Renaissance learning and poetry contests in biological and agricultural engineering

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Abstract

A “Renaissance” man or woman can be characterized by a balanced life, well-rounded interests, and a facility in both arts and sciences. Such integration and balance can be difficult to attain amidst higher education’s culture of specialization, fragmentation, and compartmentalization. Changes in ABET make it more apparent that engineering educators and students can learn from the example of people such as Leonardo Da Vinci (1452-1519) who was both an engineer and an artist, known for his inventions as well as his paintings. Many engineering students think that any time spent on non-technical subjects is not beneficial to their future careers. Over two years, the author assigned essays specifically inviting students to reflect on these attitudes. Fewer than half expressed an appreciation for the value of their general education courses, especially in arts and humanities. This goal of this project was to explore Renaissance learning within a biological and agricultural engineering (BAE) program. The primary methods included weekly essay assignments and an annual departmental poetry contest. As a component of regularly assigned homework, weekly essays were assigned to BAE seniors to give students the opportunity to reflect on various Renaissance principles. The discipline of regular essay writing can be an effective way to improve student communication skills and to lead students to a fuller understanding of their own potential and to expand their appreciation for the interconnectedness of all aspects of their college education, especially the arts and humanities. A departmental poetry contest was inaugurated to showcase the students’ creativity and to encourage students to write for enjoyment. The contest was open to undergraduates, alumni, graduate students, faculty, and staff. Judges were recruited among poetry professors in the college of humanities. Categories included technical and non-technical subjects. Prizes were awarded at the annual departmental awards banquet. Winning entries were read at a poetry reading gathering and posted in the hallways. Results were evaluated to assess the effectiveness of this approach and to guide future planning.

Introduction

A “Renaissance” man or woman can be characterized by a balanced life, well-rounded interests, and abilities in both arts and sciences. Such integration and balance can be difficult to attain amidst higher education’s culture of specialization, fragmentation, and compartmentalization. Moreover, accelerating change cannot be managed by any single discipline of technical
expertise. Multidisciplinary approaches can provide the synergy and spark the creativity required to develop workable solutions to the increasingly complex problems of today’s society. Students and faculty must learn to understand and respect their colleagues who study other disciplines, and value the contribution those studies may have on their own work.

The Accreditation Board of Engineering and Technology (ABET) affirmed the value of several Renaissance traits by including in their EC 2000 criterion 3 the following:

1. an ability to function on multi-disciplinary teams
2. an understanding of professional and ethical responsibility
3. an ability to communicate effectively
4. the broad education necessary to understand the impact of engineering solutions in a global and societal context

Anecdotal evidence indicates that many students in engineering or technology-based majors think that any time spent on non-technical subjects is not beneficial to their future careers. Over two years, the author has assigned essays inviting students to reflect on their attitudes toward the General Education Curriculum (GEC) at the Ohio State University (OSU). Fewer than half expressed an appreciation for the value of the GEC component of their education, especially the arts and humanities. Likewise, OSU’s College of Engineering annual alumni survey includes questions about the importance of and ability/preparation gained at OSU in a variety of areas including math, chemistry, physics, and humanities. Every year, humanities is ranked the lowest in both categories: importance and ability/preparation.

Leonardo Da Vinci (1452-1519) has been described as an “anatomist, architect, botanist, city planner, costume and stage designer, chef, humorist, engineer, equestrian, inventor, geographer, geologist, mathematician, painter, philosopher, physicist, and raconteur (p. xii).” He was both an artist and an engineer, known for his paintings (e.g., Mona Lisa, The Last Supper) as well as his inventions (e.g., flying machine, helicopter, parachute, three-speed gear shift, hydraulic jack, canal locks). The seven Da Vincian Renaissance principles as defined by Gelb (p. 9) are:

1. Curiosità: an insatiably curious approach to life and an unrelenting quest for continuous learning
2. Dimostrazione: a commitment to test knowledge through experience, persistence, and a willingness to learn from mistakes
3. Sensazione: the continual refinement of the senses, especially sight, as the means to enliven experience
4. Sfumato: a willingness to embrace ambiguity, paradox, and uncertainty
5. Arte/Scienza: the development of the balance between science and art, logic and imagination
6. Corporalita: the cultivation of grace, ambidexterity, fitness, and poise
7. Connessione: a recognition of and appreciation for the interconnectedness of all things and phenomena; systems thinking.

