ETL421 2014/2 Assignment two – Reflecting on the curriculum

Task: (2,000 words) Due: 13 October 2014

Enhance (or supersede) the design of the compelling classroom activity you outlined in Assignment 1. Specifically you should aim at enriching and (where sensible) extending the overall numerate experience for your students.

Expected content: The assignment should contain:

Documentation

- A narrative (or an alternative staged, multi-participant account) of the enhancement (e.g. augmentation, emendation, extension, recontextualisation, or redesign) including illustrative student-student interactions
- For emphasis, a small natural number of information visualisations (e.g. chart, graph, matrix, map, network, distribution, or some other appropriate schematic diagram)

Analysis

- Explicit indications of rationale underlying the main changes made, whether theoretically or practically based
- Suggestions for overcoming 'barriers to numeracy' (real or potential)

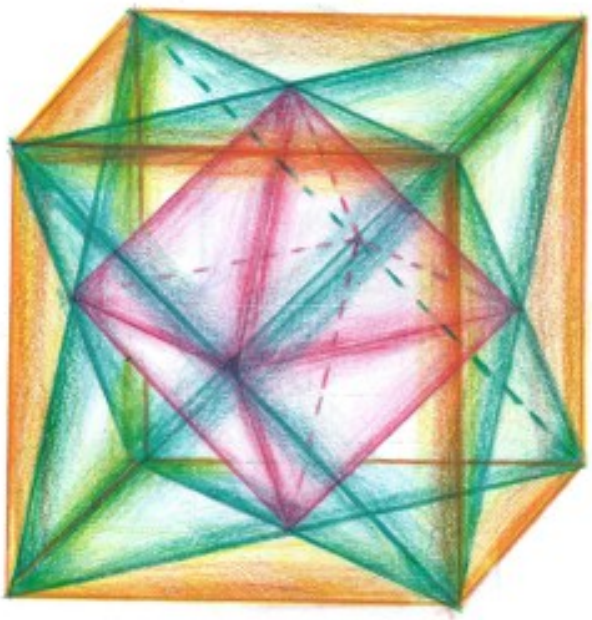
Consolidation

- An account of how you've applied knowledge arising from exploring the surprising idea or unanswered question declared in Assignment 1 (or a replacement idea/question you've discovered in the meantime)
- As an appendix (i.e. excluded from the word limit), an annotated reference list mentioning briefly (telegraphically, if you wish) how each listed resource contributes to your design

Redirection

- Evaluative comments on the reflective methods used in preparing this assignment
- Some thoughts on how you might heighten the objectivity of your reflective work in future

Parameters: Your assignment should show evidence of your development as a conscientious, professionally minded, pre-service teacher. The narrative (or alternative account) of your enhanced design should demonstrate your ability to reflect on, evaluate, and apply professional knowledge and practice. To help obtain some basic objectivity, your reflective work should combine at least two recognised approaches to reflective practice: e.g. you might combine peer review (1) with a literature review (2); and, where circumstances permit, you could add a classroom trial (3), or a simulation (3a), with an analysis of student/mentor feedback (4).



Source: *A hexahedron, two tetrahedrons and an octahedron, n.d.*

DOCUMENTATION

My teaching context: is Year 10 at Hunter Sports High School (HSHS), which is currently running Big Picture Education Australia (BPEA) programs with Year 8-10 students. The school is in an area with a high proportion of low socio-economic families. HSHS also offers a Targeted Sports Program (TSP) to elite athletes. The Year 10 class has a mixture of TSP students who are highly motivated and focused, and other students who just weren't making it in mainstream education. This second group of students generally has fairly low literacy and numeracy and don't see themselves completing any tertiary education. In NSW students must complete Year 10 and then remain in approved education and/or training until the age of 17 (Department of Education and Communities, 2013) Many of them are looking for a way to leave school as soon as they are legally able to go, some by getting a job, others an apprenticeship. My work has primarily been around working with students who are having difficulty and/or have no interest in completing their Mathematics requirements for their Record of School Achievement (RoSA) at the end of Year 10.

