

# **Program Outcome Assessment Summary Report 2013/2014 Academic Year**

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## **1. Summary of Actions Taken in Response to AY12/13 Assessment**

Following is a summary of actions taken on recommendations from the AY12/13 assessment summary:

1. The Design Patterns class, CSCD 454, was re-designed as a junior level course, CSCD 349, and is now being taught as a prerequisite to our software engineering course, CSCD350. Will be assessed Fall 2014.
2. The APE – Advanced Programming Test statement about implementation skills was retracted.
3. Met with CSCD 110 instructors to discuss a better focus on algorithmic thinking. No assessment was implemented for CSCD 110.
4. Bitwise operations and number bases coverage was added to CSCD 240. Also, makefile objective was clarified in order to require compilation from multiple source files.

5. CSCD240 ORLO was simplified by remapping objective h.i to student outcome (I).
6. New ORLO's for CSCD210 was used this year. CSCD 211 was not assessed
7. CSCD330 ORLO was applied and met expectations.
8. ORLO for CSCD350 was simplified to remove coverage of outcomes (a) and (g) and the new ORLO is in use.
9. CSCD555 was created as CSCD 506 for graduate students and was taught and will be assessed this year. Student presentations were conducted in front of faculty.
10. CSCD490 students have been asked to join Linked in for easier tracking after graduation.
11. Teamwork and Technical Performance rubrics were applied to all CSCD490 teams this year

## 2. Summary of Program Outcome Assessment in AY13/14

The following table summarizes the assessment methods applied to Program Outcomes during the 2013/2014 academic year. Details of the assessment data are provided in the sections that follow.

Program Outcome	Assessed Via
a) Students will have the ability to use current techniques, skills, and tools necessary for computing practice.	APE, CSCD 240, CSCD 300, CSCD 320, CSCD 327, CSCD 330, CSCD 340, CSCD349, CSCD 350, CSCD 370
b) Students will recognize the need for, and will have the ability to engage in, continuing professional development.	Senior Project Oral Communication Rubric, CSCD 340
c) Students will have the ability to analyze the local and global impact of computing on individuals, organizations, and society.	CSCD 340, CSCD 350
d) Students will have the ability to communicate effectively with a range of audiences.	Senior Project Oral Communication Rubrics
e) Students will have an understanding of professional, ethical, legal, security, and social issues and responsibilities.	CSCD 110, CSCD350
f) Students will have the ability to function effectively on teams to accomplish a common goal.	Senior Project Teamwork Rubric
g) Students will have the ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.	APE, CSCD 260, CSCD 300, CSCD 320, CSCD 327, CSCD 330, CSCD 340, CSCD 350, CSCD 349, Senior Project Technical Rubric
h) Students will have the ability to analyze a problem and identify and define the computing requirements appropriate to its solution.	APE, CSCD 240, CSCD 260, CSCD 300, CSCD 320, CSCD 350, Senior Project Technical Rubric

Program Outcome	Assessed Via
i) Students will have the ability to apply knowledge of computing and mathematics appropriate to the discipline.	APE, CSCD 240, CSCD 260, CSCD 300, CSCD 320, CSCD 349, CSCD 330, Senior Project Technical Rubric
j) Students will have the ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.	CSCD 300, CSCD 320, Senior Project Technical Rubric
k) Students will have the ability to apply design and development principles in the construction of software systems of varying complexity.	CSCD 349, CSCD 350, Senior Project Technical Rubric

The following table summarizes assessment findings from each of the major assessment methods that were used in AY13/14. The ORLO category only lists courses where concerns were found. See Section 6 for a summary of the ORLO report findings from each course.

Assessment Instrument	Result of Assessment
APE Exam	No concerns. No recommendations.
CSCD 110 ORLO	Concern about math skills from incoming students. Still having trouble with order of operators.
Senior Project Oral Presentation Rubric	No concerns. No recommendations.
CSCD 350 ORLO	Students would benefit from a prerequisite course in design patterns. Student demonstrate a lack of ability and experience with complex problems
Senior Project Teamwork Rubric	No concerns.
Senior Project Technical Performance Rubric	No concerns.
Course-specific Outcome-Related Learning Objectives (ORLOs)	All courses met objectives. No recommendations.
Masters Oral Presentation Rubric	No concerns. No recommendations.

