : Student 1: 8 totally correct 80%

Bloom's profile of missed concepts 1L 0M 1H

# missed      concept

1      Neural anatomy and function

1      Anterior Pituitary function

Quiz 1 : Student 2: 5 totally correct 50%

Bloom's profile of missed concepts 1L 2M 2H

# missed      concept

1      Neural anatomy and function

2      Anterior Pituitary function

1      Uterus

1      Posterior Pituitary function

2      Hypothalamic function \*

1      Neuroendocrine

1      Female Secondary organs\*

2      Female reproductive anatomy

Quiz 1 : Student 3 : 10 totally correct

100%

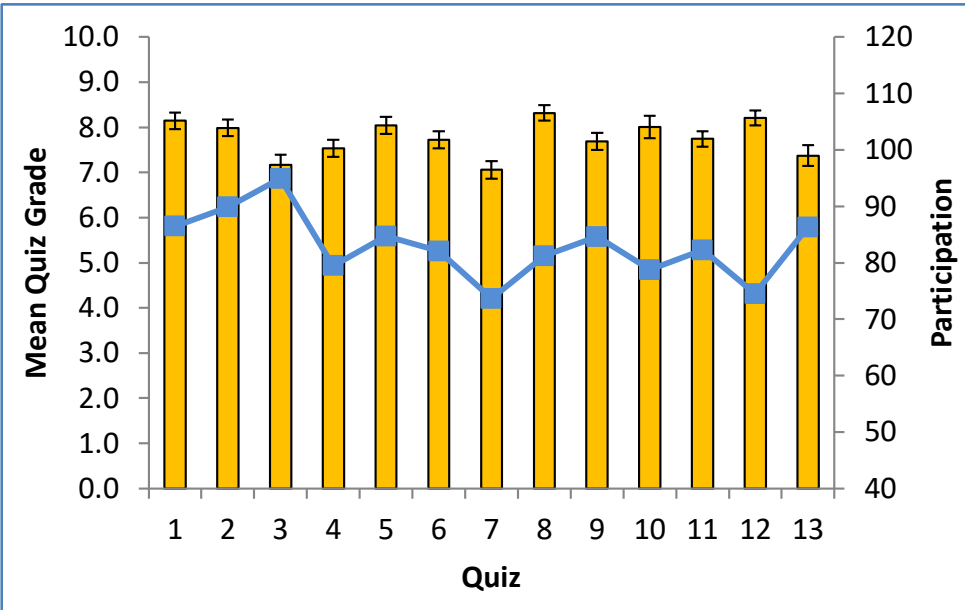
You aced this quiz! Good work!



# Student usage of the **SCHOLAR** program

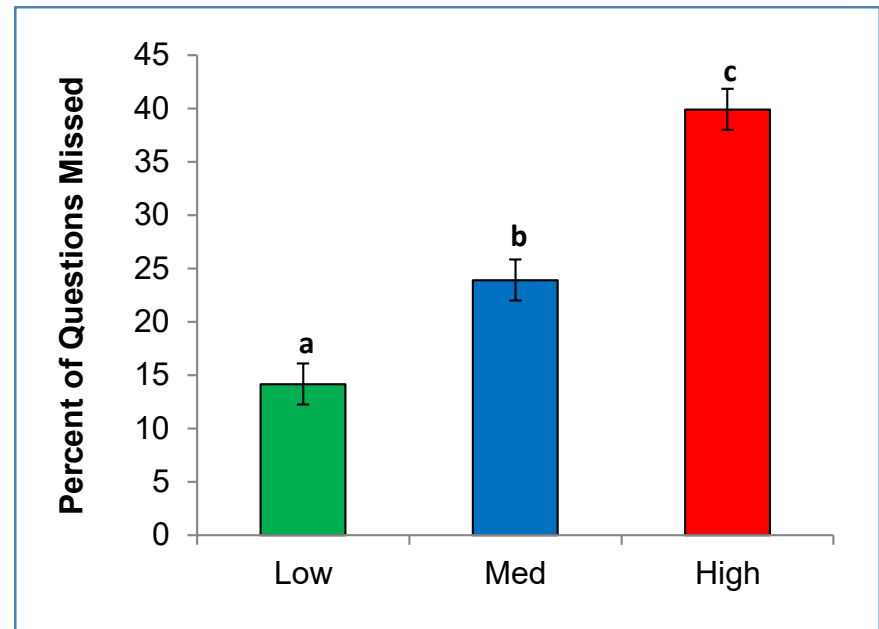
- In 2015:
  - Following each quiz, Students received a **SCHOLAR** report
  - If questions were missed, students had the opportunity to answer a “concept question”
  - “Concept question” responses:
    - Responses had to be received via email within 5 days of receiving the SCHOLAR report.
    - Answers were limited to 50 - 100 words
    - Students received 0.25 points for each correct response to the concept questions.