Narrative one: This is a reproduction of a conversation and the results obtained when I was working with [1]Randall, one of the Year 10 Big Picture students. The students select a personal interest project (PIP) of which they give a presentation at the end of the term. This presentation is assessed and forms the large part of their assessment for Year 10. Their Learning Plan shows how they are to incorporate English, Science, Mathematics, and History into their PIP:

I asked [1]Randall to show me what he had so far for his presentation of his PIP.
[1]Randall showed me the research he had done and a list he had made of the calorific value, fat and protein content of various foods.
I asked him how he though he might present this information in the presentation.
[1]Randall shrugged and told me he was not sure.
I asked [1]Randall if he knew what a Venn diagram was.
Again he shrugged and said he didn't know what it was.
I took a piece of scrap paper and sketched three circles, and labeled them 'protein', 'calories' and 'fat'. I then began to explain how some foods would sit just in one circle, some would go in the intersection of two categories, but was interrupted by [1]Randall before I could finish.
He looked excited and interested and told me that some of the foods would go in all three circles.
I smiled and told him that was exactly right. I then moved on to work with another student. When I came back an hour or so later, I found that [1]Randall had traced around the bottom of the rubbish bin to make a huge poster with three large circles and had correctly placed all the different foods in the Venn diagram.
I told [1]Randall it looked wonderful and asked him if he knew what he had just done?
He looked surprised and answered "No".
I explained how he had now included Mathematics into his PIP and told him that he could now fill that in on his Learning Plan.
He smiled so widely and looked so proud. [1]Randall told me that he really didn't know that Maths could be so real.

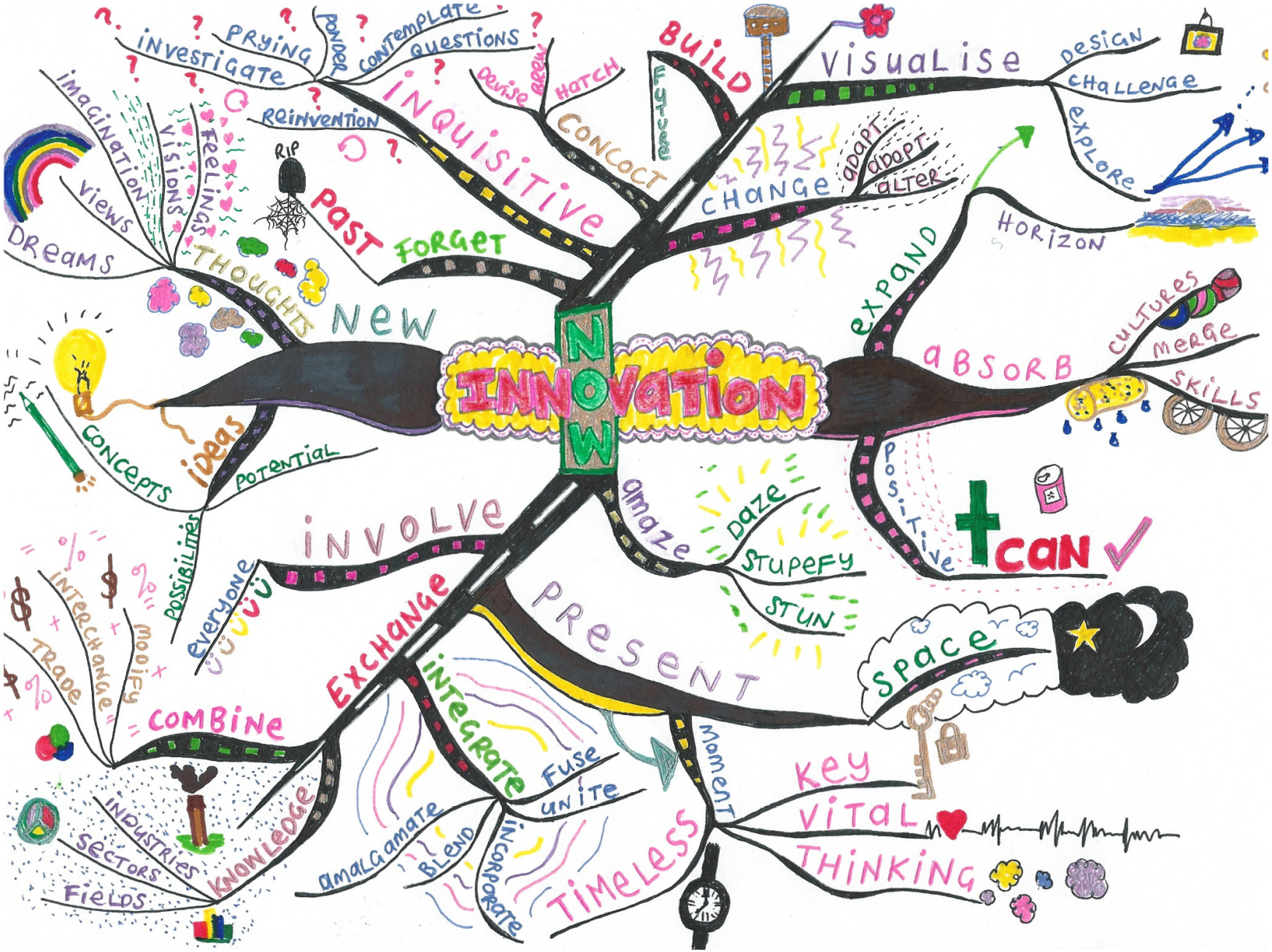
Narrative two:
'N' determinations are issued in NSW for the non-completion of requirements in a course (Board of Studies NSW, 2012). This account comes from when I was explaining statistics and data analysis to students who had received 'N' determinations at midyear due to not completing their Mathematics work for Terms 1 and 2. My aim was to get these students engaged so that we could reverse the 'N' determination.

