

Purpose driven EMI by experiment

實驗出屬於自己的 EMI



Jephian Lin (林晉宏)

<https://hackmd.io/@jephianlin/purpose-driven-EMI-by-experiment>

About me



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National Sun Yat-sen University
Department of Applied Mathematics

Teaching experiences in English

- Calculus (Iowa State U)
- Precalculus Mathematics (U Victoria)
- Calculus for Students in the Social and Biological Sciences (U Victoria)

EMI experiences

- Combinatorics
- Python and Machine Learning Algorithms
- Algebraic Graph Theory
- Topological Methods in Graph Theory
- Linear Algebra (2022 Fall)

Outline

- EMI trivia
- **MY** EMI
- General advice
- My experiential journal of EMI

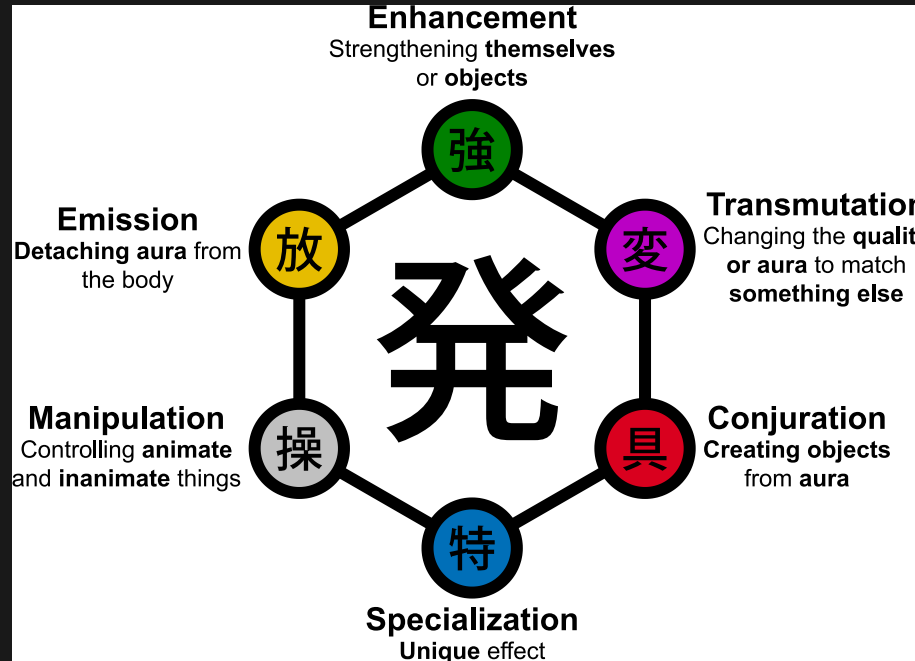
EMI trivia

- What is EMI?
- Which one is focused more in EMI, English or content?
- Have you taught any EMI courses?
- Biggest concern about EMI?
- Biggest benefit of EMI?
- Ignoring what the school says, how likely you would run an EMI course?

Kahoot!