**The following recommendations are made as a result of AY 13/14 assessments. It is recommended that:**

1. The ORLO's for CSCD 110, 211, 260 and 490 be applied this year.
2. ORLO's with recommendations and comments for action include 210, 240, 300, 327, 340. Contain comments regarding previous recommendations
3. Need to create ORLO's for 378 and 379
4. Added 378 and 379 to the required courses before Senior Project.
5. Create an ORLO for 349 Design Patterns
6. Update chart for ORLO for 378/379/349 and 490
7. Extract ethics questions as supplement to PHIL 212 assessment
8. Meet with 211 instructors to discuss class contract
9. Fix 210 ORLO to cover topics in standard syllabus
10. Create separate ORLO's for 371, 372 and 373 each time they are taught.

### 3. Advancement Programming Exam Scores

APE scores support Program Outcomes (a), (g), (h), and (i). APE exams were administered during each quarter of the academic year plus summer 2013. An 80% is required to pass the exam. Exam section topics are:

- |     |                                   |     |
|-----|-----------------------------------|-----|
| (1) | Linked List Manipulation          | 20% |
| (2) | Recursion                         | 20% |
| (3) | Data Abstraction and Class Design | 30% |
| (4) | General Programming               | 30% |

Summary data for AY 12/13 and the preceding two years:

	Previous Year	Last Year	This Year
Number of Exams Taken	144	138	166
Overall Average Score	78.9%	79.0%	81.4%
Overall Pass Rate	64.6%	63.0%	68.2%
Failures on 3+ Attempt	2.1%	4.0%	4.0%

