

Implementation of Portfolio Assessment of Student Competence in Two Dental School Populations

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Abstract: The purpose of this article is to describe the process and procedures involved in the implementation of portfolio assessment at two dental schools. Portfolios can be defined as a purposeful collection of student work that involves reflection in which students identify gaps in their knowledge and abilities and develop strategies for correcting those gaps. Framed within the current context of dental education and the calls for change in the ways dental students are taught and assessed, these two dental schools embarked upon an assessment strategy aimed at engaging students in self-directed learning and self-assessment. Where one school chose the implementation of programmatic portfolios based on all program competencies, the other school implemented portfolio assessment around specific program competencies not typically captured easily with traditional assessment measures such as ethics and ethical decision making. In a competency-based dental curriculum in which competence has been defined as the ability to accurately self-assess, it makes sense that strategies aimed at developing the skill of self-assessment should be the goal of every dental education program.

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Keywords: dental education, competency-based education, educational methodology, portfolio assessment, competency, critical thinking, problem-solving, self-directed learning

Submitted for publication 12/30/11; accepted 3/12/12

The Institute of Medicine (IOM) report on dental education in the mid-1990s called specific attention to the need for authentic assessment of student progress and outcomes.¹ This report corresponded with the adoption of competency-based dental education by the Commission on Dental Accreditation (CODA) in 1998. The literature is clear that a competency-based curriculum calls for competency-based assessment strategies.²⁻⁴ Educational researchers suggest that the evaluation of competence is best attained through the use of authentic assessment that is performance-based, realistic, and set within contexts that students will encounter beyond the educational setting. Authentic assessment refers to assessment of tasks that resemble real-world (authentic) activities. "Performance assessment" is a term commonly used in place of, or with, authentic assessment. Performance assessment requires students to demonstrate their knowledge, skills, and strategies by creating a product. For example, rather than choosing from several multiple-choice options, students might demonstrate their abilities related to evidence-based decisions by developing and work-

ing through a PICO question (problem, intervention, control, outcome) and then utilizing databases to access literature in order to come up with an evidence-based treatment recommendation. Such performance requires students to engage in higher order thinking and to integrate their learning experiences. Dental education lends itself to performance assessment in that a large component of the curriculum involves laboratory and clinical experiences that are entirely performance-based. Portfolios are an assessment strategy that takes these learning experiences to the next level through student reflection.

Portfolios used for assessment have been defined as purposeful collections of evidence accumulated over time and from multiple sources with the intention of documenting the learning process by involving students in active reflection on their learning.^{5,6} In a competency-based curriculum designed to foster self-directed learning, student assessment should not be focused on what the teacher knows but rather on rewarding students for self-assessment in which they identify gaps in their abilities and develop effective ways to fill those gaps. Portfolios provide

the venue for this type of reflective practice. The hallmark of a competent individual has been defined as one's ability to accurately self-assess.⁷ Portfolios, as an authentic and performance-based assessment strategy, provide the opportunity to capture and document examples of critical thinking, problem-solving, and self-directed learning that ultimately demonstrate competence. Miller, who has written extensively about assessment in the health sciences, asserts that the "collective wisdom" of the dental faculty—with consistent opportunities to interact with students and observe their behavior—forms the core of essential performance assessment.⁸ Portfolios provide the venue for capturing this "collective wisdom."

In 2005, the American Dental Education Association formed its Commission on Change and Innovation in Dental Education (ADEA CCI). While a decade had passed since the publication of the IOM report, there appeared to be little change taking place in dental schools across the country. The formation of the ADEA CCI was the first organized attempt to address the calls for change by bringing representative stakeholder organizations together to provide leadership and oversight to the change processes within dental schools. In 2006, the ADEA CCI issued a white paper outlining eight core principles that should characterize dental education and inform and guide curricula.⁹ Three of these eight core principles relate directly to portfolio assessment. The first, "Critical Thinking: Cornerstone of the Dental Education Experience," speaks to the importance of dental education operating in an environment that promotes critical thinking and problem-solving through a process of integration, reflection, and examination. In the second, "Lifelong and Self-Directed Learning," there is a shift from teacher-focused and teacher-directed learning to student-focused and student-directed learning, leading to "self-directed, self-disciplined, self-aware, and self-corrective learners." The third, "Assessment," emphasizes the importance of dental education's promotion of self-assessment, in which students take responsibility for their own learning and meaningful feedback is ongoing rather than at the conclusion of a course.

Portfolios based on programmatic competencies contain evidence that demonstrates the student's progress toward and attainment of competence, including longitudinal documentation of patient care, performance on competency exams, case presentations, literature reviews, reports, formative and summative evaluations, and formal performance reviews by supervising faculty. Most importantly,

the student's own appraisal, self-assessment, and reflection on his or her performance including needed improvement, lessons learned, and insights about dentistry or the learning process address the effectiveness of educational principles and pedagogical practices within dental education.

