

Transformation Rubric for Engaged Learning: A Tool and Method for Measuring Life-Changing Experiences

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ePortfolios and other engaged learning experiences can have extensive impact on students in many facets of their lives, such as subject-area learning, skill and competence development, perspectives on “how the world works,” and even students’ own identities, confidence, and needs. Assessing these various impacts can be a challenge for faculty and program developers. Existing methods can determine students’ attainment of competence, but very little guidance exists to help leaders determine the impact of their programs on the affective aspects of learning, such as changes in perspective and identity. This paper describes the Transformation Rubric for Engaged Learning, a tool and methodology for examining a program’s impact beyond competency attainment in a systematic, replicable manner. The Rubric can be used in addition to existing program assessment methods to give a more complete assessment of a variety of programs, from reflective ePortfolios to community service projects to degree-granting programs.

Students often report that reflection or other engaged learning activities “changed my life” or “made me look at the world differently.” Ironically, although academics provide students with tools for making sense of life-altering experiences (e.g., reflective portfolios), they still lack tools to help articulate and measure the impact of these experiences on students. The University of Michigan Dental Hygiene Degree Completion E-Learning Program (i.e., the E-Learning Program) has made a preliminary step in this direction, including the development of a rubric and methodology for defining and measuring changes in student confidence, skills, identity, and perspective on the world. This rubric and method can be used by institutions to measure the impact of any engaged learning experience, including academic programs, internships, service learning projects, co-curricular activities, theses and capstone projects, portfolios, or any other learning experience through which open-ended student responses are gathered. This paper describes the tool, its use, and preliminary results from the E-Learning Program.

Program Information

The E-Learning Program was launched in 2008 to offer an online option to an on-campus program that had existed for over 30 years. Degree completion programs provide the opportunity for dental hygienists with associates’ degrees and professional licenses to complete the necessary remaining credit hours towards their bachelors’ degree. The online delivery of this program afforded the opportunity to develop a new curriculum focusing on expanding dental hygienists’ scholarship from basic clinical practice to include health promotion, community program development, clinical teaching experience, research, advocacy, and leadership. The E-Learning Program, which culminates in a Bachelor of Science in Dental Hygiene, comprises

11 courses over 2 years. Didactic instruction and course interactions happen online, and there are three opportunities for students to engage with their communities and apply their learning: a community project, a teaching practicum, and a capstone project. There are no lectures and no tests; instead, program competencies are measured through a variety of assignment types, including papers, projects, short case studies, and group work.

A key feature of the E-Learning Program is the integration of reflection and meta-reflection throughout the program, largely via an ePortfolio. It is important to note that the program does not measure student competence via ePortfolio reflections because competence is measured through other assignments, as described above. Instead, reflections ask students to explore their perceptions of their own abilities and their thoughts and feelings about their experiences. Students reflect on four program competencies at the end of each course, reflect on course goals twice per course, and may also complete additional reflections as determined by individual courses. Reflections are graded for the quality of a student’s writing and depth of critical self-assessment.

In the final course of the E-Learning Program, students re-read all reflections to date and write “meta-reflections” on program competencies. They also develop final self-presentation portfolios, which include samples of work and synopses of students’ individual skills and strengths. This showcase portfolio gives students the opportunity to articulate their achievements to an audience of their choice, typically a potential employer or graduate school admissions committee. As with the in-course reflections, grades are assigned based on the quality of the reflective writing; the portfolio itself is not viewed as proof of competence.

An extensive program assessment plan was in place and analyses were performed since the first year

of the E-Learning Program (Gwozdek, Springfield, Peet, & Kerschbaum, 2011). The first rounds of analysis showed the program to be academically rigorous (Springfield, Gwozdek, Peet, & Kerschbaum, 2012). However, that analysis found that competence-based program assessments did not adequately capture students' repeated assertions that the E-Learning Program changed their lives (Springfield et al., 2012). This paper describes the effort to investigate the affective, personally transformative aspects of the program in a more systematic, replicable fashion.

The authors of this paper include an instructional designer with expertise in planning and assessing online education (Author 1); a consultant with expertise in qualitative analysis, who led the rubric development and served as one of three unaffiliated data coders (Author 2); and the program director, who also taught several of the courses within the program (Author 3).

Need for a Rubric

The central problem facing those trying to articulate the benefits of rich, reflective, engaged learning programs is that observations of students, student learning, and student comments tell us that "something special" is happening in our programs. This "something" goes far beyond the types of skills and knowledge one would expect students to gain in a typical program of study. Students say of the program "it changed my life" or "I see the world in an entirely new way now." Even mature students—those in the E-Learning Program are coming back to college after an average of 7 years in professional practice—with personalities not generally given to exaggeration, report that "This is the best thing I've ever done," and "I didn't really understand at first but after the last round of reflections, I really started to get it why we are doing all these extra things." But what is "it"? Students and faculty alike—in this program and others in academia—agree that there is an "it," but are at a loss for defining it and explaining why it is important. Until we define and have a way of measuring "it," we cannot begin to understand the program features that make it happen.

