Course Outcomes Assessment

Course/Program Title: DHY 112 Dental Materials and Procedures   Date: 5/10/17
Course/Program Team: Marlaina Lantzy RDH, MS (lead instructor), Rhonda Hull RDH, BS

Expected Learning Outcomes:
1. Analyze the principles of dental materials to rationalize the use of these materials.
2. Describe the physical and chemical properties of dental materials as it relates to biocompatibility, biomechanics and the oral environment.
3. Demonstrate the appropriate manipulation and safe handling of various dental materials in a clinical setting.

Assessment: (How do or will students demonstrate achievement of each outcome? Please attach a copy of your assessment electronically.)

Grading Criteria:	Points	Weighted Total
Lecture Quizzes (4 @ 30 points each)	120	25%
Lecture Final Exam	200	35%
Homework (10 @ 10 points each)	100	5%
Lab Skills Assessments (11 @ varied points)	220	30%
Classroom & Lab Engagement	90	3%
Attendance	90	2%
Lab Safety Quiz	P/F	0%
Total	**760**	

1. Lecture Quizzes: Four quizzes that cover units of lecture material throughout the semester are used to assess student learning of lecture material and prepare students for lab projects and board exams.
2. Final Exam: One comprehensive final is given at the end of the semester to assess student mastery of dental materials knowledge and procedures. The final exam prepares students to take licensure exams.
3. Lab Projects: Eleven skills assessments evaluate student competency when performing common clinical procedures within the dental hygiene scope of practice that are related to dental materials. All skills assessments are taught to lab competency, five of the skills are then performed in Clinic II, III and IV on live patients to meet clinical requirements for graduation. The remaining six skills are within the dental hygiene scope of practice but cannot be performed in clinical courses due the limitations of preventive services provided in clinic compared to preventive and restorative services provided in a dental office.

Validation: (What methods have you used or will you use to validate your assessment?)

1. Lecture Quizzes: Quizzes are constructed based on current dental hygiene theory and practice and scientific evidence. An item analysis is conducted by the lead instructor to validate each quiz. **(90% of students achieve an average of 75% or higher on the average of all quizzes)**

2. Comprehensive Final Exam: The final exam is constructed based on current evidence based practices and board exam content. An item analysis is conducted by the lead instructor to validate each exam. **(90% of students achieve an average of 75% or higher on the average of all exams)**

3. Lab Skills Assessments: Selection of skills taught in dental materials lab corresponds to the current scope of practice for dental hygienists in the State of Maryland and are based on current best practices.
(90% of students achieve an average of 75% or higher on all lab skills evaluations)

4. Clinical Skills Evaluations in Clinics II, III and IV: Skills learned in DHY 112 Dental Materials must be applied to patient care in clinical courses. Students must successfully complete a total of 12 sealants, one set of alginate impressions and the fabrication and delivery of either an athletic mouth guard or custom tray to satisfy patient requirements. Students are encouraged to use the intraoral camera for patient education and to record images of clinical findings for a Pathology Journal project in DHY 113 General and Oral Pathology.
(100% of students achieve passing evaluations on Impression, Custom Tray or Mouth Guard and Sealant skills evaluations in Clinics II, III and IV)

Results: (What do your assessment data show? If you have not yet assessed student achievement of your learning outcomes, when is assessment planned?)

Data from the first 3 cohorts has been compared and the results were analyzed.

 1. Lecture Quizzes: Student performance on quizzes is consistent within a 3% range from year to year. The results are below the benchmark set in the validation section **(16/18 of students, or 88%, achieved an average of 75% or higher on the average of all quizzes. Range of quiz averages: 99.58%-71.67%)**

2. Final Exam: Student performance on the final exam improved 4% between the first and second cohorts and decreased by 2% between the second and third cohorts, all within a 6% range. **(17/18 or 94% of students achieved a 75% or higher on this exam. Range of exam scores: 90%-74%)**