# Results

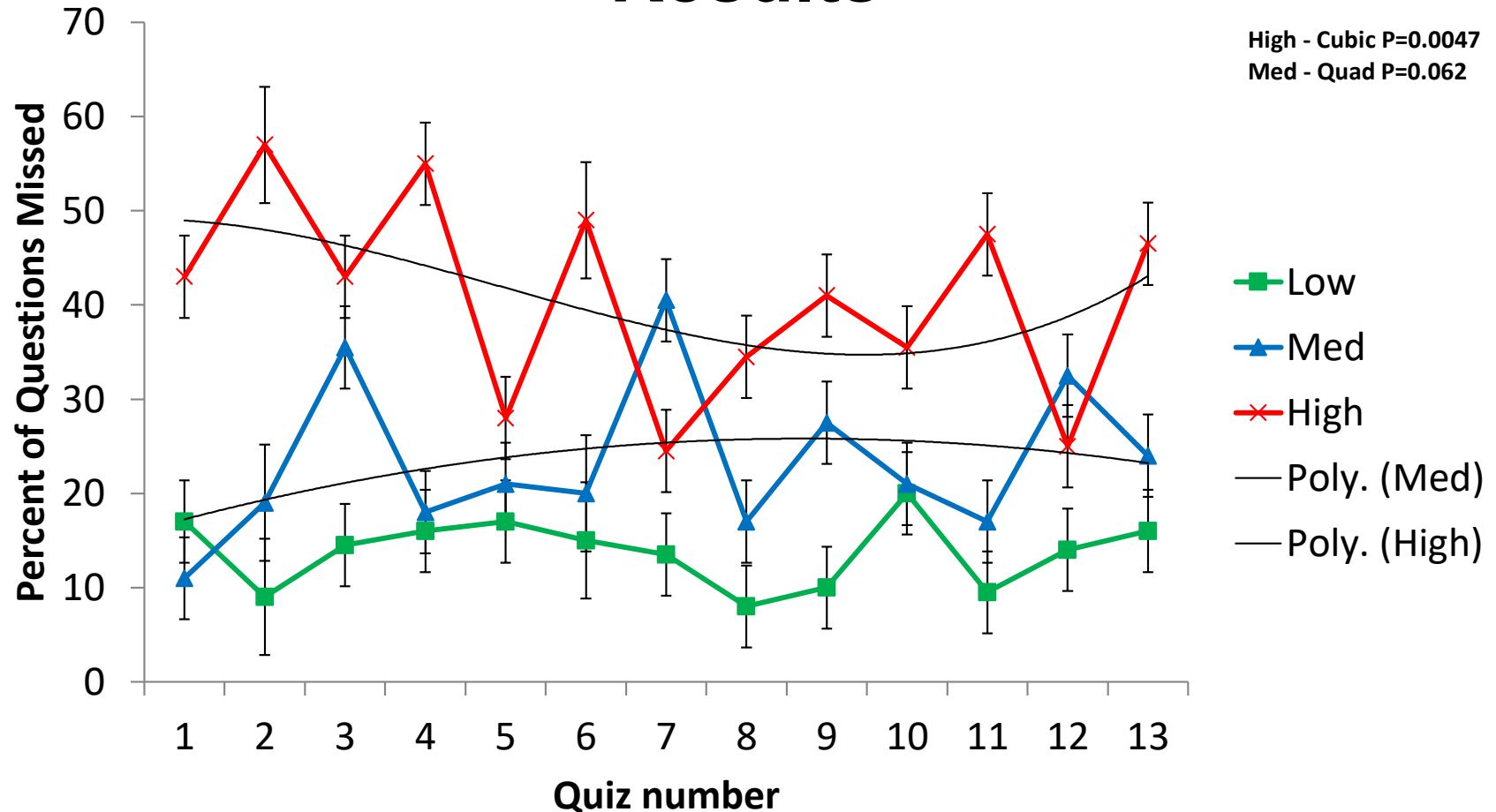


- Student participation on these quizzes ranged from 73 to 95 % over the course of these 2 semesters

- Overall, students missed significantly more upper level of cognition questions