Concepts such as confidence and "I think of myself differently" came up frequently in focus groups, so we looked first for an extant tool to measure program impact on affective traits such as confidence and self-perception. We reviewed the VALUE Rubrics from the Association of American Colleges and Universities (Finley & Rhodes, 2013), the Metacognitive Awareness Inventory (Schraw & Dennison, 1994), and the California Critical Thinking Skills Test (Facione, 1990). While all of these provide valuable information about individual students' skills, all are fairly narrowly focused on specific competencies. That is, these metrics

assess the extent to which students have attained or improved a skill, but they do not examine students' perception of that skill or their personal reaction to having acquired that skill. Although skill achievement is certainly important, we believe that some of the most profound impacts of the E-Learning Program—which included extensive ePortfolio reflections, community engagement, and other authentic learning experiences—were not being measured by these standard assessments of competence.

Looking more broadly, the literature around transformational learning did speak to issues of education's impact on learners that goes beyond attainment of competence. A thorough overview of transformational learning was written by Baumgartner (2001), who defined transformational learning as learning that "changes the way people see themselves and their world" (p. 16). This gets at the heart of what we are trying to measure and corresponds to the categories of identity and perception eventually used in the rubric. Bandura and Schunk (1981) observed that skill acquisition often led to enhanced self-efficacy, confidence in one's ability to succeed on a task, and the belief that self-efficacy has a direct impact on performance in terms of task perseverance. This ties into the idea that confidence is important because it impacts professional performance.

Extensive discussion exists describing the importance of reflection and engagement for transformational learning (Mezirow, 1991; Taylor, 2007). Both King (2004) and Taylor (2007) stated that reflection involving written accounts of these intellectual and emotional connections to learning is significantly important in the transformative process, as it strengthens a person's analytical capabilities. Taylor (2007) described how higher education can foster transformational learning by creating active learning experiences that are directly related to content taught, are personally engaging, and stimulate reflection. Lastly, Kiely (2005) provided a thorough analysis of the educational psychology of learning, which is critical for understanding how to structure experiences to maximize student transformation. He also explained why reflection is a critical component of this process; however, it alone is not adequate to foster transformative learning. The literature suggests that it is a combination of both reflection and engagement that best supports transformative learning.

All of these sources are vital in describing how transformative learning can happen within individuals and programs, and can be used prospectively during program planning to develop experiences with a high potential to foster transformative learning. However, literature on transformative learning does not provide tools for measuring those impacts directly. The ability to quantify the personal, affective impact of programs is

key to illustrating the unique effectiveness of reflective and engaged learning experiences. Therefore, we chose to develop a method for measuring these additional impacts.

Purpose and Benefits of the Transformation Rubric

In a recent editorial, Rhodes, Chen, Watson, and Garrison (2014) called for more rigorous research into the impact and effectiveness of ePortfolio. We believe our approach, which focuses on portfolio-supported engaged learning, may be one answer to that call. The Transformation Rubric we present is a coding mechanism for analyzing the impact of ePortfolios and other engaged learning experiences on students' perceptions and understanding of their abilities, their motivations, and how they understand the world around them. This is a much broader goal than assessing "what students learned" or "are students competent?"; instead, it asks "how did students' understanding of themselves and their abilities change?" It is concerning that many deeply enriching student experiences (e.g., ePortfolios) may be in danger of being cut if meaningful impact cannot be demonstrated. Further, using only rubrics that assess competency achievement could undermine efforts to demonstrate impact because the impact of engaged, reflective initiatives like portfolios goes far beyond typical notions of student learning. All learning brings about change; what is needed is a way to differentiate between transformative and non-transformative changes. We believe that this rubric can be used to determine objectively the number of changes in confidence, skills, worldview, personal identity, and pride that students report as a result of their experiences. Even more significantly, it could be used to determine how profound those changes were—distinguishing between expected incremental changes and truly transformative changes. This helps paint a much richer picture of the impact of portfolios and engaged learning experiences, one that more accurately portrays their ongoing impact on students' lives.

This rubric is being offered for the use of the engaged learning community. Although we hope that it will be used as-is, the rubric is designed so that other program-specific topics of interest may be added. It can be used to analyze both data gathered for this purpose and previously-collected data, allowing for retrospective and longitudinal analysis. The potential benefits to the community include the following:

- Facilitating more objective evaluation of the transformational power of engaged and reflective learning beyond competency attainment;
- Developing a common vocabulary around transformative change;

- Achieving the ability to directly compare effectiveness of program designs and teaching techniques to maximize outcomes and to optimize inputs of faculty time, software support, and etc.;
- Increasing the power and validity of studies by facilitating inter-programmatic assessment;
- Reducing dramatically the amount of time needed to develop assessment measures.