The skills that express these principles can be enhanced through study, experimentation, and reflection. The discipline of regular essay writing can be an effective way to improve student communication skills and to lead students to a fuller understanding of their own potential and a recognition of the importance of humanities in their lives.
Michigan State University has, for the past three years, hosted an annual poetry contest within the college of engineering. The goals were to initiate more focus on communication skills, to showcase the students’ creativity, and to encourage students to write for enjoyment. Initial resistance both within and without the college was gradually broken down as students embraced the contest and exceeded expectations with the quality of their creative work. Gunn wrote, “Students were not only interested in submitting work but experiencing what others had written… It was especially interesting to see students reading those works that were deemed winners in the contest when they were displayed in the lobby… Some students were even heard to ask other students ‘to quiet down so they could truly enjoy the reading.’ Poetry had become something that was not the property of those liberal education majors on the other side of campus. Poetry was part of engineering as much as math and science. The depth of understanding and ability to present ideas improved.” (p. 5).

At Drexel University, the E* program (Enhanced Educational Experience for Engineers) structures the freshman year into four components including a Personal and Professional Enrichment Program. This Personal and Professional Enrichment Program focuses on the development of the student as a whole person and on performing engineering in the wider context of ethical decision making amid a dynamically changing society. This program integrates humanities, especially communication and composition skills, with math, science, and engineering components. Creativity is enhanced by introducing literature, poetry, and journal writing. Concurrent assignments in engineering and humanities classrooms allow the students to explore creative self-expression through writing poetry about engineered artifacts such as a CD-ROM, laser printer, radar, suspension bridge, or calculator. Millan wrote, “Perfect exam scores will not prepare our students to become the professional who is adaptive and creative, able to cope with both success and failure or loss. Making connections, thinking symbolically, preserving contradictions, exploring conflict, are keynote skills inherent in writing poetry, whereby our students can experience the vulnerability that may in fact be their greatest creative asset.” (p. 160).

Objectives

The objectives were (1) to provide the opportunity for students, faculty, staff, and alumni in the Department of Food, Agricultural, and Biological Engineering (FABE) to explore Renaissance learning, (2) to enhance students’ creativity, and (3) to expand their appreciation for the interconnectedness of all aspects of their college education, especially the arts and humanities.

Methods

The primary methods were twofold: weekly assigned essays on Da Vincian Renaissance principles and a departmental poetry contest.

Weekly essays: As a component of regularly assigned homework, the author currently uses weekly essays to give students the opportunity to reflect on various technical topics in the course content and on education in general. Student essays are graded for completeness, grammatical
skills, and the students’ ability to express themselves in writing. The students’ communication skills are improved through the process of initial draft submission, grading, revision, and resubmission. As a component of this project, the author developed and assigned new essays that explored the seven Da Vincian Renaissance principles and, hopefully, expanded students’ appreciation for the interconnectedness of all aspects of their college education, especially the arts and humanities. Table 1 lists some of the weekly essay topics.

Table 1. Alphabetical list of weekly essay topics

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
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<tbody>
<tr>
<td>Autobiographical statement</td>
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<tr>
<td>Characteristics of biological systems</td>
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<tr>
<td>Clean Water Act’s national goal of no discharge of pollutants</td>
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<tr>
<td>Codes and engineering standards</td>
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<tr>
<td>Concluding summary paragraph reflecting on the overall experience of the course. (What ideas from this class would you like to remember ten years from now?)</td>
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<tr>
<td>Creativity</td>
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<tr>
<td>Curiosity and creative problem solving</td>
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<tr>
<td>Daily journal (Think about the things you did and observed in class. Describe something that surprised you. How might you use the skills you acquired in your future (or current) work? What do you think is important for everyone to know about this week’s topics?)</td>
<td></td>
</tr>
<tr>
<td>General education and the role of courses in humanities, social sciences, history, etc. in the education of future engineers</td>
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<tr>
<td>Indoor Air Quality petition position paper</td>
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<tr>
<td>Personal philosophy of engineering</td>
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<tr>
<td>Problem solving style (e.g., abstract thinking, visual imagery, sketching, kinesthetic (physical movement or manipulation of objects), verbal, mathematical)</td>
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<tr>
<td>VARK learning style inventory (visual / aural / reading &amp; writing / kinesthetic).</td>
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<tr>
<td>Waste-to-resource recycling position paper</td>
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Educational methods consultation: The author initially met with OSU Faculty and Teaching Assistant Development (FTAD) personnel to discuss evaluation approaches and the project in general. This allowed the project to benefit from the expertise of that office, and helped in the development of a survey instrument to assess students’ attitudes toward poetry, engineering creativity, and humanities in general.