## AY13/14, AY12/13 and AY11/12 APE Scores

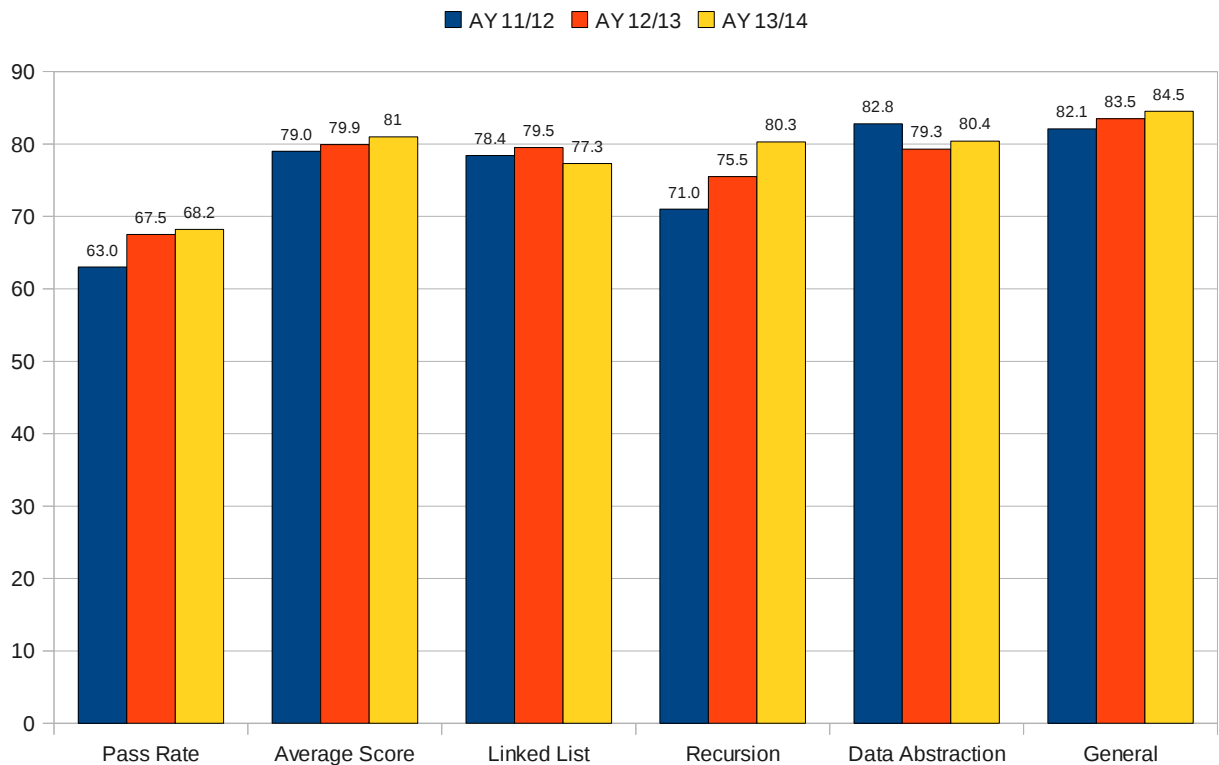


Fig 3.1 shows subsection scores along with pass rates for this year alongside the previous two years.

The average overall exam score was 81.4.0%, slightly better than the previous year. The overall pass rate was slightly better than last year. The proportion representing failures on a third attempt was about 4% which is similar to the level of the year before last. The scores and pass rates are acceptable.

Subsection scores were reasonably balanced, with little change in average performance. There were slightly lower scores in the linked list part of the exam. The other parts covering Recursion, Data Abstraction, and General Program Design had similar pass rates.

### 4. Senior Project Rubric Scores

Oral Communication rubrics were applied to senior project teams during Fall, Winter, Spring, and Summer, in sections of both CSCD 488 and CSCD 490.

Teamwork and Technical Performance rubrics were applied to the work of CSCD 490 senior project teams during Winter and Summer.

These assessments are tied to Program Outcomes as follows:

Oral Communication Rubric Scores: (b), (d)

Teamwork Rubric Scores : (f)

Technical Rubric Scores: (g), (h), (i), (j), (k)

#### **4.1 Oral Communication**

Fig 4.1 shows the average scores for presentations from the Fall and Spring offerings of CSCD 488, and the Winter, Spring, and Summer offerings of CSCD 490. The Professional Development Awareness score relates to Program Outcome (d), and the other scores relate to Program Outcome (b).

Please refer to Figure 4.1 on the next page.

