

## Learning Assessment of Core Outcomes

### Suggested Focus 2009-2010: Critical Thinking and Problem Solving

SAC Name: MLT

Contact Name, phone, and email: Ana Sacramento, SAC Chair, 5195, ana.sacramento@pcc.edu

#### Plan of action for 2009-2010 Academic Year:

**Goal:** To evaluate the efficiency of the critical thinking and problem solving learning activities currently in place in the Medical Laboratory Technology program and implement improvements in areas of need.

- **Critical Thinking and Problem Solving activities – a summary:**

#### *Critical Thinking Skills*

*The ability to think critically and apply facts and principles to practical situations in the laboratory are critical skills of the clinical laboratory profession. The MLT Program includes practice of critical thinking skills throughout the curriculum. On campus the anemia and abnormal leukocyte case studies require students to correlate their own findings on prepared blood smears with laboratory data and patient history included in the introduction to each of the case studies. The urinalysis case studies, blood bank laboratory exercises, and microbiology laboratories also incorporate practice of critical thinking skills. In the Student Lab the curriculum emphasizes the use of critical thinking skills to interpret colonial morphology and Gram stain morphologies in microbiology and to correlate hematology profiles with observations on prepared blood smears in its hematology rotations. The Clinical Lab setting provides further practice of critical thinking skills in applying principles and deriving appropriate conclusions in a working clinical laboratory. In reading Gram stains and performing differential counts on peripheral blood smears, students learn to distinguish relevant details from irrelevant details and artifact. Application of critical thinking is a continuous exercise in every area of the clinical laboratory. Supervisors evaluate students on their ability to apply test principles and reach appropriate conclusions in every rotation of their Clinical Laboratory Practice.*

#### *Problem-Solving Skills*

*Just as important as critical thinking is the development of problem-solving skills. Students are challenged in this respect based on different learning environments. For example, on campus students are not only responsible for completing assigned laboratory exercises but are also required to evaluate their work based on previously recorded data and identify and explain any discrepancies in their work. It is important that they recognize problems as they arise, including errors in performance and discrepancies in results. Additionally, they must analyze the problem and develop a strategy to take corrective action. Students are evaluated by direct observation during laboratory exercises and by written examination. This is an integral part of their education, as they will be constantly faced with these situations."*

### **CRITICAL THINKING/PROBLEM SOLVING student skills assessment:**

- Clinical Practice Student Evaluations (scale 1-5, based on the PCC Program Clinical Practice Evaluation rubric). Special attention will be given to the following rubric items:
  - “recognizes problems, errors in performance and discrepancies in results”
  - “solves problems as required and/or analyze course of action”
- ASCP Board of Certification Exam success rate
- Post graduation surveys (graduate survey and employers survey)

### **CRITICAL THINKING/PROBLEM SOLVING activities improvements:**

- Increase the % of CTPS questions in each laboratory exercise.
  - Revise CT/PS activities and improve areas of deficiency identified by the evaluations from the Clinical Practice Evaluations, board exams and post-graduation surveys.
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### **CRITICAL THINKING/PROBLEM SOLVING student skills PRELIMINARY Assessment:**

Clinical Practice Student Evaluations (scale 1-5, based on the PCC Program Clinical Practice Evaluation rubric) were compiled. The rating scale is as follows:

- 5 – Outstanding achievement
- 4 – Exceeds expectations
- 3 – Satisfactory progress
- 2 – Needs improvement
- 1 – Critical deficiency
- na – not applicable, unable to evaluate

*Note: half points (ex: 3.5, 4.5) where used in some instances*

Special attention was given to the following two rubric items:

- ***“recognizes problems, errors in performance and discrepancies in results”***, which from now on will be referred to as **critical thinking (CT)**
- ***“solves problems as required and/or analyze course of action”***, which from now on will be referred to as **problem solving (PS)**

**Direct assessment**

Evaluations were conducted by a PCC instructor (Steve Marshal) in **Student lab activities** for the areas of hematology, coagulation, urinalysis and microbiology (HCU/M). Twenty students were evaluated. The results were as follows:

CT Overall average: 3.4 (n=20)

4	45%
3.5	20%
3	35%

PS Overall average: 3.4 (n=20)

4	30%
3.5	20%
3	50%

### Indirect assessment

Evaluations were conducted by trainers, at the affiliated training facilities, based on observation of the **student's clinical practice activities** in the areas of hematology, coagulation and urinalysis (HCU) and separately, for microbiology (Micro). The number of students evaluated varied. The results were as follows:

#### HCU

CT Overall average: 4.5 (n=22)

5	50%
4	45%
3	5%

PS Overall average: 4.5 (n=21)

5	48%
4	52%

#### Micro

CT Overall average: 4.2 (n=15)

5	33%
4	53%
3.5	7%
3	7%

PS Overall average: 4.4 (n=16)

5	44%
4	50%
3	6%

### Preliminary conclusions

- The CT/PS skills of the MLT students in the areas of HCU and Micro are satisfactory.
- There was not a single instance where a student received a 2 (needs improvement).
- The results are similar in both areas (HCU and Micro) but one can say there are slightly better results in HCU than in Micro, both in overall averages and in the percentages. (discussion: this might have to do with complexity of the subject matter).
- The results are similar for critical thinking and problem solving skills.

- There is a noticeable improvement in scores from the student lab evaluation to the clinical practice evaluation. (discussion: this might have to do with the more conservative evaluation done by the PCC instructor when compared with the trainers evaluations or, it might have to do with overall improvement in the CT/PS skills of the students when faced with real life situations such as the ones encountered during clinical practice).

#### **Next Steps**

- Results will continue to be gathered and evaluated for the remaining areas of clinical practice.
- ASCP Board of Certification Exam success rate will be evaluated
- Post graduation surveys (graduate survey and employers survey) will be conducted
- Recommendations for modifications of learning activities will be formulated based on results from the current Learning Assessment