

## **Creativity and the Engineering Student**

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## Spicing up the Engineering Classroom

Trying to influence engineers to investigate something different, especially outside the confines of statics and controls, vibrations and electrical circuits, and chemicals and asphalt, may be challenging. However, what our students come to campus with is outside those technical pursuits. They arrive with backgrounds in music and art, writing and voice, and a variety of pursuits that rest on the other side of the table from our engineering courses. I believe that we need to help our students at least investigate areas that may not be prescribed by our accreditation boards and colleagues. Not only can these unique foci provide relaxation for our student, but they also can give them a wider view of the world around them. If they already have dabbled with ideas of music, art, and composition; why shouldn't we use those interests to support our own technical endeavors?

There are many avenues that we can follow in trying to broaden the view of our engineers. I will briefly touch a few of the many that have been used in a variety of engineering courses at Michigan State University. They include poetry and novel writing, the creation of art, our own talents in the skills outside of engineering, and the ever-interesting scavenger hunts. The foundation of all of this is the premise that we are all creative in some form and that creativity forms a basis upon which an engineer can grow to unbelievable heights. Looking at ways that our students can become involved in the cross pollinizing of the arts and engineering makes the engineering classroom all the more inviting and exciting for the technical mind.

Simply suggesting the insertion of these activities is not enough; one must give rational reasons to include them that benefit the engineering student. An effort will be made to explain why the activities chosen will help the student in a variety of ways, not only their engineering pursuits. Since most of the efforts made by the students involve assessments beyond simply a grade range, one must look at the efforts in creativity and anecdotal responses to the assignments. This will be detailed in the paper.

We will look at only three areas of pursuit in adding a little spice to the engineering classroom. The first of these requires nothing more than getting to class a little early. Most of us have a schedule that allows approximately 20 minutes between each of the classes that a student takes. Many students plan their schedules so they are not running all over campus to get from one class to another. In most cases they arrive in your classroom well before the class actually starts. Now is your chance to spice up that sometimes grueling course. A handful of students have arrived, you are already there, and you start with simple questions. "Did anyone watch the last episode of x,y, or z last night? Can anyone explain why they ended it that way?" or maybe "What was your reaction to what occurred in the senate chambers yesterday?" or lastly, "Who is going to win the game this week – why?" Any number of students will have some response to one or more of these questions. Answers will not hurt their grades. It is a time to offer your ideas and enter the discussion. The answers may come to a quick halt or they may jettison off in a new direction. They may be the catalyst to getting students to actually talk in class because they know that you are interested in listening to not only the course content but their own ideas.

Adding relatively simple activities to any engineering class can provide a large number of students with a way to investigate areas that have meaning in their lives and also can provide real benefits for the technical areas. Take poetry for instance. While this may create enormous groans from a class of engineers, by presenting them with viable reasons for actually trying their hand at creating a few lines of verse may get them into the mood for creation. The typical introduction into poetry writing and reading comes in a student's high school years and is usually presented as something that they must bend their own feelings into with little regard for and explanation of worth to the pursuit of engineering. Students seldom are told that poetry comes in a wide variety of forms and does not always have a Shakespearian focus. Giving students a little insight into the many varieties of poetry will provide them with multiple paths to follow to actually create their own verse. Instead of being pigeon holed into one type, they can look at the variety and find what suits them. The range of poetical forms range widely:

1. **Blank verse.** Blank verse is poetry written with a precise meter—almost always iambic pentameter—that does not rhyme.
2. **Rhymed poetry.** In contrast to blank verse, rhymed poems rhyme by definition, although their scheme varies.
3. **Haiku.** A haiku is a three-line poetic form originating in Japan. The first line has five syllables, the second line has seven syllables, and the third line again has five syllables.
4. **Free verse.** Free verse poetry is poetry that lacks a consistent rhyme scheme, metrical pattern, or musical form.
5. **Limerick.** A limerick is a five-line poem that consists of a single stanza, an AABBA rhyme scheme, and whose subject is a short, pithy tale or description.
6. **Epics.** An epic poem is a lengthy, narrative work of poetry. These long poems typically detail extraordinary feats and adventures of characters from a distant past.
6. **Narrative poetry.** Similar to an epic, a narrative poem tells a story. Henry Wadsworth Longfellow's "The Midnight Ride of Paul Revere" and Samuel Taylor Coleridge's "The Rime of the Ancient Mariner" exemplify this form.
7. **Pastoral poetry.** A pastoral poem is one that concerns the natural world, rural life, and landscapes. These poems have persevered from Ancient Greece (in the poetry of Hesiod) to Ancient Rome (Virgil) to the present day (Gary Snyder).
8. **Sonnet.** A sonnet is a 14-line poem, typically (but not exclusively) concerning the topic of love. Sonnets contain internal rhymes within their 14 lines; the exact rhyme scheme depends on the style of a sonnet.
9. **Elegies.** An elegy is a poem that reflects upon death or loss. Traditionally, it contains themes of mourning, loss, and reflection. However, it can also explore themes of redemption and consolation.