[1]Larry and [1]Harry were very slowly writing down the question I had written on the board but showing no interest.

[1] Real names of students are not used

I stopped and asked [1]Larry why he thought anyone wants to make a Stem and Leaf Chart?
He shrugged and told me he I don't know. It seemed obvious that he had no interest and really didn't care to know.
I sat down with [1]Harry and [1]Larry and explained that when I was working as a Water Engineer, I had to process thousands of test results for around 30 different parameters in water.
They both looked at me blankly.
I pointed to some of the smaller worked problems we had done and asked them if they could see that when we had about 20 scores in total that we could quite easily write them out and then work out what we need to work out.
They both nodded that they could see this.
I asked [1]Harry what he thought I would do if I had thousands of results, and how I could find out their average.
He told me that he didn't know.
I asked him if he could see that if I used a Stem and Leaf Chart, or a Dot Plot that then I can put lots of results into a fairly small table and then I would be able do things with the results?
Both [1]Larry and [1]Harry were now listening. [1]Larry asked me why I wanted to look at all of the water tests?
I explained how much I used to get paid to analyse this sort of data.
I now had the complete attention of all six students who were amazed. They wanted to know why someone would pay me to do that.
I explained that at the time I was working with regional councils who collect and treat the water that then comes out of people's taps for them to drink. I had to make sure that the water was safe and wouldn't make anyone sick. By looking at the test results and being able to see if there were any, or lots of results that weren't within the Drinking Water Guidelines, I could see if the water treatment and testing was working.
They were all amazed and one asked if that why these tables exist?
I explained that is was one of the reasons. I then asked them if they could see why I would want to work out the mean, or the upper and lower quartiles of all of these results.
[1]Harry told me that he could, it was because we could then if the average test result is right.
I nodded and smiled.
[1]Larry then told me that I could also see whether most of the results are around the middle.
[1]Skylar asked me if I sent anyone to jail?
I laughed and told him 'No'.
Larry and the other students all told me that the work made sense to them now. The said that they hadn't done the work because no one had explained what it was for.