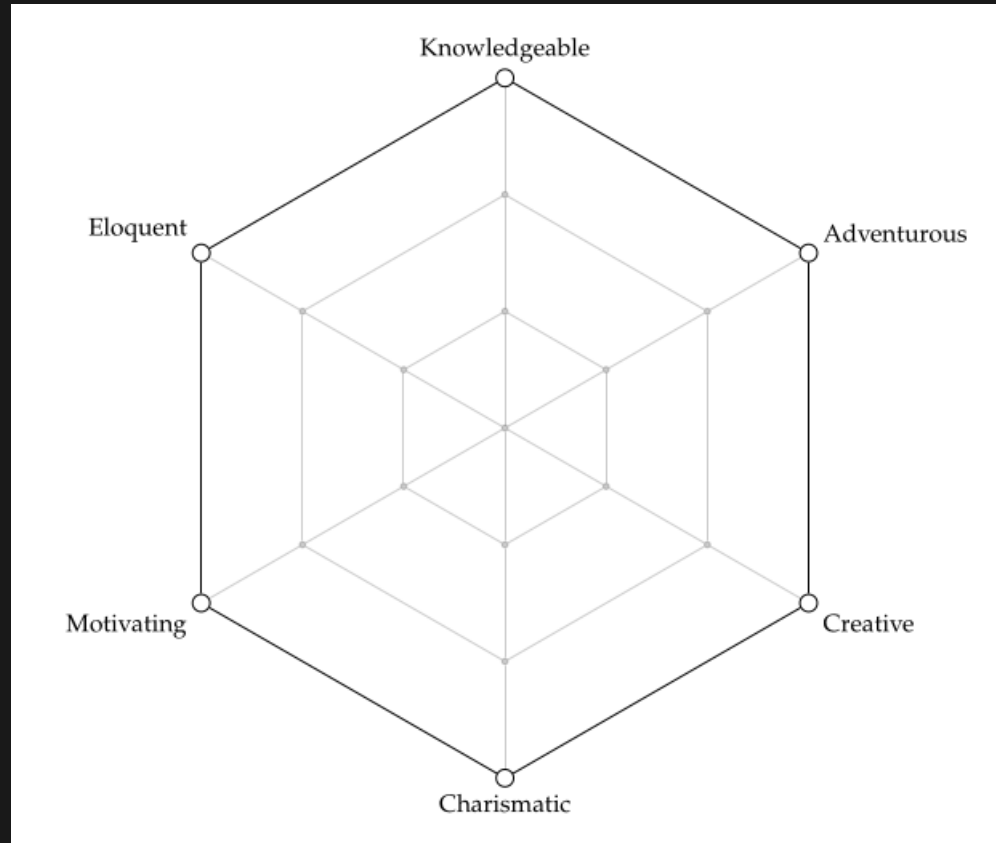
MY EMI

Everyone has their own Nen



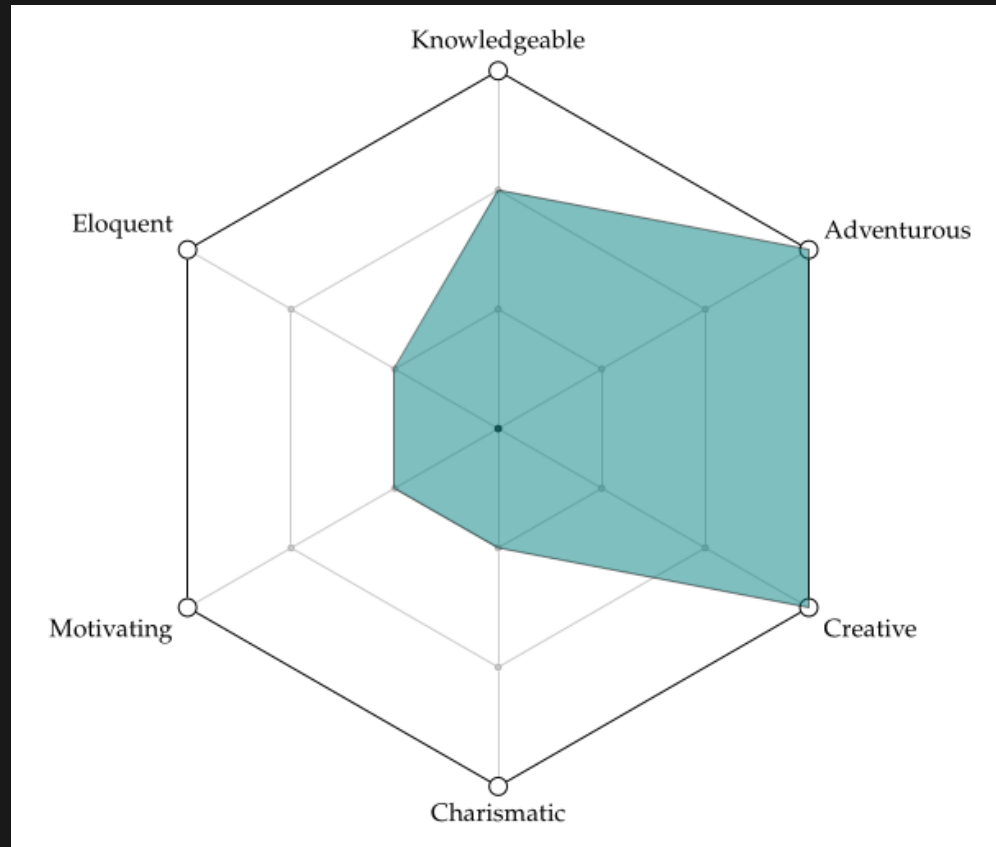
(Source: [Hunterpedia - Nen](#))

How about yours?



PDF

Jephian's answer



I am better at talking students individually.

More EMI workshops,
More conversations,
Try and find out **your own EMI** style.

General advice

How to reach the goal?

Focusing on the goal,
and move towarded it step by step.

Reflection is the key

1. Clarify your goal.
2. Trial and error.
3. Reflection.

Reflection guides you back to the **right direction** and provide **satisfaction** to move on.