Method of Development

Focus groups were held with graduating students as a standard component of the E-Learning Program evaluation. When reviewing themes in students' responses, we noticed that students spontaneously and repeatedly mentioned how the E-Learning Program had increased their confidence (e.g., Springfield et al., 2012). Faculty discussions suggested that the majority of students mentioning confidence were, academically, middle-performing students. This spurred interest in developing a more formal method of analyzing the E-Learning Program's impact on confidence and other factors, specifically comparing impacts between performance groups (high-, middle-, and low-performing students).

The author with expertise in data analytics identified qualitative analysis as an appropriate approach to our data. Qualitative analysis is ideal for identifying the themes of participants' open-ended responses, especially when researchers are un- or minimally-able to establish a set of analytic categories *a priori* from the existing literature (Auerbach & Silverstein, 2003; Brown, Tappan, Gilligan, Miller, & Angyris, 1994; Hill, Thompson, & Williams, 1997; Strauss & Corbin, 1994). In essence, this is a bottom-up approach to data analysis. Qualitative methods provide a systematic, documented, and audit-able structure for data analysis (Auerbach & Silverstein, 2003).

This author trained the other authors in qualitative methods and guided the rubric development process described below. Our qualitative analysis relied primarily on Grounded Theory (Strauss & Corbin, 1994) and borrowed from other approaches as well (Auerbach & Silverstein, 2003; Brown et al., 1994; Hill et al., 1997).

The steps are summarized here and described in more detail later. The first five steps were devoted to identifying and creating the coding categories (i.e., themes), using a combination of focus group transcripts and similar non-target data from course assignments. This allowed the primary investigators to identify a set of categories for use by a separate team of coders. The coders were trained using the non-target data (Step 6), and then analyzed the focus group data (Steps 7-9). The steps include the following:

1. Two investigators drafted an initial list of likely coding categories and definitions. The list was derived from a combination of theoretical (*a priori*) assumptions and items that emerged from the data. In essence, step one was to determine what “it” is that makes this program so impactful. This step distilled the essential impact down to transformative changes in perceptions, skills, identity, confidence, and pride.
2. The first and third authors read target data and refined the list of categories and definitions. This refined list became the draft coding rubric.
3. Using similar, but non-target, data, the second author used the draft coding rubric to categorize data to test it for comprehensibility.
4. All three authors met to discuss and refine the rubric.
5. Steps 2 through 4 were repeated as necessary until the codes and definitions were complete and understandable to people unfamiliar with the data.
6. The first author was identified as the leader of the coding process. The coding leader coded several pages of text from non-target data to create a master key for training purposes. She then trained two coders unfamiliar with the program and its data to use the coding rubric. Additional clarifications, examples, and minor changes were made to the coding rubric during the training process.
7. When each coder was able to match the key with 70% accuracy, the two trained coders and the second author (who also matched the key at least 70%) began coding target data. Each coder worked separately and submitted coded materials to the coding leader.
8. Group meetings of the coding team (i.e., a team including the leader and all coders) were used to resolve any discrepancies in coding and arrive at a final code. Discrepancies were resolved by 100% consensus of all coders. To minimize confusion across transcripts, the team coded and discussed one transcript in full before proceeding to the next transcript.
9. The coding leader maintained a record of all initial and final codes. During these meetings, the coding leader’s role was to maintain records and ensure the fidelity of the coding scheme.

In practice, the coding rubric started with one item (confidence), quickly blossomed to over a dozen terms, and then was pared down to two major categories (type of change and degree of change), each of which had at least two subcategories or levels.

Steps 1 through 5 of process outlined above took over 14 months. Training the coding team required approximately two months and coding five focus group documents took ten weeks. Other institutions wishing to perform similar qualitative analyses can use this established coding rubric to begin at Step 6 (training coders), and thus complete the assessment in a relatively short period of time.

The Transformation Rubric: Definitions and Examples

Each data point (e.g., student comment in a focus group) was coded in two ways: (a) determining the degree of change and (b) defining the type of change. For example, a phrase may be coded as representing a transformative change in perception or a non-transformative change in skill. Type of change statements may be double-coded; for example, the same statement may indicate changes in skill and confidence. However, each statement can only have one degree of change; it is either transformative or non-transformative. The Appendix has a printable summary of this coding rubric.

Degree of Change

Some changes are more profound than others. In this rubric, we use the terms “non-transformative” and “transformative” to describe the difference.