# Capstone Oral Communications

■ AY 12/13 ■ AY 13/14

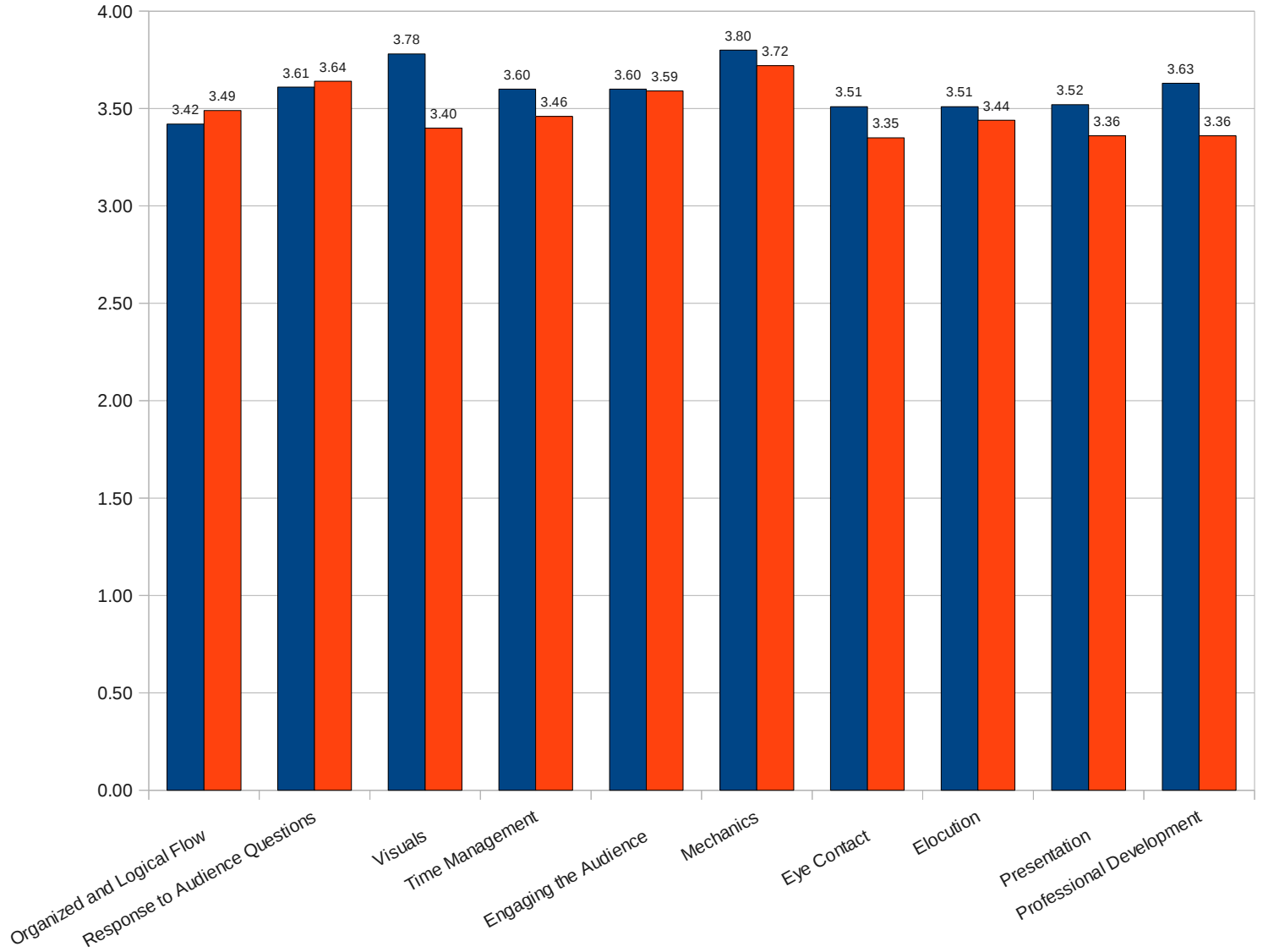


Fig. 4.1 – Project Oral Communication Rubric Scores



The scores indicate that students' are performing well against these learning objectives, and there appears to be some improvement over the previous year in a couple of categories. No action based on Oral Communication data is recommended.

## 4.2 Teamwork

Fig 4.2 shows the average scores for the teamwork performance of 9 senior project teams from the Winter and Spring offerings of CSCD 490. These scores relate to Program Outcome (f).