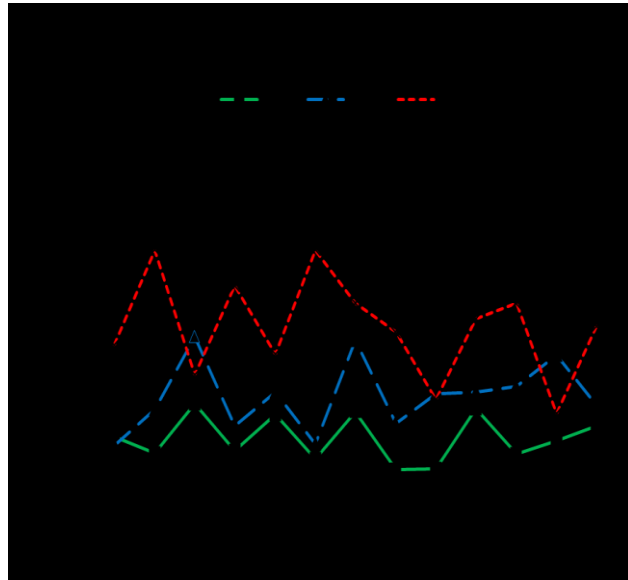


# Results



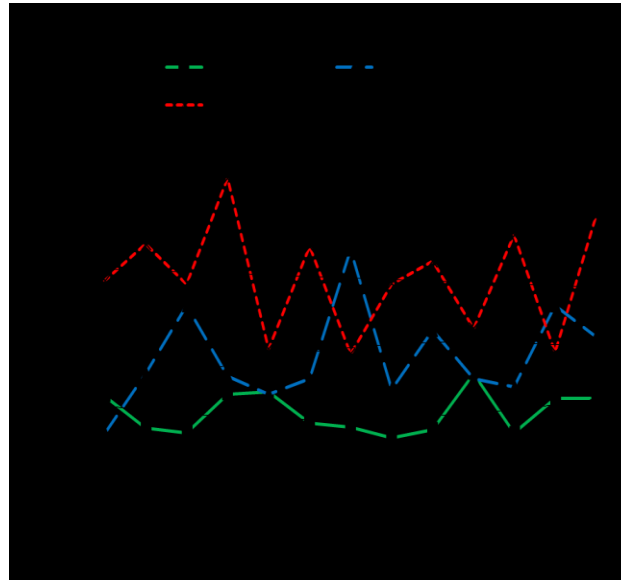
- As the semester progressed, students improved their ability to successfully answer the higher level of cognition questions