Non-transformative change. Non-transformative changes are changes in extent/amount; they represent a quantitative change from an existing amount to a greater amount. Keywords suggesting a non-transformative change include: “improved,” “enhanced,” “better,” “somewhat,” “to some degree,” and other phrases suggesting a moderate growth of an existing quality. For example, “I’m somewhat more confident than I was before” is a non-transformative statement because the change is moderate.

Transformative change. Transformative changes are changes that have substantially altered the student in some way; they represent a qualitative change to an entirely new state. Key phrases suggesting transformative change include: “I now feel,” “life-changing,” “all the time now,” “much more/less,” “I used to . . . but now I . . .” For example, “I used to think of myself as a ‘teeth cleaner,’ but now I know I’m an important part of a patient’s healthcare team” is a transformative statement.

Type of Change

Students may experience transformative and non-transformative changes in a number of areas. This rubric defines five types of changes.

Confidence. Confidence is the student's perception of comfort or perceived ability to do something. It does not necessarily denote an actual improvement in skill, but rather greater *belief* in one's ability to use a skill. "I'm much more comfortable treating patients with disabilities now" is an expression of confidence. Confidence is often double-coded with another type of change, such as skill.

Pride. Pride describes joy in an accomplishment, feeling good about one's self, satisfaction, and so on. It can sometimes be hard to differentiate from confidence. For example, "I was really proud of how much my writing improved" is an expression of pride.

Skills. Skills are anything the student has learned to do as part of the program. This includes psychomotor skills (e.g., teaching instrumentation), academic skills (e.g., professional writing), and interpersonal skills (e.g., intercultural communication). For example, "I am now able to communicate with patients in non-technical terms" is an example of a student recognizing a change in skill.

Perspective. Changes in perspective represent changes in how the student understands or sees other people or situations. For example, "I used to think most people on Medicaid didn't care about their oral health, but now I understand that their poor oral health is an access to care issue" indicates a change in perspective.

Identity. Changes in identity represent changes in how students understand or see themselves; for example, "I never thought of myself as a leader before, but now I do." A special case of the non-transformative identity code is when students describe how an experience confirmed an existing identification, desire, or motivation. We interpreted these statements as removing at least a little doubt and thus coded them as non-transformative. For example, "My teaching practicum confirmed that I really do want to be a teacher" is a clear statement of identity that indicates some change (from an implicit uncertainty to an explicit certainty) but not a transformation.

Do Not Code

The following items are not coded. In practice, we found it helpful to mark passages "do not code" or "dnc" to eliminate confusion. Types of items that are not coded include the following.

Statements about others. This rubric is interested with students' recognition of their own changes; therefore statements about others are not coded. For example, one student saying to another "Your writing has really improved!" would not be coded.

Statements of fact. Do not code lists of tasks performed unless accompanied by a clear, explicit statement that these were new or improved skills. For example, "I write well" or "In my practicum, I led

discussion groups and graded papers" speak only about the student's state at that moment and do not explicitly indicate that a change has occurred.

Generic, vague, or unspecified change. These are items that indicate some level of change, but the change is not specific enough to fit into a category or is too vague to be a meaningful indicator. For example, "I've strengthened some traits and grown a lot."

Statements of projected future growth. Do not code statements such as "I will keep working on my writing in the future"; these are projections, not statements of change that have already occurred.

Using the Transformation Rubric

Once a rubric is decided upon (this one, a modification of this one, or a different rubric), the steps are straightforward:

1. Select data to be analyzed.
2. Select and train coders.
3. Code the data.
4. Analyze the data.

Types of Data that Might be Analyzed

Any open-ended, free-response data can be analyzed with this coding rubric. It is important that questions ask students to think about their growth and change, the value of the program, and so forth. For the E-Learning Program analysis, responses to focus group questions were used (see Table 1). This rubric could also be effective with:

- Portfolio reflections
- Student reflective essays
- Exit interview transcripts
- Open-ended written survey questions
- Online threaded discussion questions

To preserve anonymity, all identifying information within the data is replaced with randomly assigned identification numbers. A key that allows researchers to match coded transcript data to anonymized student profile data is maintained by one of the authors.

Selecting and Training Coders

Results will be most objective if people unaffiliated with the program under review are trained to code the data. Two or three coders are typically suggested (Auerbach & Silverstein, 2003; Brown et al., 1994; Hill et al., 1997; Strauss & Corbin, 1994). Use of people familiar with the students is possible, but increases the likelihood that anonymity will not be maintained as well as the potential for bias.

