TEXAS A&M ENGINEERING

Clickers Click It:
A Trial Implementation to Manufacturing Courses

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AGENDA

Clickers Click It: A Trial Implementation to Manufacturing Courses

1) Introduction
2) Objectives
3) Case Studies
   - Large junior class
   - Small senior class
   - Preliminary results
4) Feedback & Issues
5) Summary
6) Future works

INTRODUCTION

- Instructors' needs
  - If students understand key concepts
  - More student participation
  - Attendance record
  - Paperless, automatic, inexpensive, easy to implement technology
- Students' needs
  - Instant feedback to know what are missed
  - Reinforced what is learned
  - Own ranking in class
  - Motivation

INTRODUCTION

Classroom Performance System (Clickers)

- Unique for each student and specific course
- Numerical & alphabetical capable
- Answering records with stamped date/time
- Student specific or anonymous modes
- Remote RF control
- PowerPoint compatible
- WebCT/Blackboard compatible
- Cost $25/clicker + $13/course

OBJECTIVES

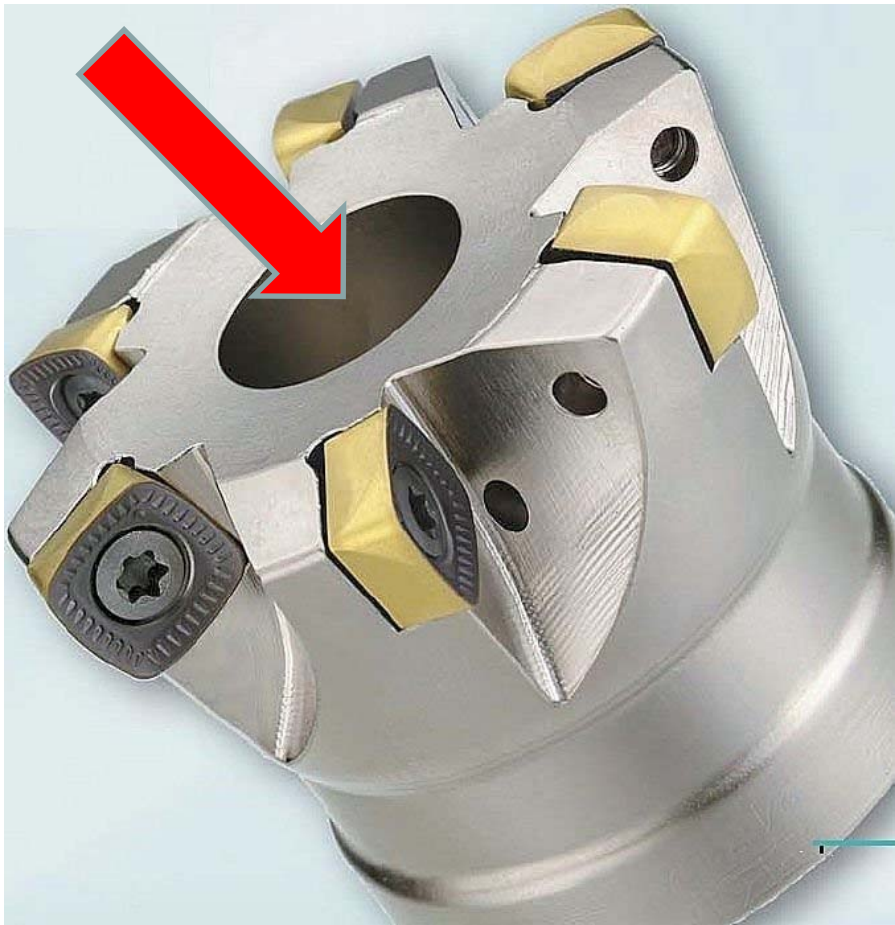
1) Assess Clickers for manufacturing courses
2) Implement in both laboratory and classroom
3) Compare results between:
   - Large sophomore course
   - Small senior course

Examples

1) This milling cutter has 6 teeth, and rotates clockwise when viewing in the arrow direction.