# Effect of Academic Rank



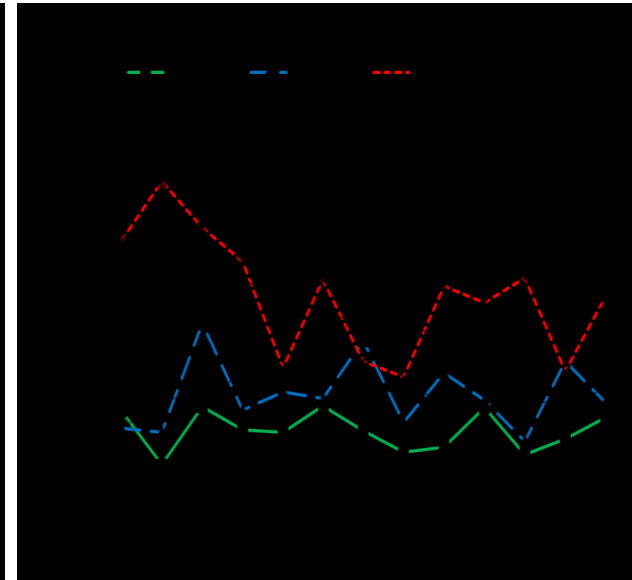
## Sophomores:

- No Change throughout the semester



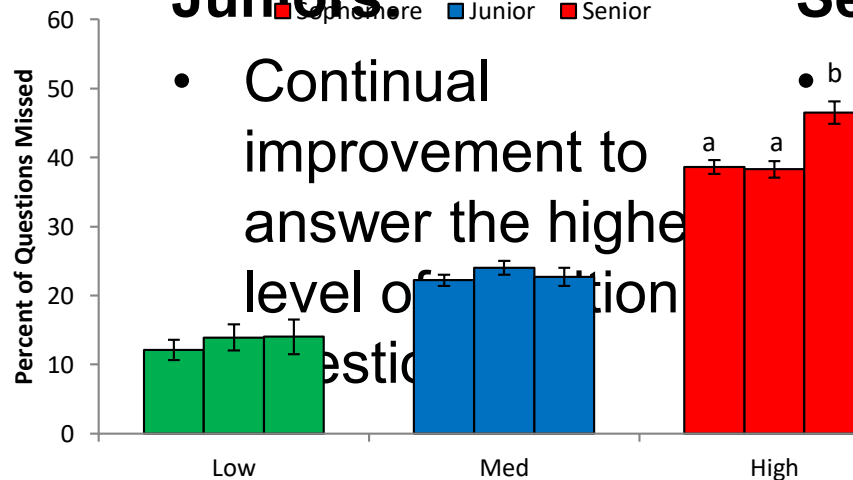
## Juniors:

- Continual improvement to answer the higher level of cognition



## Seniors:

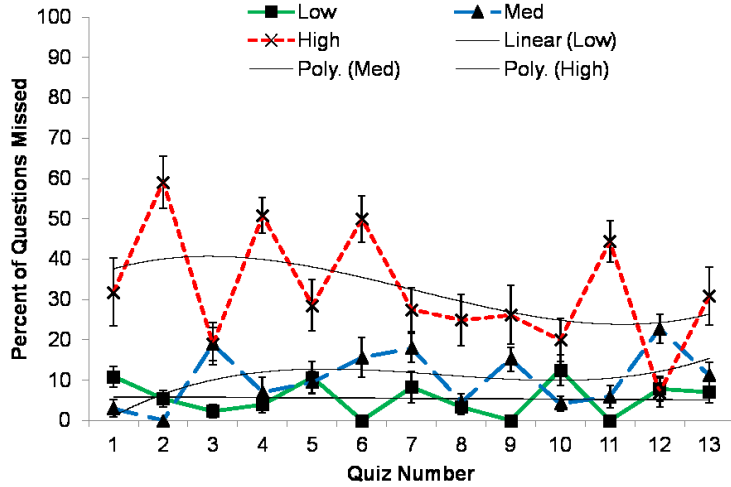
- Greatest improvement to successfully answer the higher level of cognition questions