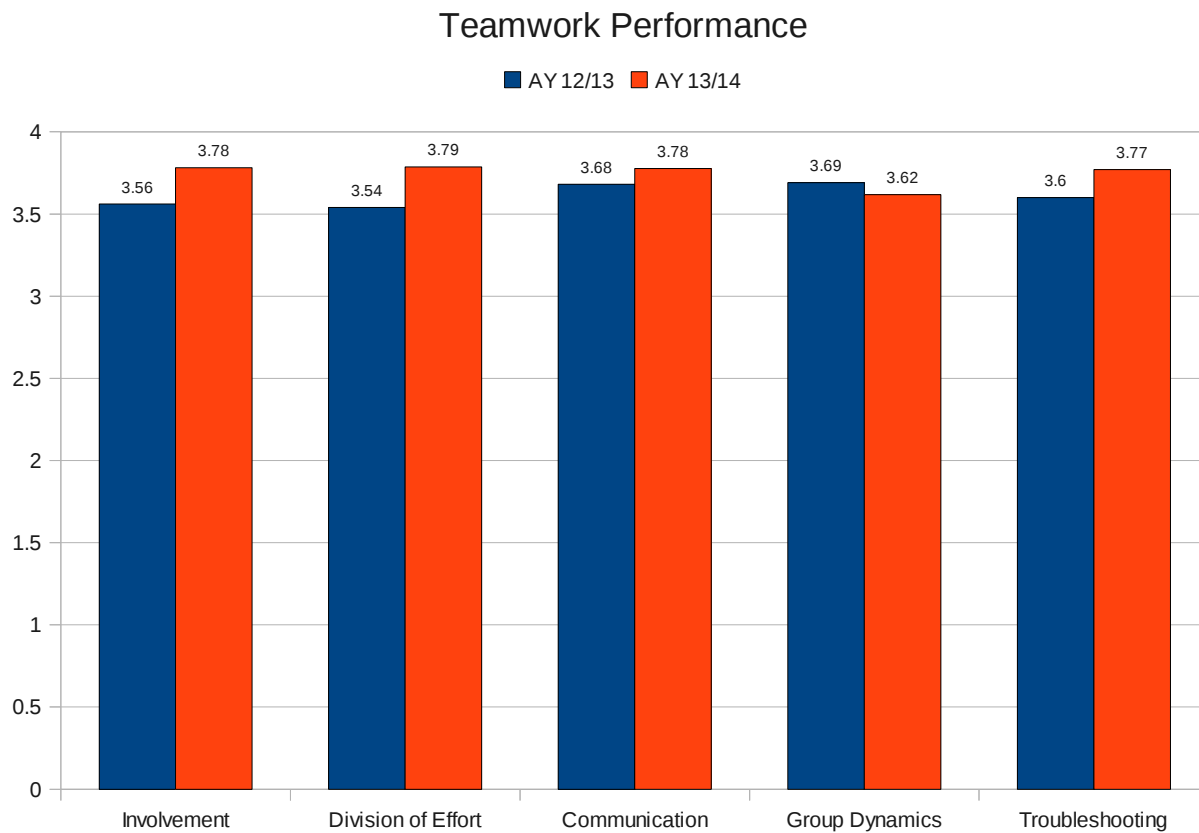


Fig. 4.2 – Project Teamwork Rubric Scores

The scores indicate that students' are performing well against these learning objectives. No specific action based on Team performance data is recommended.

### 4.3 Technical Performance

Fig 4.3 shows the average scores for the technical performance of 7 senior project teams from the Winter and Spring offerings of CSCD 490. These scores relate to Program Outcomes (g), (h), (i), (j), (k).