The effectiveness of widely used multiple-choice examinations comes into question for the assessment of the "soft science" areas of predoctoral dental education. For instance, while the technical ability to prepare a crown margin is easily assessed in most dental school environments, the less-defined areas like ethics, lifelong learning, and service to the profession present more of a challenge. For these areas, the progressive, long-term presentation of the portfolio over the entire course of study is an effective tool for capturing and evaluating student development. Paired with the self-assessment, the portfolio provides a reasonable mechanism for assessing these areas.

Changes in the reporting of licensure examination scores provide further reason for considering portfolio assessment. In April 2008, the Joint Commission on National Dental Examinations (JCNDE) reported in its e-newsletter that it approved moving to a pass/fail reporting system from the standard score reporting system for the National Board Dental Examination (NBDE).¹⁰ Beginning January 1, 2012, candidate performance is now reported to candidates, state boards, and dental schools only as pass or fail. The JCNDE outlined the basis for this decision as being related to the fundamental purpose of the examination program, which is to provide state boards with information regarding candidates' theoretical knowledge and problem-solving skills to practice safely.

When the decision to move to the pass/fail reporting system was announced, the advanced/specialty dental education communities voiced their concerns, as they view National Board scores as an important part of their admissions processes. With the elimination of actual scores, concerns surfaced over what additional information could serve to identify qualified candidates for advanced dental education programs. Portfolio assessment is a strategy that could provide information about the quality of candidates for use in the admissions process, thereby addressing the concerns of no longer having NBDE scores. Portfolios would be able to demonstrate student competence above and beyond NBDE standard scores, GPAs, and other traditional dental competency measures.

The purpose of this article is to describe the processes and procedures involved in the implementation of portfolio assessment at two dental schools. The unique perspectives of two schools that took a different approach to portfolio assessment will be discussed.

A Partnership Is Formed

Two of the coauthors (CGA and MM) first met in the summer of 2008 at the ADEA CCI liaison meeting.¹¹ When Gadbury-Amyot presented at that meeting on portfolio assessment of student competence, a discussion with McCracken ensued about the possibility of implementing portfolio assessment at the University of Alabama at Birmingham School of Dentistry. In May of that same year, an associate dean at the A.T. Still University Arizona School of Dentistry and Oral Health attended a day-long workshop presented by Gadbury-Amyot in San Antonio on portfolio assessment and indicated interest in launching portfolio assessment. These conversations began what would be a long journey toward implementing and evaluating portfolio assessment of dental student competence. While research has been conducted on the validity and reliability of portfolio assessment of competence in a dental hygiene student population,¹² to date there has been no such study in predoctoral dental education. This partnership with two dental schools has resulted in the first-ever study in a predoctoral dental school setting that examined the validity and reliability of portfolio assessment of predoctoral dental students.

In determining the research design for this study, the primary author consulted with a researcher (Brennan) whose work in the field of educational measurement, in particular in performance assessment and generalizability theory, is recognized nationally and internationally. This partnership resulted in the development of a research project to study the validity and reliability of portfolio assessment for dental students.

The coauthors met at the 2009 ADEA Annual Session to discuss the implementation of portfolio assessment at their respective dental schools and to further develop the research project. As a first step, both schools shared their program competencies and portfolio projects including student instructions. They agreed to review the information provided by each school and planned to meet again at the 2010 ADEA Annual Session, using electronic communica-

tion in the interim to continue the dialogue of portfolio assessment at their respective dental schools.

This study was designed to satisfy a set of concerns regarding validity and reliability. In the fourth edition of *Educational Measurement*, validity is defined as “the appropriateness, meaningfulness, and usefulness of the specific inferences made from test scores,” and test validation is the process of accumulating evidence to support such inferences.¹³ For this project, “test” would be equivalent to portfolio assessment. The Arizona School of Dentistry and Oral Health (ASDOH) implemented a programmatic portfolio assessment strategy based on its fourteen program competencies, while the University of Alabama at Birmingham School of Dentistry (UAB) developed a high-stakes portfolio assessment strategy based on areas that had previously been identified as not being adequately assessed, e.g., professionalism and scholarship.