3. Lab Skills Assessments: Student scores for lab skills evaluations continue to be artificially high. The entire cohort received 100% for 8 of the 11 skills evaluations. This is concerning because it is not an accurate reflection of how much they have learned. The inflation may be due to lab instructors grading each skill using more of an experiential pass/fail, rather than stringent evaluation of each step of every skill. See discussion in Follow Up section. **(18/18 or 100% of students achieved a score of ≤ 95% or higher on all lab skills evaluations)**

4. Clinical Skills Evaluations in Clinics II, III and IV:

Spring 2015: 11% of students have completed either 1 or 2 rolling requirements related to dental materials for Clinic II-IV by the end of Clinic II.
Spring 2016: 22% of students have completed 2 rolling requirements related to dental materials for Clinic II-IV by the end of Clinic II.

The data for the 3 measures discussed above is presented in the following table.

Cohort	Quiz Average	Final Exam	Lab Skills Assessments	Final Course Grade Distribution	Changes in Clinic Requirements Progress
Spring '15 (n=19)	87.02%	80.96%	100%	A=19 (Average 94.4%)	No data
Spring '16 (n=20)	90.22%	86.3%	96.86%	A=18 B=20	During Clinic II: 17/17 students completed clinic II sealant requirements; 2/18 completed impression requirement 1/18 completed custom tray requirements
Spring '17 (n-18)	88.31%	84.5%	99.37%	A= 12 B= 6	During Clinic II: 18/18 students completed clinic II sealant requirements; 4/18completed impression requirement 4/18 completed custom tray requirements

Follow-up: (How have you used or how will you use the data to improve student learning?)
This is the third year this course had been taught in the dental hygiene program. Dental Materials was not an area of expertise for Marlaina Lantzy; the initial course design and first two years of delivery were presented challenges on how to teach the lecture and lab. Year three was a huge improvement in course design and the lead instructor felt confident teaching both lecture and lab. This resulted in students and faculty enjoying lab and the lead instructor feeling more assured about the learning in the lecture portion of the class.

Changes from year 1 and 2 to year 3- The overall course grades were weighted instead of using a straight points system. This change corrected grade inflation caused by lab skills evaluations. The grade distribution for Spring 2017 was more reflective of student performance.

Lab Skills Evaluation Grades:
Student scores for lab skills evaluations continue to be extremely high. This is concerning because it is not an accurate reflection of how much they have learned. The inflation may be due to lab instructors grading each skill using more of an experiential pass/fail, rather than stringent evaluation of each step of every skill. The lead instructor recognizes that lab skills grades are inflated and need to be changed. The line items of each skills evaluation form was changed for year 3 to more accurately and concisely evaluate student performance. Suggestions for improvement: dental materials CE courses for the lead instructor; collaboration with faculty from other programs regarding dental materials lab skills evaluation of students; change the lab skills section to Pass/Fail.

At the request of the Clinic II coordinator, the lab schedule was revised to teach sealants and custom trays/mouth guards earlier in the semester. This allowed students to achieve lab competency and in turn, be allowed to perform these procedures on patients in Clinic II sooner. The extra time for requirement completion in Clinic II allowed all students to complete Clinic II requirements as well as additional rolling requirements for Clinic III and IV. Rhonda Hull contributed lab schedule changes that greatly improved the efficiency of lab time. Ms. Hull is invaluable to the success of this course!

The lecture portion of the course needs to be changed to better use the limited face-to-face lecture sessions. Ideas for improvement include: flipping the class, recording lectures on Camtasia and then using class time for active learning, or changing the course to a hybrid delivery for the lecture content. The lead instructor is concerned that the current course design does not allow students adequate time to master the didactic material.

Program Grade Scale: The weight of assignments and exams is reviewed each year to ensure points awarded are distributed appropriately and accurately measure student learning. The program grade scale is currently 75%-79% =C, 80%-89%=B and 90%-100%=A. This is not an even distribution and is artificially inflating grades into the A and B range. The program grading scale should be evaluated and adjusted for a more even scale which would in turn create a more accurate grade distribution in a Bell Curve with A's, B's and C's.

Budget Justification: (What resources are necessary to improve student learning?)
Investigate the need for replacing non-functioning model trimmers, based on dental assisting program needs.