10. **Ode.** Much like an elegy, an ode is a tribute to its subject, although the subject need not be dead—or even sentient, as in John Keats’ “Ode on a Grecian Urn”.

11. **Limerick.** A limerick is a five-line poem that consists of a single stanza, an AABBA rhyme scheme, and whose subject is a short, pithy tale or description.

12. **Lyric poetry.** Lyric poetry refers to the broad category of poetry that concerns feelings and emotion. This distinguishes it from two other poetic categories: epic and dramatic.

13. **Ballad.** A ballad (or ballade) is a form of narrative verse that can be either poetic or musical. It typically follows a pattern of rhymed quatrains. From John Keats to Samuel Taylor Coleridge to Bob Dylan, it represents a melodious form of storytelling.

14. **Soliloquy.** A soliloquy is a monologue in which a character speaks to him or herself, expressing inner thoughts that an audience might not otherwise know. Soliloquies are not definitionally poems, although they often can be—most famously in the plays of William Shakespeare.

15. **Villanelle.** A nineteen-line poem consisting of five tercets and a quatrain, with a highly specified internal rhyme scheme. Originally a variation on a pastoral, the villanelle has evolved to describe obsessions and other intense subject matters, as exemplified by Dylan Thomas, author of villanelles like “Do Not Go Gentle Into That Good Night.”

When looking at the above list, one could immediately say, “I won’t try that! It is far too difficult and I am not an English teacher!” The interesting thing is that the first 5 examples do not require an enormous amount of work on the part of the student. Lines that don’t rhyme, poems that are exceptionally short, and the free construction of a poem that reads like a paragraph can entice a student to create their own examples. Take the Haiku for example. This form of poetry only requires 17 syllables and generally focuses on nature, but that is not a required focus if one wants to venture outside the box. First line – five syllables, second line – seven syllables, and third line – five syllables. Short and sweet and done. The student can create in a very short space and complete the assignment. They have accomplished the assignment and taken very little time out of their schedules. So now the question must be asked, “Why do this anyway?”

As has already been stated, our students have encountered poetry before in English classes across the world. They may not have liked it, but they have at least experienced something with poetry. If we give them a little more focus on poetry and engineering, they may find it worthwhile to dabble in the creation of poetry for engineering’s sake. So where is the value? Let’s start at the beginning of the creation, a blank piece of paper. The writer must decide what he or she will use as a structure for the poem. We have the 15 varieties above to choose from, but the average engineering student may want to use the path of least resistance and go for the seemingly easiest path to follow. This may come in the form of that 17 syllable Haiku, we talked of above. Think of assigning students a lab report or a final paper. Each of these require a structure that must be followed, but these are long and cumbersome. The Haiku is only 17 syllables, but it is teaching structure. Using that required lab report, we can see a need to choose the right words to describe the laboratory that was investigated. When you think of the Haiku, we find that the writer must

really think about the way they create the text. It has to be investigated carefully or it won't fit the prescribed structure 5-7-5. This also lends itself to choosing the right word to fit the description of the activity. Perhaps it will influence our students to open a thesaurus and really choose the right word to describe the activity, a description that may influence the way the reader of their text truly understands completely what is being said. The interesting thing is that when you do assign this poetry writing activity, many students do not take the path of least resistance, they forge out into areas of much more complicated endeavors. As one student said, "I just like doing this because it is different and let's me think in different directions." The Haiku is fine, but so are the other patterns available, especially when students like to use the writing as a relaxer.