The Standards for Educational and Psychological Testing provided guidance on how to best address issues of validity.¹⁴ Standards 14.8 through 14.10 (Table 1) assisted in the development of the methodology for the portfolio research. Standard 14.8 states: “Evidence of validity based on test content requires a thorough and explicit definition of the content domain of interest. For selection, classification, and promotion, the characterization of the domain should be based on a job analysis” (p. 160). In this instance, the domain of interest is “competence”; and since the CODA Accreditation Standards are reviewed on a five-year cycle, it was determined to start by mapping program competencies to CODA standards as a way to substantiate the validity of portfolio assessment for student competence. Furthermore, ADEA’s efforts in developing the ADEA Competencies for the New General Dentist¹⁵ provided a national resource to assist in the “explicit definition of the content domain of interest.” Though ASDOH’s portfolio project was linked to its program competencies, UAB’s portfolio project was not. Therefore, given the validity argument for mapping program competencies to CODA standards and the ADEA Competencies for the New General Dentist, UAB set about aligning its portfolio project to its respective program competencies and mapping competencies as described above.

Reliability of the study has to do with consistency of scores across replications of a measurement procedure.¹³ Two general conclusions about interrater reliability in performance assessment predominate: 1) when tasks are the same for all students and scoring procedures well defined, interrater reliability

Table 1. Standards for Educational and Psychological Testing: Standards 14.8–14.10

Standard 14.8 states:

“Evidence of validity based on test content requires a thorough and explicit definition of the content domain of interest. For selection, classification, and promotion, the characterization of the domain should be based on a job analysis” (p. 160).

Standard 14.9 states:

“When evidence of validity based on test content is a primary source of validity evidence in support of the use of a test in selection or promotion, a close link between test content and job content should be demonstrated” (p. 160).

Standard 14.10 states:

“When evidence of validity based on test content is presented, the rationale for defining and describing a specific job content domain in a particular way (e.g., in terms of tasks to be performed or knowledge, skills, abilities, or other personal characteristics) should be stated clearly” (p. 160).

Source: American Educational Research Association, American Psychological Association, and National Council on Measurement in Education. Standards for educational and psychological testing. Washington, DC: American Educational Research Association, 1999.

tends to be high;^{12,16} and 2) when different students respond to different tasks, select their own tasks, or produce unique products, interrater reliability tends to be low.¹⁷ ASDOH did not initially identify required elements/evidence for entry into the portfolio. In contrast, UAB had identified required elements/evidence and also had a progression strategy in which elements/evidence were identified as being due during Years 1, 2, 3, and 4. Subsequently, ASDOH set about identifying required elements/evidence for each of its program competencies. While some degree of flexibility concerning portfolio elements/evidence existed in both programs, it was agreed that being able to address reliability issues would require two or three required common elements/evidence per competency. Students were also encouraged to add additional elements/evidence if they could justify that these additions contributed to the attainment of competence.

A Pathway to Developing ePortfolio Assessment

ePortfolio Mentors

Realistically, in a large dental school setting, every faculty member will likely not have a direct role in portfolio assessment. In both of these dental schools, a core group of faculty members served as mentors for portfolio assessment. These individuals assisted in developing a portfolio project that spanned the curriculum, identified required elements/evidence for each of the competencies, and assisted in both formative and summative feedback.

We agree with a study that argued for the integration of portfolio assessment across the curriculum by embedding it into courses where assignments, already included in each course syllabi, have been thoughtfully considered for inclusion in the portfolio.¹⁸ Using this integrated approach to portfolio assessment makes the collection of evidence easy and intuitive rather than being yet another hurdle to be overcome prior to graduation. Feedback is also assured since the assignments are already built into the course. On the other hand, when portfolio assessment stands apart from the curriculum, it is perceived by both students and faculty members as extra busy work. Well-developed portfolio assessment means strategically embedding portfolio assignments across the curriculum with the intent of not adding additional assignments but rather to more thoughtfully consider what should and should not remain.

Table 2 outlines resources and processes that have been found to support portfolio assessment both from the student and faculty perspective. Clearly the development and implementation of a program-level portfolio require a more complex strategy than simply leaving it to individual faculty members with little attention to resourcing or professional faculty development.¹⁹ Readers will also find it instructive to refer to an article by Kramer et al. that discusses a variety of assessment measures and outlines their strengths and limitations.²⁰ For portfolios, one of the strengths identified relates to the ability of portfolios to evaluate competencies not easily evaluated by traditional assessment measures. In concert with this identified strength, UAB set out to design its portfolio assessment program to address this very issue. A limitation identified is the issue of reliability of portfolio raters, thereby validating the need for our conducting this