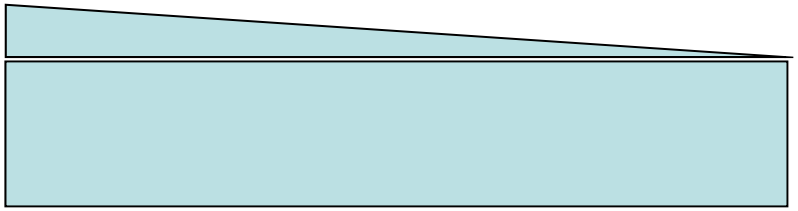
✗ A. True

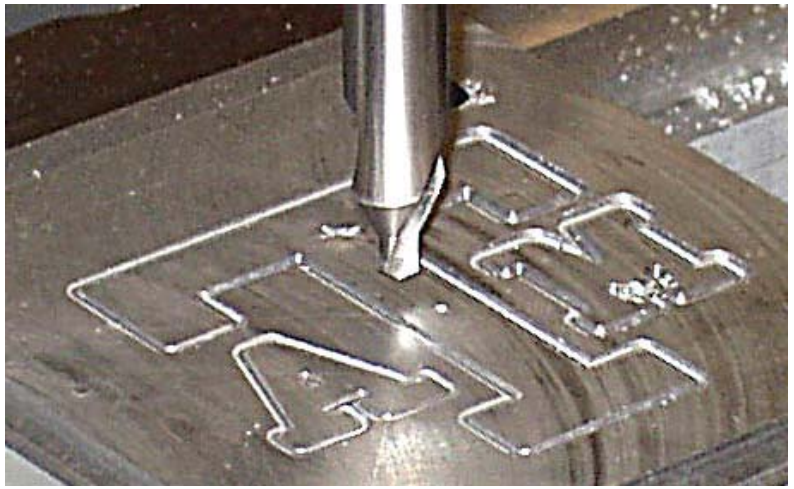
✓ B. False



Examples

2) This _____ operation assures _____ of the workpiece before engraving.



