Creative Rap Assisted Pedagogies

Peter O'Shea
QUT, Brisbane, Australia
pj.oshea@qut.edu.au

Abstract: Creativity is an important graduate capability which needs to be cultivated in engineering students. The evidence suggests that to develop creativity and innovation in students it is necessary to give them significant practice in divergent thinking. This kind of practice is particularly important in disciplines such as the physical sciences and engineering which have traditionally had a heavy emphasis on convergent (rather than divergent) thinking. Accordingly, this paper presents a novel strategy for engendering divergent thinking in engineering students. It is an unconventional approach in which students compose and perform contemporary raps which help them to summarise and reflect on material covered in lectures. Qualitative feedback on the strategy is presented.

Introduction

The neuroscience research shows that novelty and surprise tend to strongly foster attention (Maffei et al, 1973), (Itti & Baldi, 2005). This research finding has significant implications for anyone wishing to capture the attention of potential customers and also for the education of engineering students. If graduates are to assist their employers to gain the attention of customers they need to be able to habitually synthesise creative and innovative solutions.

Development of creativity is much like the development of any skill – it is strongly fostered by so-called *deliberate practice* (Ericsson, 2005). The latter is practice which:

1. is driven by a goal/vision,
2. is mentally demanding and engaging,
3. involves regular monitoring,
4. is informed by copious amounts of guidance and feedback,
5. regularly 'pushes the envelope', and
6. involves reflection.

Studies show that one needs a great deal of deliberate practice to become an "expert". In particular, about 10,000 hours of deliberate practice tend to be needed to develop substantial expertise (Gladwell, 2008). Motivated by the research on creativity and deliberate practice, this paper seeks to answer the following question: "What strategy can be put into place to engender creativity development for engineering undergraduates?" To answer this question the evidence was consulted, and a strategy was devised based on that evidence. This strategy is discussed below.

The creative rap strategy

Rationale for the strategy
1. The evidence shows that many hours of deliberate practice are required for expertise development (Ericson, 1993; Gladwell, 2008). This suggests that it is critical that students be given opportunities for practicing creativity as soon as possible. That is, students should be engaged in creative development from their very first semester at university.

2. To become a truly great innovator one needs to obtain substantial practice in both convergent and divergent thinking (Perkins, 1995). In the field of engineering there has traditionally been a heavy emphasis on convergent thinking but a much lesser emphasis on divergent thinking. There is thus a need to address this imbalance - divergent thinking needs to be encouraged and supported in explicit and practical ways.

3. Deliberate practice begins with a vision or goal. This vision can be initiated by providing role models for students, and it can be nurtured by showing many and varied examples of the required practice (Sweller et al., 1998), (Paas et al., 2003).

4. Deliberate practice of creativity needs to be motivated. Social interactions and humour both have motivating effects and can thus be used to motivate creativity (Hake, 1998; Garner, 2006). Fortuitously, humour not only provides motivation, it also tends to intrinsically stimulate creativity (Perkins, 1995).

The outworking of the above rationale

To kick-start practice in divergent thinking, a creative rap strategy was implemented in the very first semester of the engineering course at QUT in 2010. This was in line with Principles 1 and 2 from the above rationale. The strategy was implemented in the Electrical Engineering unit which had about 650 students and which involved three hours of lectures per week, 1 hour of tutorials, half an hour of labs and some independent project work. The lecture component of the unit needed special care, because without proper design, students tend to learn relatively poorly from lectures (Mittendorf & Kalish, 1996). To properly comprehend material covered in lectures it is necessary for students to summarise and otherwise reflect on that material (Palincsar & Brown, 1984). It was anticipated that the use of raps by and for the students would help them to reflect in creative ways.

To stimulate creative reflection students were asked to devise raps about material covered in previous weeks' lectures. To help give students a vision for what was being asked of them, the lecturer presented a video worked example. This example was a rap which he had co-written himself and which he performed. This was in line with Principle 3 from the rationale. The lecturer's rap was designed to be amusing in line with Principle 4 from the rationale. The lecturer explained why the rap strategy was being introduced, and appealed to the students to prepare a rap for the following week. To provide some additional initial motivation for students to engage, a packet of Tim-Tam biscuits were offered as a reward for those who performed their rap in front of their peers. The raps were not assessed because it was felt that such a practice might undermine long-term intrinsic motivation.

Outcomes

About five students responded by creating raps (in their own time) and then performing them in front of their peers. Below is a sample rap, which related to lecture material on electrical capacitors.