Table 2. Resources and processes for supporting ePortfolio assessment

	Resources/Processes
Student Perspective	<p>Introducing students to the concept of competencies and ePortfolios, showing examples including exemplars</p> <p>Curriculum map for students of where each of the program competencies appears</p> <p>Ongoing work helping students learn how and why ePortfolios are being used and valued in the program</p> <p>Technical support for learning about the ePortfolio technology solution including features, layout and design, how to incorporate media, and problem resolution</p> <p>Guidance on reflective writing, again showing examples including exemplars</p> <p>Opportunities for informal, formative, and summative feedback (mentor system works well for this)</p> <p>Learning activities that encourage student development of ePortfolios (best accomplished with assignments across the curriculum, built into courses and course assessment)</p>
Faculty Perspective	<p>Curriculum mapping that illustrates which courses develop which competencies</p> <p>Professional development to help with reframing of existing teaching, learning, and assessment activities to support use of ePortfolios</p> <p>Professional development to deepen understanding of assessment practices and to shift from an overreliance on summative practices and faculty assessment towards a model of assessment in which students engage in practices more characteristic of the professions, including negotiated learning, reflection, and self-assessment</p> <p>Professional development for the formative assessing of ePortfolios at both course and program levels</p> <p>Development or adaptation of quality evaluation processes (does not require throwing the baby out with the bathwater: quality evaluation currently being used can be integrated into the ePortfolio projects)</p>

Source: Adapted from Housego S, Parker N. Positioning ePortfolios in an integrated curriculum. *Educ Training* 2009;51(5/6):408–21.

research in two dental schools. Another limitation refers to the issue of time, in that the development of portfolios can be time-consuming for both faculty members and students, as can evaluation for faculty members. Again, the issue of integration across the curriculum outlined in this article is critical when it comes to addressing the limitation of time for faculty and students in portfolio assessment.

ePortfolio Technology

Both schools chose to use an electronic portfolio system. Dozens of companies provide ePortfolio systems, and an excellent overview of technologies can be found at a website (<http://electronicportfolios.com/categories.html>) developed and maintained by Helen C. Barrett, Ph.D., and based on two concepts: level of interactivity, and level of personal expression and creativity for the portfolio developer.²¹

We chose to use Foliotek for our ePortfolio solution for several reasons, the most important being Foliotek's willingness to customize ePortfolio projects for each of the dental schools. This project

involved building on previous research, and because each school was taking a different approach to its portfolio assessment, a one-size-fits-all ePortfolio solution was not going to work. Also, in accord with Barrett's categories of ePortfolio tools, the portfolio projects at each school were institutional in design versus a single class project and therefore demanded a more robust ePortfolio solution that would facilitate interactivity, along with a data management and reporting system. The data management system allows for collection of evaluation data and can produce reports aggregating quantitative data.

Scoring Rubrics and Rater Calibration

The next step in the process was developing an evaluation tool. Brennan states that, in performance assessment, carefully constructed scoring rubrics and intensive training sessions for raters are essential elements for producing ratings that are reliable.²² Scoring rubrics work well as an evaluation instrument for performance assessment such

as portfolios.^{5,22,23} A primary trait analysis scoring rubric previously developed by the primary author for evaluating portfolios provided a starting point for the development of a scoring rubric for each of the dental schools.²⁴ The ADEA Competencies for the New General Dentist¹⁵ provided validation of rubric traits such as critical thinking and health promotion. The scoring rubrics for the two dental schools appear in Appendixes A and B.

It is critical for reliability of scoring that raters are trained through intensive calibration exercises. Therefore, an important first step was to make sure that raters understood the criteria on the scoring rubrics. Next, raters were given a sample student portfolio that they independently evaluated; they then collectively came together to discuss and defend their evaluations. Subsequently, preliminary data collection and analysis took place at the end of the third year. At this point in the curriculum (end of the third year), only certain components of the portfolios were ready for evaluation. However, by implementing a preliminary data collection phase, the raters were provided with an opportunity to further calibrate before the final data collection that would take place at the end of the students' final year of dental school (spring 2012).

Self-Assessment and Reflection: The Heart of Portfolio Assessment

In developing portfolio assessments, we were guided by this thought: "Graduates in the workforce will not in general be taking examinations or writing academic essays. They will be puzzling over what counts as good work and how they will be able to discern whether they are producing it" (p. 403).²⁵ Dental education has articulated the importance of self-assessment in work that emerged from the ADEA CCI.^{7,9} For students to develop effective self-assessment skills, they must engage in self-assessment activities. It is only through practice that they will be able to build their skills in self-assessment to the point where their own judgments of their work are accurate and useful. A recent study conducted in dental hygiene clinical education found that students required an orientation to self-assessment as there was a general lack of knowledge and experience with self-assessment prior to entering professional school.²⁶ As the students gained greater experience

with self-assessment, they began to see how self-assessment assisted them in their clinical skill development. In that study, Mould et al. concluded that the ability to accurately self-assess has been defined as a hallmark of competence and therefore requires that educational programs work with students on the development of self-assessment skills.