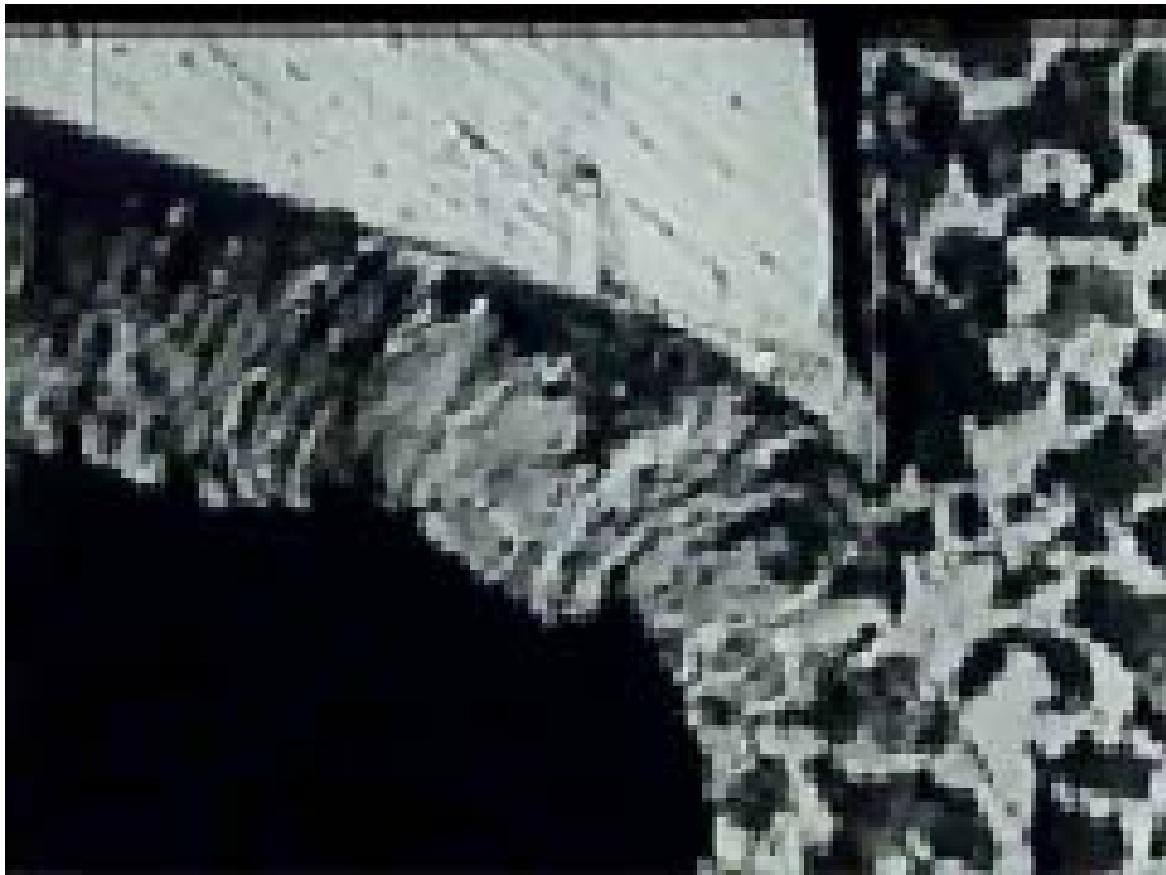


- ✗ A. Face milling, flatness
- ✗ B. Peripheral milling, parallelism
- ✗ C. Slab milling, profile
- ✓ D. Face milling, parallelism

Examples

3) When orthogonally machining steel in air (0.58 coefficient of friction), a HSS tool with 20º rake will produce a shear angle of____ degrees:

- ✔ 40
- ± 1



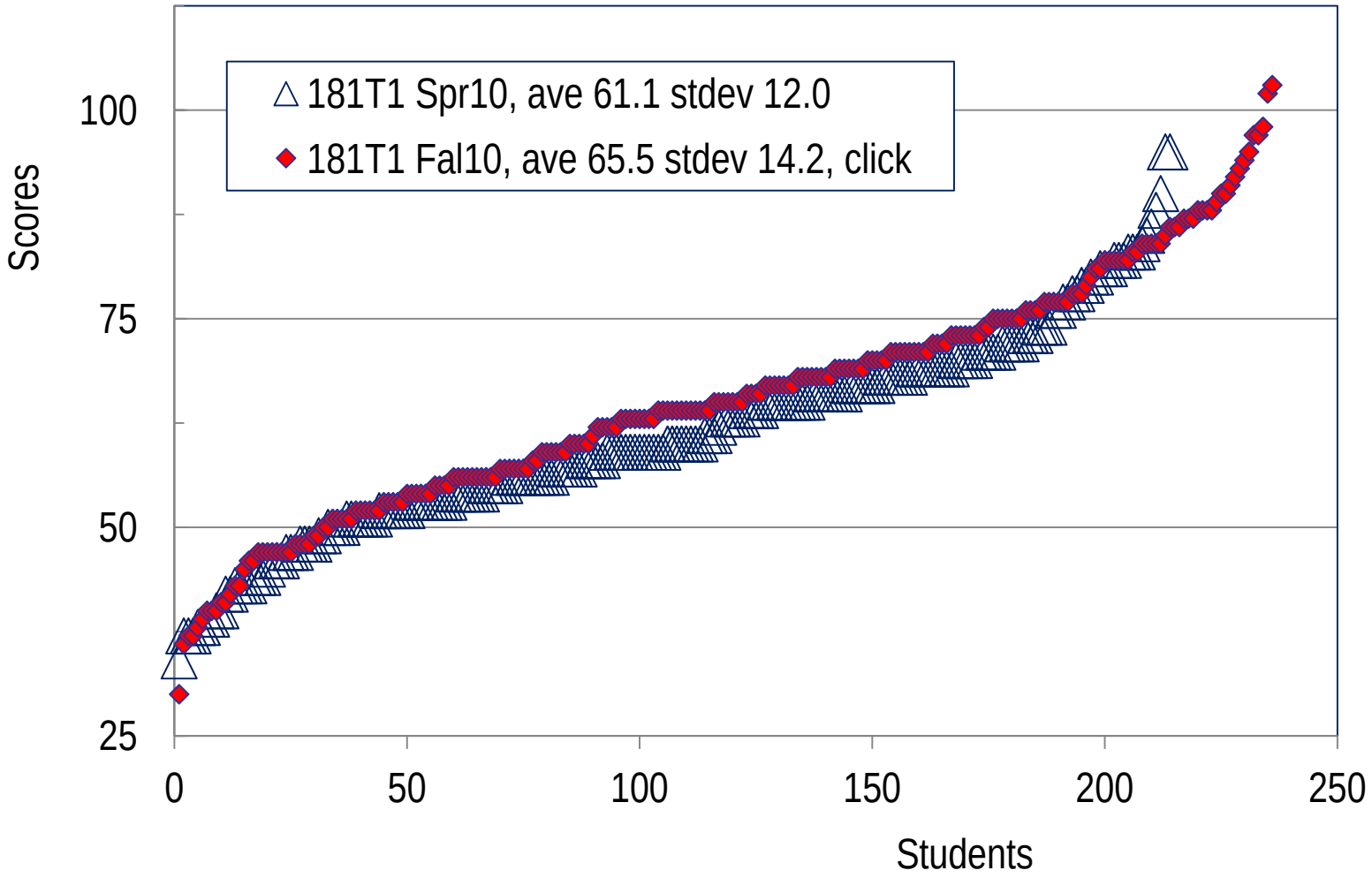
Examples

6) From your opinion, the bottle-neck operation in this lab exercise is:

- A. Waiting for available machine
- B. Lack of tooling
- C. Poor quality tooling (broken, bent…)
- D. Lack of training, TA support
- E. Hand threading operation
- F. Lab arrangement (too much walking around)
- G. Environment (temperature, noise…)
- H. Others