> "If you had one shot and one opportunity to win a box of tim-tams for sayin a rap in front of your whole ENB120 lecture would u do it,
>
> Wake up in the morning feeling like Mr O'Sh**ea**,
>
> We rock up to our lecture, its gonna be really g**ay** (as in happy),
>
> Ladies and gents I'm dropin a bombsh**ell**,
>
> U just add capacitors when the're in parall**el**,
>
> Before we start singing the rest of the **verses**,
>
> when capacitors are in series u got to add their in**verses**,
>
> We will rap on cause we are sav**age**,
>
> Capacitance equals charge on volt**age**,

We were talkin about LE**Ds**,

That's because we are all VI**Ps**,

I don't see what's all the f**uss**,

Cause Peter O'Shea ain't got nothin on **us**,

Now I know right now you think these boys are my h**ero**,

But the initial potential difference of a capacitor is z**ero**,

Peter, Peter, you thought you could j**am**,

But we'll be chowing down on a tim-t**am**, ...

Now boys and girls we have reached the end of our **rap**

We can't believe we get a box of tim-tams for sayin this c**rap**"

Feedback

The creative rap strategy has only recently been implemented and the evaluation process is in the early stages. Most of the feedback/evaluation at this stage has been qualitative and has been sourced from student comments. Sample comments from anonymous end of semester feedback were:

- "even had small competitions like rapping out the content of the previous weeks lectures which added an exciting and funny dimension to the lectures"
- "the 'learning raps', 'educational videos' quiz game and all the other little things certainly made it and AWESOME unit giving us a lecture to look forward to"
- "had something fun for every lecture from the raps to the robot dance"
- "creating raps and other innovative idea's to inhance fun learning"

There have also been many verbal student comments, almost all of them being positive. The themes from this student feedback have been:

- The raps were humorous and well received
- Those who prepared the raps learned the subject matter much more thoroughly than they would otherwise have done
- The students enjoyed devising the raps, not so much for the rewards offered, but because of the social engagement and humour it evoked.
- The students were able to compose the raps relatively quickly – the above rap, for example, was composed in about 10 minutes
- Students were supportive of the idea of raps continuing (and even being extended in future years).

The rapping was only performed in two different lectures, one in which the model rap was shown, and one in which the new raps were performed. It is felt that one additional lecture could be used for raps, without losing the novelty element. It should be noted that although only a few students participated physically in the raps, the others may well have been learned by example (i.e. via legitimate peripheral participation).

Further work will proceed in the direction of i) seeking more quantitative evaluation, ii) using peers more effectively as role models, and iii) providing further worked examples to assist students.

Conclusion

This paper has reported on a strategy to engage engineering students more fully in divergent thinking by using contemporary raps. The students in a first year engineering class were asked

to devise raps related to the previous week's lecture material and to also perform those raps in front of their peers. The first trial of this strategy appears to have been quite successful, with qualitative feedback being very positive. While almost all students appeared to appreciate the raps, the students who volunteered to perform the raps appeared especially positive about them.

References

Ericsson, K. (2005). Recent advances in expertise research: A commentary on the contributions to the special issue. *Applied Cognitive Psychology, 19*, 233-241.

Garner, R. (2006). Humor in pedagogy: How ha-ha can lead to aha! *College Teaching*, 54(1): 177-180.

Gladwell, M. (2008). *Outliers: The story of success*. Amazon.

R. R. Hake, (1998). Interactive-engagement vs. traditional methods: A six-thousand student survey of mechanics test data for introductory physics courses, *American Journal of Physics,* 66, pp. 64-74.

Hattie, J. (2009). *Visible Learning*. A synthesis of over 800 meta-analyses related to achievement. Routledge.

Itti, L, and Baldi, P. (2005). Bayesian Surprise Attracts Human Attention. *Proceedings of Neural Information Processing Systems* (NIPS 2005).

Maffei, L, Fiorentini, A, and Bisti, S. (1973). Neural correlate of perceptual adaptation to gratings. *Science,* 182: 1036–1038.

Mittendorf, J, and Kalish, A. (1996). The 'Change-up' in Lectures. *The National Teaching and Learning Forum,* 5(2): 1-5.

Paas, F, Renkl, A, and Sweller, J. Cognitive load theory and instructional design: Recent developments [introduction to special issue]. *Educational Psychologist,* 38(1), 2003.

Palincsar, A, and Brown, A. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction,*1: 117-175.

Perkins, D. (1995), *The Eureka Effect.* RW. W. Norton & Company, New York.

Sweller, J, van Merrienboer, J, and Paas, F. (1998). Cognitive architecture and instructional design. *Educational Psychology Review,* 10: 251