Self-assessment and reflection are said to be two associated acts in which self-assessment involves the process of reflection but not all reflection leads to self-assessment.²⁷ Reflection assists us in exploring our experiences so that we can form a mental image with which to play, relive, and develop into future actions. We can reflect on intentions, actions, thoughts, and feelings. Research has found that when students are learning to reflect, their reflection is mainly descriptive.²⁸ Students engaging in descriptive reflection may not recognize significant factors in the experience. To realize the full potential of reflection, the reflector must deconstruct the experience to see it from multiple angles in order to then reconstruct it.²⁹ Samuels and Betts describe deconstruction as a process in which the student takes apart the elements of an experience to examine each part and its relationship with other parts.²⁹ Others have suggested that, through deep and rich reflection, learning will progress beyond a pre-existing schema of how things work to require us to challenge assumptions, which results in new perspectives and the consideration of new alternatives.³⁰ Through reflection, we create personal meaning from experience and take a critical stance towards our meanings and interpretations.

Research has found, however, that the practice of reflection and reflective writing does not necessarily increase the level of reflection and may lead to routine responses.³¹ Bain et al. identified five levels of reflection that can help guide the reflective process.²⁸ The first three levels—reporting, responding, and relating—focus on what happened and what lessons can be learned and applied in other situations. At these levels, there is no in-depth analysis of how or why the experience unfolded as it did; rather, the reflector reviews the event through existing frameworks of thinking and beliefs. In the fourth level, in-depth analysis occurs and may involve challenging existing frameworks of thinking. At this level, alternative ways of interpreting what happened are perceived, thus completing the deconstruction process. The fourth level, where deconstruction has occurred, creates the opportunity for reconstruction, at the fifth level, where the application of learning is based on new frameworks of thinking.

Table 3. Example of a reflection template**Reflection Paper Outline**

Following your rotation in oral surgery, you will be required to develop a reflection based on your experience. Write at a minimum a 2-3 page paper, double-spaced, that reflects on the following:

1. What experiences did you participate in while on your rotation?
 2. What was good/bad about those experiences? What went particularly well, what didn't go so well, and why do you think it didn't go well?
 3. What would you do differently if you could do it again?
 4. In your opinion, how will this experience contribute to your professional growth as a future dentist?
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As an example, dental students are required by the CODA standards to engage in service activities. Assume a student participates in a school event on a Saturday organized to provide free dental exams for homeless people. During the event, the student identifies a suspected oral cancer and appropriately refers the patient. In later weeks, the patient writes a thank-you note to the student for this important service. In the first three levels of thinking, the student records the events of the day, including the importance of the oral exam. At the fourth level, the student's previously untested opinions about homeless people are examined. The student critically evaluates local access to care issues and is challenged to balance the responsibility of the health care provider with the ability to pay. In the fifth level, the student through this experience develops a position about service in the community.

Reflection is a complex process that requires strategies for educating and guiding both students and faculty members. Armed with basic reflection strategies, students have the potential to reach Bain et al.'s higher levels of reflection.³² Strategies found in the literature include prompts, examples, and even direct instruction to ensure students have the foundational knowledge and skills for reflection. Prompts can be provided through faculty feedback and the use of questions that challenge and promote deeper levels of reflection. Bain et al. researched the impact of differing kinds of feedback on levels of reflection and found that high-level challenging feedback, focused on the process and levels of reflective writing, is most effective.³² Modeling through the use of examples of reflective writing that show the differences among levels of reflection has been found to be a good strategy for promoting higher level reflection as well.³³

Providing structure through the use of templates is another strategy for promoting reflection (Table 3).

Conclusions

Changing teaching, learning, and assessment practices involves risk and uncertainty for both educators and students. Determined faculty members have always found ways to implement changes when they see value in it. Likewise, when students can see the value, they are more likely to engage. Implementing portfolio assessment of student competence can only be accomplished through the concerted efforts of all involved—faculty, students, and administrators. We believe that portfolio assessment offers a competency-based assessment strategy that provides integration across competencies and disciplines, sampling from multiple contexts and multiple sources, triangulation of information, and the training of dental students to be reflective practitioners.