Table 1
Focus Group Questions Used in the E-Learning Program

The focus group data used to develop the coding rubric had the following questions:

- Did you have any a-ha moments?
- What does it mean to be a leader in dental hygiene? How do you think your views have changed compared to when you first started the program?
- How has your understanding of either your own career opportunities or careers for hygienists in general changed?
- How has your understanding changed of what it means to be a member of a multidisciplinary health care team?
- What do you see as the role of reflection in your profession moving ahead?
- Do you notice differences between yourself and the people you work with *vis a vis* reflection?
- Can you identify something you do differently as a result of being reflective?
- Did your growth surprise you?

To train coders, the coding leader distributes and explains the codes along with some practice items. Coders then practice individually. The coding leader then meets with the coders and discusses the results. The coding leader may need to correct coders' understanding of the rubric or may need to refine the rubric further (or add more examples) in order to clarify. Repeat this process until at least 70% inter-rater reliability is achieved (Hill et al., 1997; Strauss & Corbin, 1994). Our experience suggests this will likely take four to six rounds of coding. During training, it is better to code smaller amounts of data and discuss the coding more frequently than to code larger samples with less discussion, because accuracy and inter-rater reliability are built through discussion and consensus.

Preferably, coders should be trained on practice data, not the data to be included in the final analysis (Brown et al., 1994; Hill et al., 1997; Strauss & Corbin, 1994). Consider using practice data in a pilot cohort that is not part of the full study or select a question that will not be included. If practice data cannot be found, train on a small subset of the final data, but re-code it after training is complete and all other data have been coded. For training, we used students' written reflections from an online class discussion; the selected text addressed types of change similar to those mentioned in the focus groups that were the final data set.

Coding

Once inter-rater reliability has achieved a minimum of 70% agreement, coding of actual data can begin. Each coder should work alone to code the data or a portion of the data. Then, as in the practice rounds, the coders meet with the coding leader and come to consensus on the final code (Auerbach & Silverstein, 2003; Hill et al., 1997). The coding leader generally does not interfere with the consensus process, unless

the coders cannot reach consensus or have clearly misunderstood the coding rules. In this rubric, every coded passage must be coded for depth and type of change, and more than one type of change may be applied to each passage. For example, the same passage may be coded as skill, confidence, and transformative.

At the end of the training phase, all three coders were in agreement for more than 70% of items. Across the five focus groups, the three-person agreement rate for our five categories fell to 33.6%; two person agreements accounted for another 50.6% of coded items (Cohen's kappa ranged .31 to .36), indicating that we had agreement between at least two coders for 84.2% of items. On the practical level, these issues caused us to spend more time discussing each transcript in order to achieve consensus. Assessment of transformation was better, with a 61% rate of three-way agreement (Cohen's kappa = .31-.41) across the five focus groups.

We identified three distinct reasons for the drop in agreement. First, the training materials were drawn from an online discussion thread with more narrowly worded questions that rarely had passages that could be double-coded. In contrast, student comments in the focus groups lent themselves to multiple type-of-change codes; for example, identity and confidence. It was common for Coder A to mark a passage as identity, Coder B to mark it as confidence, and Coder C to mark it as both. After discussion, the group would often agree on a final code of identity and confidence. By strict count, only Coder C matched the final code 100%, even though the other two coders matched the final code 50%.

The second factor was the difficulty of deciding how much text to code for context. For example, Coder A might code all five sentences of a paragraph as skill, while Coders B and C only coded the last two sentences as skill (deeming the first three sentences to be contextual but not critical to code). In this case, 100% agreement was achieved for two sentences, but three

sentences did not have 100% agreement, simply because Coder A coded more sentences for context.

Finally, after one coder repeatedly coded passages as both identity and perspective, we clarified that these two categories were generally mutually exclusive, since identity focuses on the self and perspective focuses on other people. This resulted in increased consensus in the final three focus groups. Given the high rates of partial agreements among coders and the use of a full consensus procedure to reconcile disagreements, we believe that our results provide an accurate summary of students' comments.

Practical Issues

Coding leaders need to decide what size unit of text to analyze: a phrase, a sentence, or a paragraph (Auerbach & Silverstein, 2003; Hill et al., 1997). In this analysis, we generally worked with one sentence at a time, unless students included multiple distinct thoughts in one run-on sentence. In that case, the sentence was divided into phrases at logical changes in topic.

This group of coders found it easiest to track codes by working on individual word-processed documents, highlighting passages, and inserting comments with the code(s) in the comment (see Figure 1). This allowed the coding leader to know exactly where adjoining codes started and ended. Each coder worked on a separate copy of the document and then sent the coded document to the coding leader.