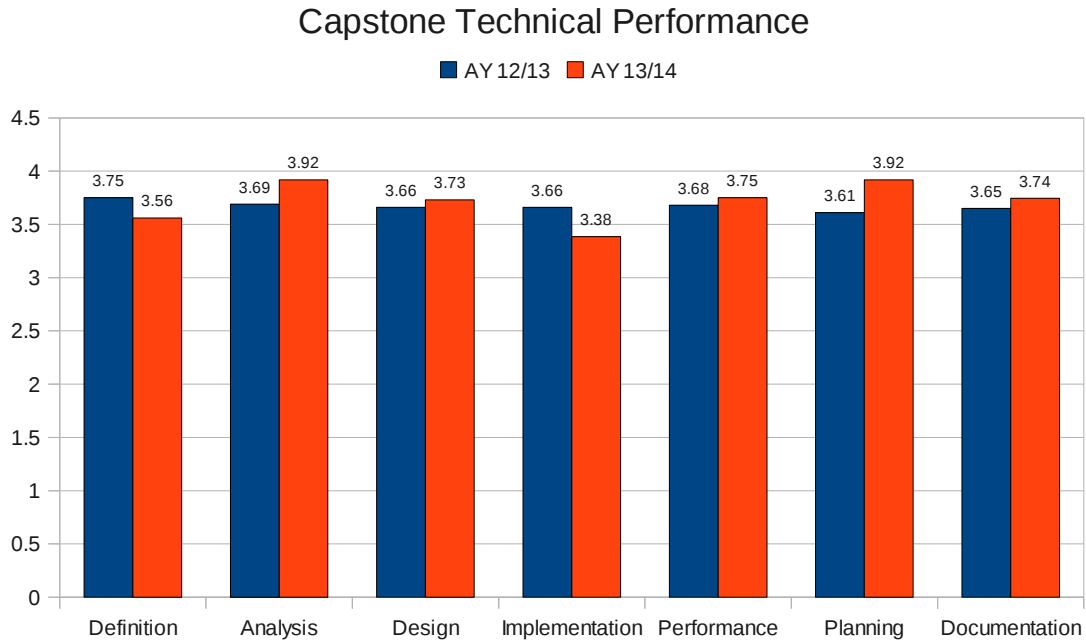


Fig. 4.3 – Project Technical Performance Rubric Scores

The scores indicate that students' are performing well against these learning objectives. No specific action based on Team performance data is recommended.

## 5. Course-specific Outcome-related Learning Objectives

Course-specific assessments were conducted for the following courses. Here we summarize the findings for each course. Full reports are available in the /faculty\_reposit/ABET/ directory for the course.

Course	Term	Outcomes	Result of Assessment
CSCD 110	Winter 13	(a), (I)	There is a great amount of concern regarding basic mathematics skills of incoming students. The students understanding of arithmetic order of operations and Boolean order of operations continues to demonstrate a remedial level of basic math with our incoming students. While order of operations is lectured and demonstrated in class, I am not sure that anything can repair this obvious flaw in preparatory background.
CSCD 240	Spring 13	(a), (h), (i)	I believe the assessment data is incomplete, and a proper assessment can't be made based on this ORLO and data. I believe this ORLO should be changed to add more assessment data. This data should include: Pointer arithmetic for 1D and 2D arrays, Structures, Linked Lists, Bitwise operations, File I/O, enums, #define vs const, Base conversions. These assessments should be placed under Program Outcome (h) and Program Outcome (i). Program Outcome (h) was not met for this time period.
CSCD 260	Fall 11	(g), (h), (i)	Objectives met.
CSCD 300	Fall 11	(a),(g),(h),(i),(j) )	Objectives met.
CSCD 320	Fall 11	(a),(g),(h),(i),(j) )	Objectives met.
CSCD 327	Winter 14	(a),(g)	I believe the data presented above indicate that the outcome-related learning objectives were adequately met. Based on the report for AY12-13, the topic of database normalization was moved to the mid of the term so that students had adequate time to digest the related concepts. With 67% students met the expected score (15 out of 20), I believe the improvement on this topic is noticeable.
CSCD 330	Spring 14	(a),(g),(i)	Objectives met.
CSCD 340	Winter 14	(a),(b),(g)	Objectives met.

CSCD 350	Winter 14	(a),(g),(h),(k)	<p>Disciplined object-oriented thought, understanding, and application among students are still lacking.</p> <p>While students may be able to apply OOP concepts correctly in the syntactic sense, most lack a solid understand of what they are telling the program to do and why their solution is appropriate or not.</p> <p>The new prerequisite CSCD 349 Design Patterns, combined with something like advanced programming and problem solving, should begin address this situation. The next ORLO will apply to an offering of CSCD 350 after the students have seen this material, probably in Winter 2015.</p>
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## 6. Master's Oral Communication Rubric Scores

The Oral Communication rubric was also applied at the defense of 11 Master's degree candidates during AY 13/14. The rubric was applied by audience members present at the oral defense. The results are summarized in Fig. 6.1.