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APPENDIX A

Scoring Rubric for the Arizona School of Dentistry and Oral Health

Description of Primary Portfolio Traits	Comments	Rating			
		Not at all	Some	Most	All
1. Does the portfolio specifically document evidence of critical thinking? Competency 1. Critical Thinking and Information Management: Acquire, synthesize, and integrate new information and utilize critical thinking and problem-solving skills in patient care and community health.		Not at all	Some	Most	All
Components					
• Evaluates and integrates emerging trends in health care as appropriate.		1	2	3	4
• Utilizes critical thinking and problem-solving skills to access, critically appraise, apply, and communicate scientific and lay literature as it relates to providing evidence-based patient care.		1	2	3	4
• Evaluates and integrates best research outcomes with clinical expertise and patient values for evidence-based care.		1	2	3	4
2. Does the portfolio show evidence of student professionalism and ethics? Competency 2. Ethics: Apply ethical standards in professional interactions with patients, colleagues, and staff. Competency 3. Legal: Apply legal principles in professional interactions with patients, colleagues, and staff.		Not at all	Some	Most	All
Components					
• Applies ethical and legal standards in the provision of dental care.		1	2	3	4
• Practices within one's scope of competence and seeks out consults and referral when indicated.		1	2	3	4
• Evidence of self-assessment with appropriate corrective measures taken as applicable.		1	2	3	4
3. Does the portfolio show evidence of professional communication and interpersonal skills? Competency 6. Communication and Behavioral Principles: Apply appropriate interpersonal skills, communication skills, psychosocial principles, and behavioral principles in caring for a diverse population.		Not at all	Some	Most	All
Components					
• Applies appropriate interpersonal and communications skills.		1	2	3	4
• Applies psychosocial and behavioral principles in patient-centered health care.		1	2	3	4
• Communicates effectively with individuals from diverse backgrounds in a culturally competent manner.		1	2	3	4
4. Does the portfolio demonstrate a commitment to health promotion? Competency 4. Leadership: Demonstrate the ability to function as a leader. Competency 7. Community: Apply public health principles of assessment, policy development, and assurance in improving the oral health of communities.		Not at all	Some	Most	All
Components					
• Provides prevention, intervention, and educational strategies.		1	2	3	4
• Participates with dental team members and other health care professionals in the management and health promotion of all patients.		1	2	3	4
• Recognizes and appreciates the need to contribute to the improvement of oral health beyond those served in traditional practice settings.		1	2	3	4
5. Does the portfolio illustrate an understanding of the principles of practice management and informatics? Competency 5. Self-Assessment: Demonstrate the ability to assess personal performance. Competency 8. Management and Financing Models: Understand, utilize, and evaluate different models of oral health care management, financing, and delivery. Competency 9. Risk Management, Quality, and Infection Control: Apply principles of risk management, quality improvement, radiation and environmental safety, and infection control to patient care.		Not at all	Some	Most	All
Components					
• Evaluate and apply contemporary and emerging information including clinical and practice management technology resources.		1	2	3	4

• Evaluate and manage current models of oral health care management and delivery.	1	2	3	4
• Apply principles of risk management, including informed consent and appropriate record keeping in patient care.	1	2	3	4
• Demonstrate knowledge of effective business skills, financial management, and human resource management.	1	2	3	4
• Apply quality assurance, assessment, and improvement concepts.	1	2	3	4
• Comply with local, state, and federal regulations including OSHA and HIPAA.	1	2	3	4
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6. Does the portfolio provide evidence of competent patient care including assessment, diagnosis, and treatment planning?				
Competency 11. Patient Assessment, Diagnosis, Treatment Planning, and Consent: Obtain and interpret patient data and use findings to accurately assess and manage patient care; formulate provisional, differential, and definitive diagnoses and develop an individual, comprehensive, sequenced treatment plan and alternative plans; obtain informed consent and/or make referral plans to other health and social service providers.				
	Not at all	Some	Most	All
Components				
• Manage the oral health care of persons of all ages and stages of life including the infant, child, adolescent, and adult, as well as the unique needs of women, geriatric, and special needs patients.	1	2	3	4
• Formulate a comprehensive diagnosis, treatment, and/or referral plan for the management of patients.	1	2	3	4
• Manage restorative procedures that preserve tooth structure, replace missing or defective tooth structure, maintain function, are esthetic, and promote soft and hard tissue health.	1	2	3	4
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7. Does the portfolio specifically document evidence of attainment of each of following program competencies? (Following are those competencies not already included in the six rubric areas)				
	Not at all	Some	Most	All
Components				
#10. Body Systems: Demonstrate core knowledge of fundamental structures, functions, and interrelationships of the body systems including the orofacial complex.	1	2	3	4
#12. Patient Education and Empowerment: Educate patient on the etiologies, prognoses, and preventive strategies so that he/she can participate in the management of his/her own oral health care.	1	2	3	4
#13. Manage Oral Diseases: Prevent disease and/or manage care for pediatric, adolescent, adult, geriatric, and special needs patients from diverse backgrounds with:	1	2	3	4
a. Pain and anxiety	1	2	3	4
b. Dental caries	1	2	3	4
c. Need for preventive and restorative procedures that preserve tooth structure and esthetics and promote soft and hard tissue health	1	2	3	4
d. Partial or complete edentulism	1	2	3	4
e. Periodontal diseases	1	2	3	4
f. Pulpal diseases and related periradicular pathology	1	2	3	4
g. Oral mucosal and osseous diseases and disorders	1	2	3	4
h. Need for surgical procedures	1	2	3	4
i. Medical emergencies	1	2	3	4
j. Malocclusion	1	2	3	4
k. Dental emergencies	1	2	3	4
l. Temporomandibular joint dysfunction	1	2	3	4
m. Need for pharmacologic agents	1	2	3	4
n. Special needs	1	2	3	4
#14. Outcomes Assessment: Evaluate the appropriateness, necessity, and the long-term impact of dental care on the patient	1	2	3	4