The coding leader then transferred the codes to a spreadsheet containing one row for each sentence or phrase of the focus group transcript and columns for each coder's responses. The spreadsheet can then be used to calculate the percentage agreement between the coders (see Figure 2). When coders provide multiple codes for the same phrase, that line should be listed multiple times in the spreadsheet and each code entered on a single line. During the consensus meeting, the coders decided on the final code (using their own coded documents for reference) and the coding leader recorded the final code in the spreadsheet (see Figure 2). The spreadsheet could then calculate how often each coder's original code matched the final code and gave some sense of the individual accuracy of each coder. Experience strongly suggests also noting the final code on paper as well as on the spreadsheet, in case of file corruption or loss. The coding leader should maintain copies of both the original coded documents and the final codes.

For smaller data sets, each item should be coded by two to three people (Auerbach & Silverstein, 2003; Hill et al., 1997). For large data sets, more coders may be needed, but every coder does not need to review every document. Instead, simply assign two to three coders to read each document. Vary the coder groups so coders

A, B, and C are not always working on the same data. Instead, have coders A, B, and C work on one source and coders A, D, and G work on a second source, and so on.

Analyzing the Data

Setup. The first step toward analysis is to input all the data into a qualitative statistical software package (e.g., Nvivo). Source files (e.g., focus group transcripts) must be imported and marked up according to the final codes determined by the coders. A spreadsheet of student characteristics is also needed to create subgroups or to compute correlations, if desired. Typical characteristics include each student's code name or number, cohort (if examining multiple groups), GPA, gender, ethnicity, age, and etc. Other factors of interest tracked included class rank grouping (1st, 2nd, and 3rd tertile by GPA), overall portfolio reflection grade, years elapsed since last degree earned, and number of children cared for during the program.

It may also be helpful to track data concurrently in a quantitative statistical package such as SPSS. This is helpful for computing basic quantitative measures, such as number of participants in pre-specified categories (e.g., gender or racial groups), computing correlations among student characteristics, or determining the best ways to group students.

Analyses. Users of the Transformation Rubric may then perform the analyses they desire on the data. We assume that many users will wish to perform analyses such as the following:

- Determining how frequently each type-of-change code appears in the data, (a) for the entire group and/or (b) for each subgroup (e.g., cohort, grade rank group, gender);
- Determining how frequently transformative and non-transformative changes occur (a) for the entire group, (b) for each subgroup, and/or (c) to compare the percentage of transformative vs. non-transformative changes overall and for each type of change;
- Determining how frequently each type of change is related to different parts of the program in order to help determine which parts of the program elicited the most (transformative) changes (a) for the entire group and/or (b) for each subgroup (e.g., cohort, grade rank group, gender).

Because the rubric is so new, it is not yet known what may constitute a threshold for a transformative program. We hypothesize that students in all types of programs will report changes, but that the changes in highly engaged programs with reflective components

Figure 1
Using Comments to Code Data

Figure 2
Spreadsheet for Tracking All Codes

Line #	Stu #	Text of response	Final		Coder 1	Coder 2	Coder 3		
13	5	But I really liked to be able to do the whole student	dnc		dnc	dnc	dnc		
14	5	It was really cool to be able to go into a college an	dnc		dnc	dnc	dnc		
15	5	Usually you can't just go to a place and say "Hey, t	dnc		dnc	dnc	dnc		
16	5	I think the teaching was the most memorable for m	Ident	TR	Ident	TR	Ident	TR	NT
20	4	I agree with 5 on that - the teaching was very eye-	Ident	TR	Ident	TR	Ident	TR	TR
20	4	I agree with 5 on that - the teaching was very eye-	Persp	tR	Ident	TR	Persp	TR	Ident
21	4	The program director had me doing more logistic	Ident	TR	Ident	TR	Ident	TR	Ident
21	4	The program director had me doing more logistic	Persp	tR	Ident	TR	Persp	TR	Ident
22	4	I had thought that I wanted to be a teacher prior to	Ident	TR	Ident	TR	Ident	TR	Ident
22	4	I had thought that I wanted to be a teacher prior to	Persp	tR	Ident	TR	Persp	TR	Ident
23	4	I've had deal whether or not I want to step into a te	Ident	TR	Ident	TR	Ident	TR	Ident
23	4	I've had deal whether or not I want to step into a te	Ident	TR	Ident	TR	Persp	TR	Ident

will be relatively more transformative than standard lecture-test programs.

