.

# 1 + 1 is more than 2: cross-disciplinary collaboration for EAP and TNE materials creation

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# Overview

- Report on our well established and ongoing Mathematics + EAP collaborations
- Focus on two contexts:
  - EMI in a China TNE context (Costas)
  - UK/ HE in a plurilingual/ majority Anglophone context (Deak)
- 5 faces of our collaboration in the context of wider EAP-informed HE teaching and learning using the trope of a 'wave'.

# 5 faces of a wave

| No. | Name and meaning | What we will cover |
|---|---|---|
| 1 | **Dissipation:** loss of energy | Starting point of background of having 'little impact' |
| 2 | **Periodicity:** cyclic repetition | Achieving repeatability and stability |
| 3 | **Propagation:** ripple effect | Impact – examples from both contexts with feedback |
| 4 | **Superimposed:** (1 + 1 is more than 2) | The synergetic effect of collaboration |
| 5 | **Tidal:** a vision for the future | Looking to a transformational future – Open Access Textbook |

# Part 1

Dissipation of waves:

a loss of energy

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# What we mean by 'dissipation' here

- Waves lose their energy as they move through their medium, due to friction.
- Human beings and their initiatives can share this property: loss of energy due to friction with the social medium.
- In this first face, therefore, we note early, 'energy dissipating' aspects of our work.
- The remaining faces are much more positive! :)
- Pedagogy as minimising learning friction.

# Our initial separate contexts

Our respective roles began in distinct contexts:

- **Costas:** EMI in a TNE in China context;
- **Deak:** School-embedded EAP at Leeds.

# Challenges we faced: dissipation (Costas)

- Teaching mathematics:
  - students have trouble with the language – it's more than just the mathematics
- Students not able to understand everything from the lectures due to language barriers.
- Students not able to communicate mathematics in English to ask their questions.
- Thinking about how to bring language in the mathematics lectures to support the students.

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# Challenges we faced: dissipation (Deak)

- Mathematics language, texts and genres presented a challenge to my then knowledge and understanding of in-sessional EAP. Very different from Business, for example.
- Logistical and belonging challenges: Covid-19 plus a whole new School.
- Pedagogy: materials produced but:
  - How to get them to the students in a Covid-context?
  - Relative peripheralisation and formulaic nature of much language in maths
  - Impenetrability of mathematics texts
- Puzzling about how to bring EAP knowledge into the discipline of mathematics.

# Part 2

Periodicity:

cyclic repetition

# What we mean by 'periodicity' here

- Systematicity and stability
- Scaling up: increasing the amplitude and/ or frequency
- Replicability and predictability (alongside adaptation and flexibility)

# CL narrative [1]

- Initial assumption: language won't be important as we have mathematical notation
- More evident in the TNE context that language plays several critical roles, even in mathematics (terminology and communication)
- Language LO in the module. Now I know how to achieve this

# CL narrative [2]

- Need to embed language in mathematics lectures
- What terminology do the students not know?
- Need to give the students some pre work on mathematical language
- Helping students learn mathematical terminology used in the lectures, through diagrams and texts
- Micro-dialogues to help them with communicating the topic.

# DK narrative [1]

- Terminology in a textual and diagrammatic context (c.f. CL)
- A range of mathematics genres from popular writing: Chalkdust, Numberphile online maths assocations AMA, popular writing
- Standard genre analysis approaches to dissertations
- What worked in UG Dissertations could be adapted for PGT to a high degree (crossover principle)
- Music and Maths and an essay writing brief (later replicated in History of Mathematics)
- Knowing people and being in meetings: 'waves of connections'

# DK narrative [2]: First Year Provision

- Creation of an entire two-Semester programme called First Year Provision delivered to all c.150 EAP students
- This teaches terminology, text and communication in a mathematical context
- Involves a Progress Task element which triages students based on linguistic performance for Sem2 delivery:
  - Good to go
  - 3-session academic writing delivery
  - Individual consultations

# Part 3

Propagation:

ripple effect

# What we mean by 'propagation' here

- Impact: the positive effect of pedagogical intervention

# CL impact 1

Student Staff Partnership Forum:

- Students have asked for similar language-focused interventions to be included in the other modules of the Joint School, besides Mathematics.
- "With the command of academic vocabulary, not only can students comprehend better what teachers say in class, but it can also make them more efficient in their future learning life."