Score for Primary Traits: ____/39

Description of General Portfolio Traits	Comments		Rating	
	Not at all	Some	Most	All
8. Is the student able to illustrate growth and professional development to the reader?				
Components				
• Illustrates continued development and growth over time, i.e., ability to read, analyze and apply scientific literature in decision making process.	1	2	3	4
• Demonstrates increased use of professional language over time.	1	2	3	4
• Illustrates heightened professionalism, humanitarianism, and ethical behavior.	1	2	3	4
• Provides evidence of professional involvement, e.g., SADA, student member of state or local dh associations, etc.	1	2	3	4

	Not at all	Some	Most	All
9. Does the portfolio contain sufficient evidence of self-evaluation by demonstrating the following components?				
Components				
• Demonstrates ability to identify weaknesses and develop appropriate problem-solving strategies.	1	2	3	4
• Illustrates ability to recognize strengths and maximize them.	1	2	3	4
• Analyzes experiences in school and what effect these experiences had on learning.	1	2	3	4
• Documents self-evaluation using evidence.	1	2	3	4
10. Does the portfolio illustrate a commitment to lifelong learning?	Not at all	Some	Most	All
Components				
• Contains explanation of student's commitment to lifelong learning.	1	2	3	4
• Contains explanation of student's short- and long-term career goals.	1	2	3	4
• Student demonstrates the value of value of lifelong learning to him/her personally and to the profession as a whole.	1	2	3	4
• Able to use information technology to assist in evidence-based decision making (ability to find information for answering questions).	1	2	3	4
11. Does the portfolio demonstrate organizational skills in its design, content, and overall interpretation of items chosen for inclusion?	Not at all	Some	Most	All
Components				
• Portfolio design is concise with logical organization.	1	2	3	4
• Reflects student's ability to adequately manage information and assemble relevant items to support achievement of competence.	1	2	3	4
• Student demonstrates ability to interpret faculty guidelines for development of portfolio with a final product that demonstrates organizational skills.	1	2	3	4
• Reflections on items chosen for inclusion are logical interpretations and organized in such a manner as to support the student's claim of competence.	1	2	3	4
12. Does the portfolio demonstrate creativity in its design, content, and overall interpretation of items chosen for inclusion?	Not at all	Some	Most	All
Components				
• Student demonstrates ability to interpret faculty guidelines for development of portfolio with a final product that demonstrates individual creativity.	1	2	3	4
• Reflects personality and characteristics of the student.	1	2	3	4
• Demonstrates ability to apply knowledge in creative (out-of-box) situations.	1	2	3	4
• Creative application/inclusion of items not required by faculty to meet portfolio guidelines.	1	2	3	4
13. Does the student portray a professional level of communication in the portfolio by incorporating the following components into the introduction to the portfolio, section introductions, and the portfolio summary?	Not at all	Some	Most	All
Components				
• Introductions and summary present clear and succinct statements.	1	2	3	4
• The organization pattern of entries is logical and easy to follow.	1	2	3	4
• Portfolio contents are referred to as documentation to support the points made by the author.	1	2	3	4
• There are few errors in grammar or mechanics to distract from the overall presentation of information.	1	2	3	4
• Entries are placed into context for the reader.	1	2	3	4
• The relationship between the entry and the program competency are clearly linked for the reader.	1	2	3	4
• Illustrates ability to transfer knowledge from school into practical application or the work environment.	1	2	3	4

Score for General Traits: ____/27

Cumulative Score: ____/66

Sources: This rubric is derived from a compilation of the ADEA Competencies for the New General Dentist (American Dental Education Association. ADEA competencies for the new general dentist: as approved by the 2008 ADEA House of Delegates. *J Dent Educ* 2012;76(7):891-4) and the Commission on Dental Accreditation Standards for Dental Education Programs (adopted August 6, 2010 with implementation July 1, 2013; www.ada.org/sections/educationAndCareers/pdfs/predoc.pdf, accessed September 19, 2010).