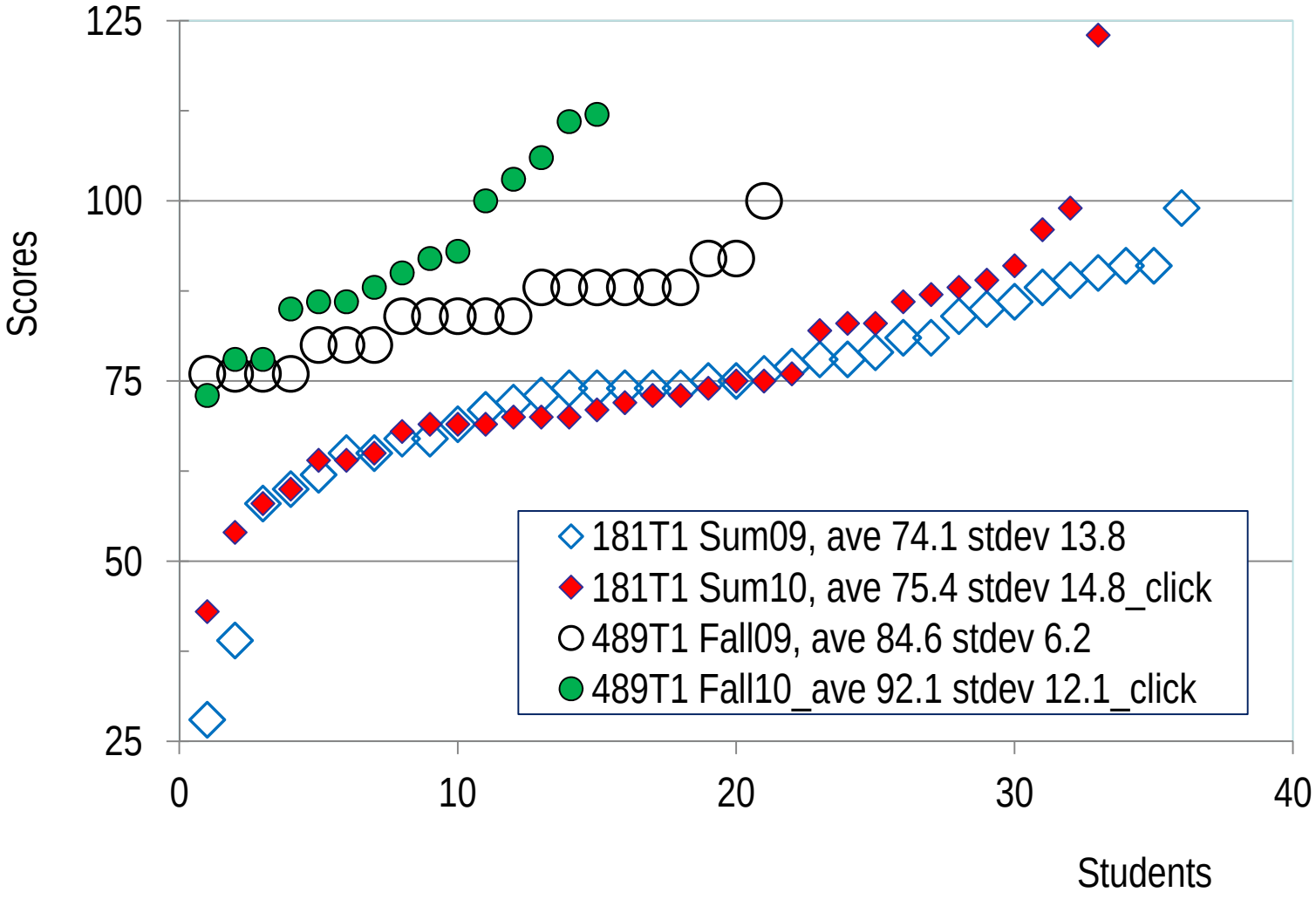
RESULTS

Test scores in a large class



RESULTS

Test scores in a small class



ISSUES

- Students
  - Missing clickers, absence, malfunction…
  - Cheating (share answers, use multiple clickers…)
- Instructors
  - Learning new system (with IT support)
  - Overcoming initial hiccups
- Technology
  - Duplicated Clickers IDs
  - Mysterious Clickers
  - Slow response between questions in a large class

STUDENT FEEDBACK (Positive)

Other positive aspects of clicker/policy:

Helpful for tests. Similar to test questions

It helps me think faster.

The clicker helps me concentrate in class and it helps me remember terms.

It helps me in knowing if I am studying correctly and if I need to focus more on certain aspects before an exam.

Instant feedback

STUDENT FEEDBACK (Negative)

Other negative aspects of clicker/policy:

Sometimes technology is a pain in the rear! people are cheaters!

can't skip class

forces me to study a lot

If your clicker is malfunctioning or not working at all, you are out of luck and cannot participate in the quizzes.

Other suggestions:

SUMMARY

We are implementing Clickers in manufacturing classes /labs.

Preliminary data show:

- ✓ Improved class attendance
- ✓ Improved student attention in lab and class
- ✓ Reduced lab tool/equipment mishaps
- ✓ Positive feedback from senior students, and mixed feedback from junior students
- ✓ Improved exam scores: significant in senior class, marginal in junior class

Others:

- Steep learning curve for instructors
- Possible cheating in a large class
- Occasional technical hiccups

FUTURE WORKS

We will continue implementing Clickers in manufacturing classes, and:

- Modify Clicker policies and grade percentage for junior class.
- Minimize Clicker cheating in a large class
- Work with Clicker provider to solve registration and technical issues.