# CL impact 2

Through recent focus groups, students have asked for:

- More mathematical language-input in the Mathematics lectures
- Mathematical-language input in the English classes
- A textbook full of similar language-focused activities, for each of the chapters of the Mathematics module

# DK 1a: MATH3015 (2023-24)

- "The writing workshops were also useful and helped me to write my essays and also helped me achieve a better workflow for other research–based modules, such as my dissertation."
- "The academic writing support was amazing. Big shoutout to Deak his workshops were so engaging and they have helped me across my modules."
- "The sessions on mathematical writing and researching from Deak and Suzy were really helpful not only for this module but for other modules that I study."
- ['Suzy' is Suzy Beck, Learning Advisor; Suzy is happy for the comment that references her to be used in this presentation.]

# DK 1b: MATH3015 (2024-25)

- "All the workshops were very useful – especially the one talking about how the same questions can have different approaches."
- "It was very important to give essay support to us, because I personally haven't written an essay since my GCSEs! I think I would have struggled more without this help. [...]"
- "Academic writing help was good."

# DK 2a: FYP 2023-24

- The feedback on the following slides was taken anonymously by MS Forms in class delivery.
- A selection is given for space reason; I believe the selection to be highly representative; the total feedback can be sent to anyone who wishes to see it.
- The selection is the top 19 responses of 67 responses.

| What have you found useful or enjoyable in the session(s) you have att |
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| sure |
| Everyone can interact with tutor |
| Ican learn a lot of professional knowledge |
| The interesting PPT |
| The class atmosphere is good and the teacher makes it clear |
| about math |
| Professional terms |
| The professor is very energetic and the class is pretty interesting. |
| Learning some mathematical words and sentences. |
| It's useful to learn mathematical terms |
| I learned a lot of math |
| Properties of three points in a triangle |
| Useful Mathematical Methods |
| Using English and learning professional terms will help us in our future st |
| Mathematical terminology in English and how to explain them |
| Leran useful maths |
| enjoyable |
| enjoyable |

# Part 4

Superimposed waves:

the whole is greater than the sum of its parts

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# What do we mean by superimposition here

- The synergy of effective **collaborative** working
- *Or* the dys-synergy of working practices whose respective directions do not align (or, in physics parlance, are dissonant or antagonistic)

# What does this mean for best practice?

- The EAP and Discipline 'waves' can avoid each other or indeed work at cross-purposes
  - Peripheralisation of EAP by the discipline
  - Shallow engagement with the discipline from the EAP angle
- It's a win-win-win (i.e. EAP, Discipline, students) if they align and move in phase.

# Beneficial outcomes so far

- Academic identity and practitioner level:
  - Supported each other's professional development
  - Informed each other's materials and practice
- Scholarship level:
  - Presenting numerous times (including BALEAP 2025; potentially EuroSoTL 2025 in Groningen …)
- Pedagogical output level:
  - Co-created pedagogical materials leading to …
- Collaborative project level:
  - Open Book with Chen Shuwei (SWJTU): 'The Academic Language of Mathematics'

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# Peer-peer impact: threshold moments

- CL: thinking of language in a mathematical way

- DK: co-writing mathematical texts on the Kaprekar constant, 6184, and the Kaprekar series.

# Peer-peer impact: new adventures!

- Three-person collaboration with Shuwei Chen of SWJTU
- *The Academic Language of Mathematics* (provisional title)
- An 8-chapter **open access student-facing textbook** taking a comprehensive approach to academic language in mathematics.
- Indubitably a function of our ongoing collaboration.

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# Peer-peer impact: a little bit of fun!

- *Chalkdust* is a mathematics magazine.
- We have submitted a co-written article: a satirical interview with Pythagoras.
- We both feel that neither of us would have done this alone.

# Part 5

Tidal wave:

A powerful energy across space and time

# A model for collaboration

- *The Academic Language of Mathematics* as an aspirationally impactful resource.
- We're hoping to inspire others to reach for effective academic language-subject pedagogical collaborations

# Conclusion

# Collaborations as an ISEAP approach

- Well selected, sustained EAP – disciplinary collaborations are a way of overcoming the challenges of making academic language visible in the disciplines and supporting students in the academic literacies and academic genres aspects of their studies.
- Disciplines are embedded in linguistic, textual and social contexts, rich for conventions of genres, language and practice
- Language permeates, modulates, constructs and carries knowledge
- This case study demonstrates the mutually beneficial affordances of collaborating across the EAP/ Acad Literacies ~ discipline 'divide', weakening that 'divide' by waving hello across the divide.

# That's all folks!

- Waving goodbye for now!
- Thanks very much!
- A wave of questions?


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