Preliminary Results for the E-Learning Program

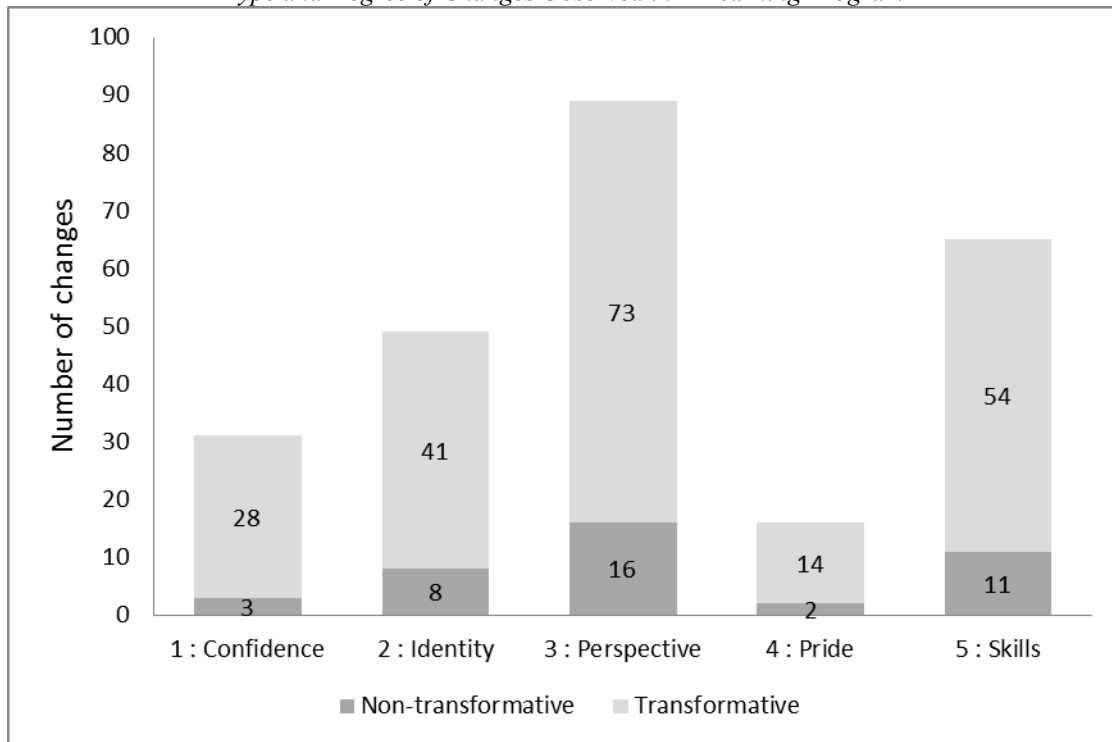
Using the Transformation Rubric and methodologies above, the following preliminary results were obtained for the E-Learning Program. The frequency of each type of change across the first five cohorts of students in the E-Learning Program is provided. Each focus group was held around graduation. Out of the 1,045 statements made by the 30 students who participated in the five focus groups, we identified 249 changes. Over a third of those changes were perspective changes (36%). Pride was the least-reported change (6%). On average, each student reported 8.3 changes. The frequency of transformative and non-transformative change is shown in Figure 3. Overall, 210 of the changes reported (84%) were transformative changes, with only 40 of the reported changes (16%) being non-transformative. On average, students reported seven transformative changes and 1.33 non-transformative changes.

Conclusion and Next Steps

Students often report that educational experiences have changed their lives but educational researchers have had great difficulty documenting these changes outside of anecdotal reports. This stands in contrast to efforts to document changes in students' knowledge and skills, for which a variety of systems exist. In this paper, we have provided a tool and methodology for objectively measuring a program's impacts beyond attainment of competence: the Transformative Rubric for Engaged Learning. Preliminary analysis of our E-Learning Program shows that over one-third of the changes reported by students were perspective changes, that is, differences in the way students perceive their work, patients, field, and concepts such as leadership. Over a quarter of the students also reported changes in their clinical, interpersonal, and technical skills. The vast majority of changes were transformative in nature, suggesting that graduates not only have better knowledge of their field but also see their field and themselves very differently than when they entered the program.

Many ePortfolio and engaged learning programs stimulate dramatic changes in students' lives, but lack a

Figure 3
Type and Degree of Changes Observed in E-Learning Program



way to measure that impact simply and directly. If the rubric becomes a widely used instrument, we expect three main benefits. First, programs that foster transformational learning will be able to measure and describe their students' confidence, identities, perceptions, pride, and skills in addition to the competency assessment tools already in use. This will help ensure the continuance of these programs in a time of increasing budgetary uncertainty. Second, if programs' non-competency outcomes can be measured in a systematic way, program inputs (e.g., faculty and staff time) can be optimized because the impact of changing inputs can be observed in program outcomes. Finally, with a standardized method for analysis, highly impactful programs can be identified and best practices shared, thus improving learning for students in a wide variety of programs.

What is most needed now is experimentation within the community to use the rubric to analyze a variety of programs, including both programs with heavy emphasis on engagement and reflection and more traditional programs. This will allow the community to:

- assess the validity of the Transformation Rubric as a tool for measuring transformational change across a variety of

programs, subject areas, and student demographics;

- start understanding what program features contribute most to actual transformative outcomes; and
- start building an objective picture of the impact of engaged learning activities beyond attainment of competence.