### **Rain:**

I love a rainy day

and all they wash away.

To show their lack of greed

mighty rivers run with speed

the purpose of its loot

to bear all trees with fruit

to quench the thirst of souls so parched

onward so those souls can march.

Rain always comes in April

a season of the staple

some grow sad when skies are gray

it makes me want to run and play

and in great puddles make a splash

quickly here and gone in flash.

I love the rain it treats all equal,

people and the smallest beetle.

When it comes, I'll join peaceful.

I love a rainy day.

## **Puppy**

Soft, cute and fuzzy.

My heart melts with sight of you.

I will buy twenty.

## **Grey**

Right and wrong

Black and white

But grey keeps coming in to sight

When it feels so right

Takes all my might

To change my mind

Look behind

And be okay

With what I say

And what I do

So close to you

But I feel too true

To myself

Please give me help

To move beyond

The feelings so strong

They eat away

Happiness stays

Don't you leave

No not again

Pain happens

Back in sight

Not black and white

Can I be okay

With all these shades of grey

Another area that might allow students to branch out from the engineering curriculum is free-hand drawing, a drawing that is executed by hand without guiding instruments, measurements, or other aids. Freehand drawing enables visualization of an idea in the form of a sketch. It is also a universal language designers use to communicate with other participants of a project. That is why freehand drawing ought to be an inherent element of a design process, especially in the first conceptual phase. With so many of our students involved with Computer Aided Design, this activity provides relaxation to students. The computer has given rise to the creation of everything from figures and tables to elaborate drawings of flows and the inner workings of organisms too small to be seen by the naked eye. This is fantastic, but the workings of the human hand can provide a myriad of thought processes to be expressed quickly and easily on paper. Students with pen or pencil can quickly formulate ideas, scratch them out and try again. The numerous tries are a record of what has been envisioned and can provide insights into future work. In providing students with a rationale for free-hand drawing one can show that hand drawn sketches are a way to quickly investigate a design concept. They can be very crude or highly refined, but are a very tactile and human method of transferring thought onto paper. Hand drawing is also a way to capture a "record" of an idea for reference later. Freehand drawing is the ability to draw something without depending on instruments or something else to draw. We guide the drawing process with only our hand, and it depends on our observational skills. Instead of tracing the likeness of a cat, or using instruments to do it for us, we draw it by hand.

So, what is the importance of basic drawing? Drawing remains a central and pivotal activity to the work of many artists and designers – a touchstone and tool of creative exploration that informs visual discovery. It fundamentally enables the visualization and development of perceptions and ideas. We are constantly asking our students to define problems, speak them out, and write them down. But not all students can use these tools in the best way. These students need to start by seeing on paper ideas that may come to life as they draw them.

The assignment in the engineering class may simply be to draw anything at the beginning or end of class. Take no more than 3 minutes. Have the students concentrate on what they would just like to get down on paper. This may actually be little more than a stick figure or the logo of a favorite team. But it also may be more than that. I have included the basic drawings and the more exceptional efforts. All are acceptable and all receive credit. No games are played to determine the best from the mediocre. The purpose is to get the students to just do it. They soon discover that they do not always need a computer to show their ideas. They can carry with them pencil and paper and let their ideas flow. When asked why they are doing this rather rudimentary activity, one can respond, "Because it may actually Improve Communication Skills, Enhance Creativity, Increase Emotional Intelligence, Improve memory, be a Self-esteem Booster, and Reduces Stress." This list should have enough power to attract every student in the class. They may not go for all of them, one is better than nothing. Just a few examples show what comes up when students are allowed to draw what they like in a short period of time.

Spicing up the engineering classroom can take on a myriad of ideas gleaned from faculty and students alike. Here we have tried to look at only a few directions that a class could take that does not in any way waste enormous amounts of time or effort. Conversations before or after class, poetry writing, or free-hand drawing offer students a time out of the box of vibrations, fluids, or mathematics. These simple activities allow creativity, insight, and adventure combined with what happens in the engineering classroom. They are not addons, they serve a purpose in getting students to practice word differences, structure creation, and the ability to see what their hands can create. From what they tell me, it does spice up the class and opens up new vistas for them to pursue.