My experiential journal of EMI

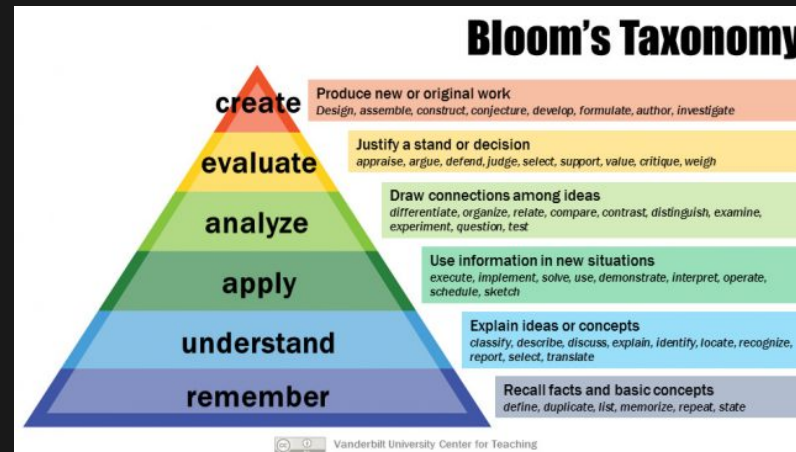
Goal of my EMI

- **Friendly environment** for international students.
- Provide **EMI experiences** for people who wants to study aboard.
- Build ability for **digesting information from multiple resources**.

Non-current course

Goal of my teaching

- **Mathematical thinking** in daily life




(Sources: [Vanderbilt Center for Teaching](#))

Trial: 50% English + 50% Chinese

After you explain something in English, you say that again in Chinese.

解釋完某個觀念以後，再用中文再講一次。

- Difficulty: 
- Outcome: 

Local students only listen to Chinese, while international students only listen to English. It is quite nice that you just need to prepare 1.5-hour materials for a 3-hour lesson  .

Trial: Kahoot!

Run Kahoot! as an informal assessment.

- Difficulty: 
- Outcome: 

It takes some time to build the Kahoot! game, but not too hard.

Trial: Infinite make-up quizzes

Same question type, different numbers.

Score = average of all scores.

$$\frac{1}{4}(0 + 5 + 5 + 0) = 5.$$

NullBasis 18



Indicating your answer by underlining it or circling it.
Compute the check code and fill it into the box on the right.

check code

- Difficulty: ★★★★★
- Outcome: ★★★

This move is mainly for the future machine learning course — not recommended.

Trial: Points for participation

Award students points when they ask or answer questions in class.

- Difficulty: ★
- Outcome: ★

Need more scaffolding, but I am not good at it.

Trial: Points for active learning

Award students points for any activities related to learning (English or Mathematics).

- Difficulty: ★
- Outcome: ★★ ★

Need more time to moderate their activities, but I do not have time nor a reliable TA.

Trial: Group homework

Spend extra time to do oral comprehension test to each group.

Let

$$A = \begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix} \text{ and } \mathbf{b} = \begin{bmatrix} 3 \\ 4 \end{bmatrix}.$$

Give some intuitive reason showing that $\mathbf{b} \notin \text{Col}(A)$.

Answer

$\text{col}(a) = \text{span}(1, 1), (2, 2)$ if vector b is in $\text{col}(a)$, by the definition we can find x, y are rational numbers such that vector $b = x(1, 1) + y(2, 2) = (x + 2y, x + 2y)$. But

$b = (4, 3) = (x + 2y, x + 2y)$ has no solution. Therefore x, y don't exist. Hence, $\mathbf{b} \notin \text{Col}(A)$

- Difficulty: ★★★★★
- Outcome: ★★★★★

Extremely time-consuming (~3 hours per week) but worthy. You get to know students much better.

The evolution of my evaluation scheme

Year	Exams	Quizzes	HW	Par	AL
2018	100				
2019	85	15		+5	
2020	60	15	15		10
2021	60	15	15		10
2022	60	15	15		10

- Par = Participation
- AL = Active Learning

Trial: Padlet for discussion

Use Padlet to collect students' thoughts
anonymously.

Padlet

- Difficulty: ★
- Outcome: ★★ ★★ ★★ ★★ ★★

Super easy to set up a board. Indeed, students are more willing to share opinions in this way.

A few more words about discussion...

Thinking is the core value, so cultivating discussion is always possible in all area — even in mathematics.

- open-ended questions
- train them to ask good questions
- train them to find good examples
- train them to verify answers

Reflection: Design thinking

Look at the problem from users' point of view.

- cheating
- copy other's homework
- **emails** without subject / name / etc

Other tips

- 從素養導向教育下思考規畫 EMI 課程設計
- EMI 專業領域教學策略 (1) : 數理領域

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*It's not what you do, but how much
love you put into it that matters.*

*– Rick Warren,
The Purpose Driven Life*

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Thanks!