Ideal subjects would be programs about to undergo a significant increase in engaged curricula or teaching methodologies (e.g., introducing a reflective portfolio). By analyzing data from students before and after the change, it should be possible to see if the new curriculum engenders more transformative changes than the old program.

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Appendix
Printable Rubric

This document was developed in 2013 at the University of Michigan School of Dentistry using the grounded theory methodology (Strauss & Corbin, 1994). It can be used by researchers to investigate the impact of a wide range of engaged learning opportunities, such as reflection, portfolios, service learning, clinical practice, and simulations. Changes in five areas are currently defined, as well as two levels of change: transformative and non-transformative. This rubric can be used to code data from a number of qualitative sources: open-ended survey questions, focus group transcripts, student essays or reflections, and so on. Once coded, changes can be analyzed to determine program impact. See the associated paper for details for use.

Type-of-Change Codes		
Code and Description	Details	Keywords & Examples
Confidence: Students' perception of their comfort or perceived ability to do a thing	This is NOT better skill, but rather greater <i>belief</i> in one's ability to use a skill. Often double-coded with skill or identity. For example, "I am much more confident about my writing skills" would be double-coded for both Confidence and Skill.	Confident, comfortable, easy, no longer a problem "I used to be terrified of public speaking, but now it doesn't bother me." "I'm much more comfortable networking now."
Pride: Expressing gratification in an accomplishment	Similar to confidence, but usually very explicit about being proud of a skill.	"I found it rewarding to..." "I was so proud that I..." Do not code generic statements such as "I'm so proud of all of us"
Skills: anything the student has learned to DO as part of the program.	Teamwork, relationships, "soft" skills Clinical skills Communication/presentation skills Teaching skills Leadership skills (I have improved my leadership skills, like listening, communicating, etc.)	"I can now...", "I have improved...", "I [verb] better..." "I have become more [adjective]..."
Perspective: changes in how the student understands or sees <i>other</i> people	Externally focused I understand SOMETHING ELSE (outside of myself) differently than I did before How I perceive other people is different How I think/believe the world works is different I have a different understanding of my profession now	"I see leadership in a different way; I used to think leadership was X, now I think it's Y." "I never realized how hard it is to sign up for Medicaid." "I used to think the best way to change someone's mind was to give them more data. Now I know it's more complicated."
Identity: Changes in how students understand or see themselves.	Internally focused Vision of self, career, path Traits about myself: I AM a different person or kind of person Change in motivation or direction (I'm now motivated to...) Confirmation of motivation or direction (non-transformative change only)	"I <i>am</i> now..." "I have become a better [noun]..." "I see myself as a Leader; my vision of <i>myself</i> as a leader has changed" "I confirmed that I still want to..." (always non-transformative) Role, see myself

Extent-of-Change Codes		
Code and Definition	Examples	Keywords
Transformative change: The student recognizes that change occurred AND the change has substantially altered them in some way.	Qualitatively different; different in kind The way the student conceptualizes this issue is significantly different than it used to be	“I now feel . . .” “I used to . . . but now I . . .” Life-changing, no longer, not anymore, all the time now, changed a lot, much more, in a different light, enlightened,
Not transformative change: The student sees a change in extent/amount.	Quantitatively different; different in amount No “generic” statement can be transformative	Enhanced, acquired, improved, better than before, somewhat, to some degree, a little

Do Not Code	
Items in this category will not be counted or analyzed. Use this code to clearly mark passages that should not be coded to avoid confusing and time-consuming re-reading.	
Statements about others	“Your writing has really improved!” Student must be observing her own changes. “We’ve all grown”
Statements of fact	Lists of tasks performed, unless accompanied by a clear, explicit statement that these were new or improved skills. “I write well.” (We don’t know if she did before or not.) “I see myself as a leader.” (We don’t know if she did before or not.) “Doing X was useful.” (We are interested in whether it was also a change.) Any statement that highlights a fact about a current state, with no suggestion that a change has occurred. The coder should not infer that a change has happened; we are interested in whether the student herself noted the change.
Generic, vague, or unspecified change	“This program prepared me to move forward” “I’ve strengthened some traits and grown a lot”
Statements of projected future growth	“I’m sure we will continue to grow” “I will keep working on my writing in the future”

Notes regarding context:

You may use the context of a paragraph to determine if something is a change (vs. a statement of fact). You may wish to look at the paragraph as a whole and determine whether there was a substantive change or not; then look for specific instances line-by-line.

Do not make assumptions based on context outside the paragraph. For example, do not make assumptions about students’ motives, prior abilities, or former actions.