Visits to other schools: The author traveled to Michigan State University (MSU) to observe their engineering poetry contest which is held during Engineering Week, a time when all colleges of engineering showcase the work of their students and faculty. Arrangements were made to meet with Craig Gunn, who developed and organizes MSU’s annual poetry contest. The author also visited an engineering faculty member at Louisiana State University (Marybeth Lima) who incorporates the seven Da Vincian Renaissance principles in a freshman engineering course offered during the spring semester in the Department of Biological and Agricultural Engineering. Both visits provided an excellent professional development opportunity for the faculty involved, and helped inform the implementation of Renaissance assignments and poetry contests at the author’s institution.
Poetry Contest: With the help of a student assistant, the author organized and publicized the departmental poetry contest. Posters, banners, e-mails, and word-of-mouth were used to invite student participation from the department’s two undergraduate programs: Food, Agricultural, and Biological Engineering (FABE), and Agricultural and Construction Systems Management (ACSM). The contest was open to departmental alumni, faculty, staff, and graduate students advised by departmental faculty. Three judges were recruited from OSU’s Department of English based on their poetry credentials and student recommendations. All three, including OSU’s Poet Laureate, were very enthusiastic and supportive of this project. The contest was held during spring quarter 2004.

Results and Discussion

Results include departmental participation in terms of numbers of entries submitted, numbers of participants, and the poems themselves. Winners were announced at the departmental awards banquet in May. Four categories were awarded: students vs. non-students and technical subjects vs. non-technical. Prizes in all categories included rosette ribbons (1<sup>st</sup> through 6<sup>th</sup> place) and participant ribbons (all entries). Cash awards were made to the student winners in both technical and non-technical subject areas ($50 to 1<sup>st</sup> place, $25 to 2<sup>nd</sup> place, and $10 to 3<sup>rd</sup> place). Winning entries were read aloud at an evening poetry reading gathering in the student lounge which included live music and fine art gallery provided by students, staff, and faculty. Poems were posted in the hallway and student lounge of the Agricultural Engineering Building through finals week.

To assess the overall results of the project, a survey instrument was developed to be given to all departmental students, faculty, and staff. This survey evaluated their attitudes toward creativity, communication, the role of humanities in technical education, and of course, poetry. Survey responses were collected both prior to the poetry contest and afterwards. Responses from non-participants in the poetry contest were used as control samples. In addition, a different questionnaire was used to solicit feedback from the poetry contest judges. Detailed results will be presented at the 2004 ASEE Annual Conference. Potential future plans might be to expand the contest to include fine art in addition to the poetry and/or to extend the contest college-wide.

The results from the weekly essay assignments included a marked improvement in students’ written work as judged by the instructor. Students’ initial resistance to the essay requirement consistently decreased over the time span of each course. Several students claimed they actually looked forward to the weekly essay assignments because it gave them the opportunity to think in new ways about what they were learning and how. One student, after graduation, returned specifically to tell the instructor how much he had appreciated and benefited from the essay writing discipline even though he had been one of its most vocal critics. Experience as a working engineer had given him a new perspective.

Conclusions

The assignment, grading, revision, and re-grading of essays on Da Vincian Renaissance principles enhanced student learning in four courses at OSU. The poetry contest provided an
opportunity to enhance the educational experience of all students currently enrolled in the department’s two undergraduate programs along with departmental alumni, graduate students, faculty, and staff. Students’ survey responses indicated that they had experienced increased creativity and had expanded their appreciation for the arts and humanities. Teaching skills that were enhanced by this project included many of the seven Da Vincian Renaissance principles (especially Curiosità, Arte/Scienza, and Connessione), allowing the instructor to grow while the students were challenged to do likewise.

Acknowledgements

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References


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