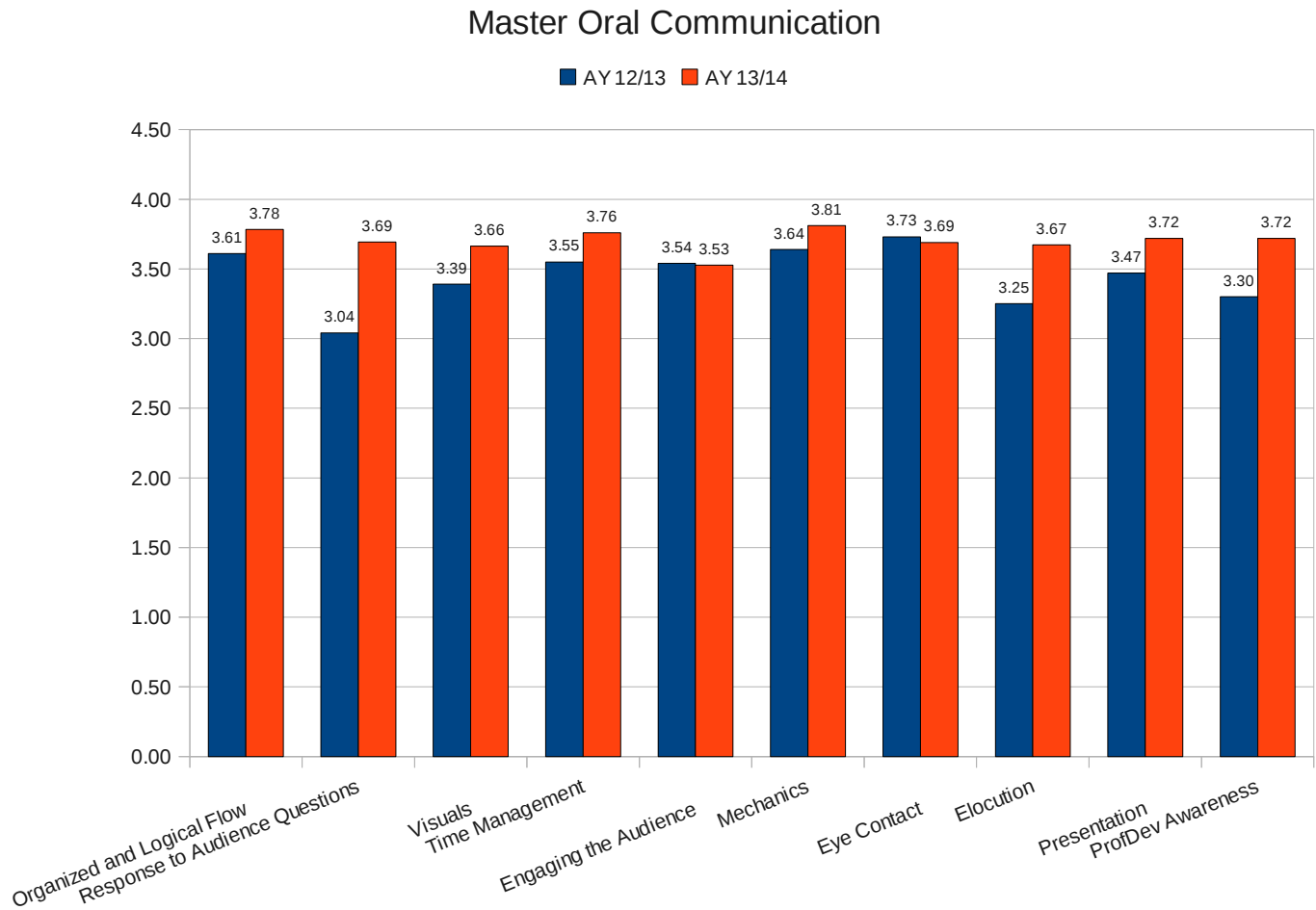


Fig. 6.1 – Master's degree Oral Communication Rubric Scores We had 11 Masters Students that defended their Masters work this year

Overall, all the scores improved over the previous year. The improved results can likely be attributed to encouragement of the students to practice their presentations prior to their actual Masters work defense.