APPENDIX B

Scoring Rubric for the University of Alabama at Birmingham School of Dentistry

Description of Portfolio Traits	Comments	Rating			
		Not at all	Some	Most	All
1. Does the portfolio specifically document evidence of critical thinking?					
Components					
• Evaluates and integrates emerging trends in health care as appropriate.		1	2	3	4
• Utilizes critical thinking and problem-solving skills to access, critically appraise, apply, and communicate scientific and lay literature as it relates to providing evidence-based patient care.		1	2	3	4
• Evaluates and integrates best research outcomes with clinical expertise and patient values for evidence-based care.		1	2	3	4
Competencies:					
1.1 Evaluate research and clinical findings and apply these data to health care treatment decisions.					
1.2 Utilize critical thinking skills.					
2. Does the portfolio show evidence of student professionalism and ethics?					
Components					
• Applies ethical and legal standards in the provision of dental care; knows right from wrong.		1	2	3	4
• Practices within one's scope of competence and seeks out consults and referral when indicated.		1	2	3	4
• Evidence of self-assessment with appropriate corrective measures taken as applicable.		1	2	3	4
• Evidence of understanding and internalization of principles of ethics associated with the profession.		1	2	3	4
Competencies:					
2.1 Apply principles of ethical reasoning to academics, patient care, practice management, and research.					
2.2 Apply principles of professional responsibility to academics, patient care, practice management, and research.					
2.3 Practice within one's scope of competence, making referrals when necessary.					
3. Does the portfolio show evidence of professional communication and interpersonal skills?					
Components					
• Applies appropriate interpersonal and communications skills.		1	2	3	4
• Communicates effectively with individuals from diverse backgrounds in a culturally competent manner.		1	2	3	4
Competencies:					
3.1 Apply appropriate interpersonal and communication skills.					
3.2 Apply psychosocial and behavioral principles in patient-centered health care.					
3.3 Communicate effectively with individuals from diverse populations.					
4. Does the portfolio demonstrate a commitment to health promotion and service?					
Components					
• Provides prevention, intervention, and educational strategies.		1	2	3	4
• Participates with dental team members and other health care professionals in the management and health promotion of all patients.		1	2	3	4
• Recognizes and appreciates the need to contribute to the improvement of oral health beyond those served in traditional practice settings.		1	2	3	4
• Shows innovation and leadership in designing and implementing service projects.		1	2	3	4
• Demonstrates an internalization of ideals of service associated with the profession.		1	2	3	4
Competencies:					
4.1 Assess individual preventive treatment needs concerning the etiology and control of oral diseases and conditions.					
4.2 Assess individual health education needs to develop counseling techniques and self-care regimens designed to motivate patients to assume appropriate responsibility for their oral health.					

- 4.3 Provide preventive treatment to patients.
- 4.4 Contribute to community health promotion efforts to prevent oral diseases.

5. Does the portfolio provide evidence of competent patient care including assessment, diagnosis, and treatment planning?

Components

• Formulate a comprehensive diagnosis, treatment, and/or referral plan for the management of patients.	1	2	3	4
• Manage restorative procedures that preserve tooth structure, replace missing or defective tooth structure, maintain function, are esthetic, and promote soft and hard tissue health.	1	2	3	4
• Understand and communicate evidence base for making treatment decisions.	1	2	3	4

Competencies:

- 6.2 Perform a comprehensive patient evaluation that collects diagnostic data and complete patient history (including chief complaint, medications, systemic health, behavioral, socioeconomic, and cultural information) to assess the patient's medical, oral, and extraoral conditions.
- 6.3 Develop a differential, provisional, and/or definitive diagnosis by interpreting and correlating findings from the patient examination.
- 6.4 Develop a properly sequenced treatment plan based on the patient examination and diagnostic data.
- 6.9 Communicate and manage dental lab procedures.
- 6.10 Manage fixed replacement of teeth to proper form, function, and esthetics.
- 6.11 Manage removable replacement of teeth to proper form, function, and esthetics.
- 6.12 Prevent, diagnose, and manage periodontal diseases.
- 6.13 Diagnose and manage pulpal and periradicular diseases.
- 6.14 Diagnose and manage oral surgical treatment needs.
- 6.17 Determine prognosis and evaluate oral health care outcomes and maintenance.

Cumulative Score:

Sources: This rubric is derived from a compilation of the ADEA Competencies for the New General Dentist (American Dental Education Association. ADEA competencies for the new general dentist: as approved by the 2008 ADEA House of Delegates. *J Dent Educ* 2012;76(7):891–4) and the Commission on Dental Accreditation Standards for Dental Education Programs (adopted August 6, 2010 with implementation July 1, 2013; www.ada.org/sections/educationAndCareers/pdfs/predoc.pdf, accessed September 19, 2010).