# Outcome in Course

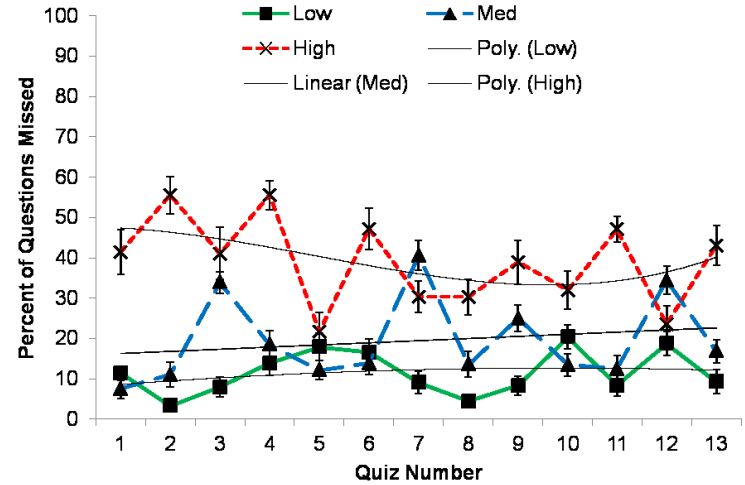
**Student earning an A in course**

Low P=0.0535  
Med P<0.0001  
High P<0.0001



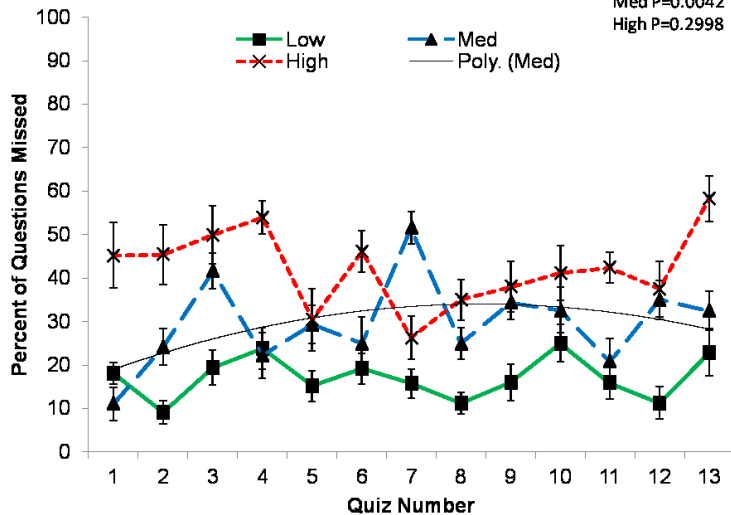
**Student earning an B in course**

Low P=0.0329  
Med P=0.0002  
High P=0.0405



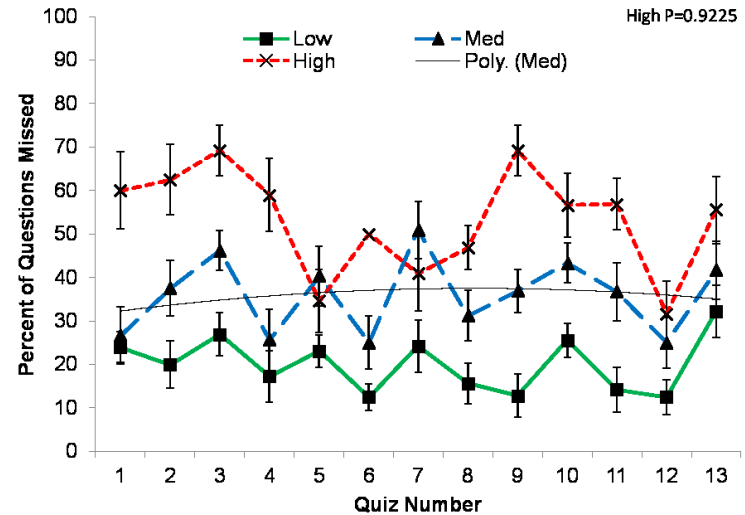
**Student earning an C in course**

Low P=0.3587  
Med P=0.0042  
High P=0.2998



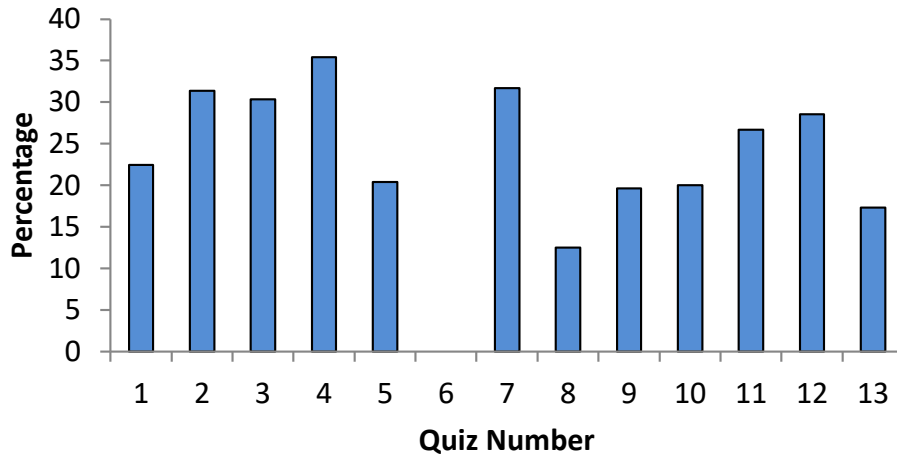
**Student earning an D in course**

Low P=0.2741  
Med P=0.0470  
High P=0.9225



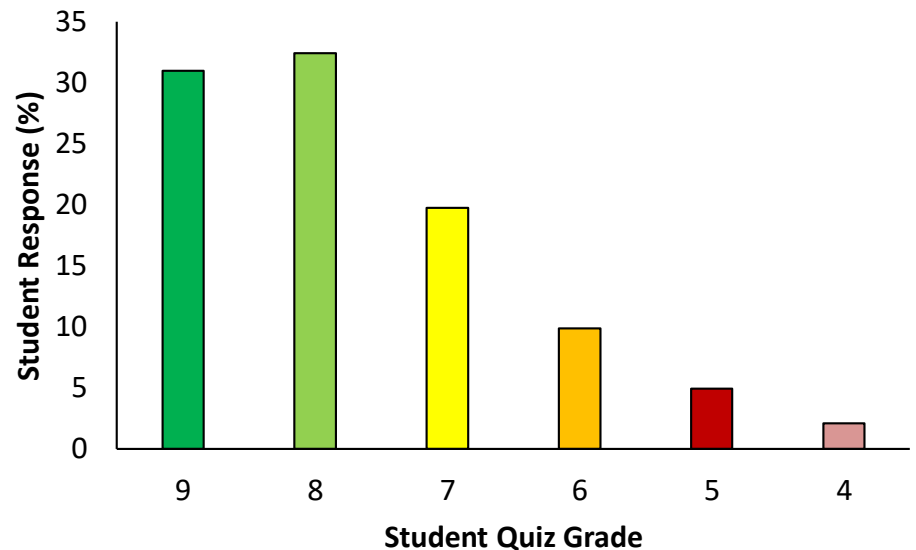
# Student usage of the **SCHOLAR** program

Participation with Concept Questions



- Student participation in the follow up concept questions ranged from 12.5 to 35% over the course of the semesters

- 63% of those who responded to the concept questions were earning an 80% or better on the quizzes.



# Summary

- Students struggle with upper level of cognition questions
- Students improved their ability to successfully answer the higher level of cognition questions
- The ability to successfully answer the higher level of cognition questions occurred more quickly in upper classmen and those who earned a higher grade in the course.
- Approximately 23 % of the students responded to the concept questions
  - ~63% of students who responded to the concept questions were earning an 80% or better on the quizzes

# Conclusions

- Incorporation of the **SCHOLAR** program improved the instructor ability to monitor the classes progress on learning core concepts in the course.
- We were able to capture individual student progress and comprehension of the course information with the **SCHOLAR** program.
- While designed to track individual student progress and coach individuals with deficiencies, incorporation of this learning tool was limited among the students.



# Thank You!

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