A chart/graph/network/schematic diagram:
Following is a visualisation in the form of a mind map that shows my approach to reaching and helping these students: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ANALYSIS

Rational underlying changes made:
The pedagogy underpinning my approach to these students is the educational philosophy developed by Rudolf Steiner and known as the Waldorf pedagogy or Steiner education. The scenarios described above are in contrast to much of today's mainstream pedagogies. Too often today education appears to concentrate on superficial results and fails to support the hidden potential of childhood. The education movement in Australia is often pressured, mechanized and devoid of imagination and compassion. It tends to focus on memory rather than the development of understanding. Steiner education is designed to be a health-giving education, nurturing and balancing the human faculties of thinking, feeling and will (Steiner Education Australia, n.d.).

I aim to make sure students are not overwhelmed and that confidence is continually built, never crushed. Genuine problem solving shouldn't be introduced until Year 11. I see many of the expectations of what should be taught in the Mathematics curriculum in high school as not realistic. Why do we need to teach so much calculus? The aim should be for students to graduate from high school being 'math healthy'. This means having a good attitude about Mathematics; having good study skills and work ethics; having solid basic skills.

Suggestions for overcoming 'barriers to numeracy':
Main lessons in a Steiner high school aim to take students on a rich cultural and pictorial journey to provide a base for ongoing studies at a higher level. The activity above shows how the lesson on the formula developed by Gauss and used to find the sum of a series is done in a way that challenges, excites and allows students to explore and discover.

The Steiner curriculum is on which connects with the student to themselves, to others, to the natural world, to cultural heritage, to the past, the present and the future.

I have seen several times teachers and textbooks starting with formulae and giving the students problems and expecting them to gain an understanding of the material. In some cases the entire content in a textbook of a sub-topic has been instructions on how to feed the information into the calculator. The students don't learn effectively from this approach.

CONSOLIDATIONS

How I have applied knowledge arising from exploring the unanswered question declared in Assignment 1:
As the narratives above illustrate, I have been able to communicate to these students that Maths is not a collection of blind procedures to solve meaningless problems. The Waldorf pedagogy advocates that Mathematics strengthens basic skills, fosters mathematical thinking and sparks enthusiasm for learning (York J. , 2014). I have endevoured to focus on what is essential to develop mathematical capacity and numeracy.

My philosophy is that learning comes through the teacher. I aim to not be tormented by a 'list' of materials that needs to be finished in order to teach Mathematics and numeracy. I believe in depth over superficiality. In Years 9 and 10, the central themes should be about skills, learning the language of mathematics (numeracy), logic, and seeing the beauty of mathematics (York J. , 2014)

It is important for me to teach out of my own inspiration and not teach material or use certain methods in which I don't believe. We have all been trained to think within a certain box. Many of us make (often unconscious) assumptions about teaching Mathematics.

I question whether formal tests or exams before Year 11 are even necessary. They are certainly not stipulated as a required method of assessment listed by the Board of Studies NSW in the Mathematics Years 7-10 Syllabus the (Board of Studies NSW, 2008). If tests are given they shouldn't expect the students to have mastered skills, but encourage and inspire them to continue to build their skills and understanding.
Many of the Year 9 and 10 students I have worked with over the past six months hate Mathematics and think they are bad at it. For students in Year 6 or 7, correcting this is not so difficult. Changing a student in the middle years of high school is much more difficult. Changing an entire class' attitude about Mathematics in high school can be quite an uphill battle.

REDIRECTION

Evaluative comments on the reflective methods used in this assignment and thoughts on heightening objectivity of reflective work in future:
The reflective methods used in preparing this assignment have come from a variety of sources:

- Writing in and looking back at previous entries in my daily journal
- Discussion with fellow students on the Discussion Board
- Having at least two conversations per week with my mentor teachers
- Taking every opportunity to talk to other staff
- Talking to the students and asking them what they want to get out of the classes and whether or not they feel this is happening.

All of these methods were effective, although different methods of reflection. I don't know that I have many thoughts on how I would heighten the objectivity of this reflective work in the future. By combining my thoughts and reflections with open discussion with fellow university students, my mentor teachers, other teachers teaching different subjects and year levels, and including the input from students, the result is fairly objective.

I will say that I agree it is important to be objective, and I will ensure going forward that I include all stakeholders in discussions and make sure to take on board all the different perspectives, various pedagogies available and continue to strive to improve. There is always more knowledge and a better way of doing things, so to achieve this we must continue to strive.

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