New Patterns for Learning

Making Connections

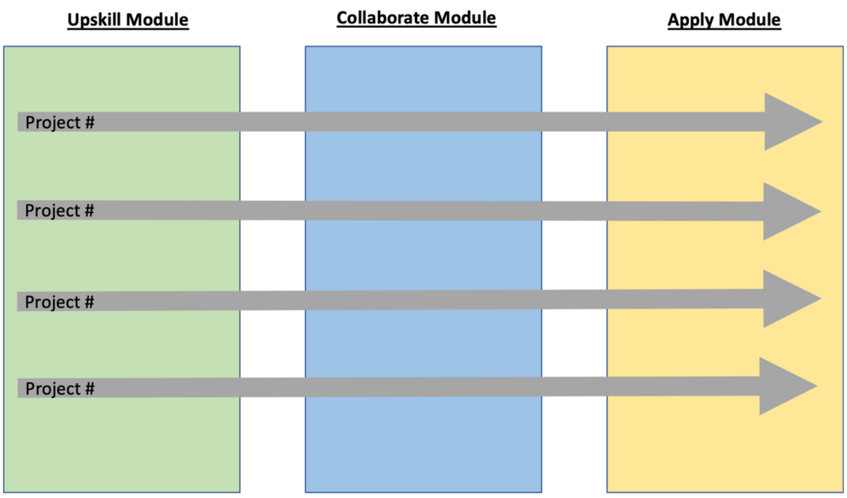
One way of establishing coherence in interdisciplinary practice, where subjects may not *speak* quite the same language, is to find a Meta-type – a language that can *speak* the languages of a given range of disciplines meaningfully and equally.

Meta-Types

At the University of East London (UEL), I used Newtonian physics as a metaphorical concept and language framework. In the module ‘*Energy and Momentum’* this meta-typical language enabled an inclusive way of assessing performance capability across multiple related disciplines.

Subject Based Practical Skills
4. Demonstrate skills in mediating force, resistance and flow as an individual performer (dance and movement, sound and music, drama and acting), and through interdisciplinary ensemble practice.
5. Demonstrate and evidence skills in the dynamic structuring of sound and music, movement, narrative, staging, lighting, and audio-visual elements.
6. Develop and apply skills and tools in sustaining energy and momentum in devising and performance practice: motivation, discipline and repetition, inspiration and catalysts, practicing stillness, equilibrium, tension and release, momentum.
7. Develop and evidence techniques for managing interaction in devising, improvisation, and performance: the dynamics of action and reaction.

Another example from my work at UEL is in interdisciplinary curriculum design, where the creation of a meta-typical module pattern, based on a creative arts practice workflow (skills, collaboration, applied practice), enables discipline-specific content to *float* in industry-oriented applied projects. Project content can be designed dynamically adaptive to changing contexts. The key enabler is that learning intentions are written inclusively using meta-typical language, non-specific to disciplines. E.g., *“Analyse and evaluate emergent modes of collaboration in your own multidisciplinary and interdisciplinary projects, making reference to the work of key practitioners.”*



Additionally, each project is populated with a selection of learning outcomes from the three modules[1], enabling projects to work dynamically relative to the learning process and professional contexts they are applied within.

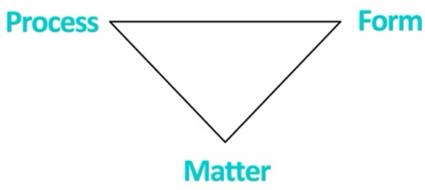
Both approaches significantly influenced the design of the MetaPraxis Project, in which the following approaches have enabled similar dynamic and adaptive ways of designing for learning.

[1] Within categories: specialist skills and techniques, skills development in context, interdisciplinary practice, reflexive practice, research and contextualisation.

Decode

Autopoiesis

Autopoiesis describes the capacity of a network to be self-generating or adaptive, modelled on living systems, which, according to Capra, feature the components of *"form (or pattern of organisation), matter (or material structure), and process"* (Capra, 2002:61).

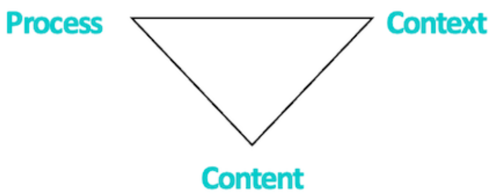


For example, the metabolism of a cell *"consists of a network (form) of chemical reactions (process), which involve the production of the cell's components (matter), and which respond cognitively, i.e., through self-directed structural changes (process), to disturbance from the environment."*

(Capra, 2022:64-65)

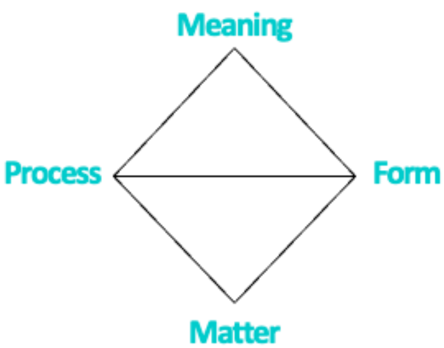
System Components

I have proposed a transposition of this model to learning and curriculum design, through which *matter* becomes *content, form* becomes *context,* and *process* is *process, mode,* or *capability*. Simply put, we can think of these as the '*what', 'where', and 'how'* of learning.



System Effects

Capra adds a fourth dimension: *meaning*.

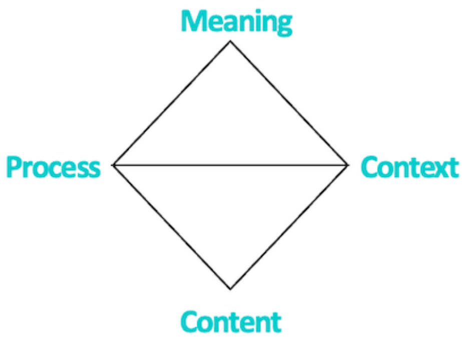


"Culture is created and sustained by a network (form) of communications (process), in which meaning is generated. The culture's material embodiments (matter) include artifacts and written texts, through which meaning is passed on from generation to generation."

(Capra, 2022:64-65)

We can perform another transposition:

'Knowledge is created and sustained by an ecosystem (context) of learning (process), in which meaning is generated. Knowledge's material embodiments (content) include artifacts and written texts, through which meaning is passed on from generation to generation.'



Web 1.0

Consider the tedium of early websites: static pages displayed with limited scope for interpretive interaction. The website recalls a fixed model; there is little agency for the user apart from at input and output stages.

Subsequently, the model, view, controller system (MVC) has enabled more dynamic interaction for web users. In this example the *model* is the predetermined ideal set of all relevant information stored on a server, the *view* is a selection of that content displayed to a viewer as determined by the *controller*, an algorithm that *interprets* user interaction to establish which *content* the user will *view* and when. The more sophisticated the algorithm, the more nuanced the interaction. In many cases, the *model* and the *controller* are updated based on user interaction. The system adapts.

Transposed to learning and curriculum design, *model* is *content*, *view* is *context*, and *controller* is the *learning process* or *mode of interpretation.*

To what extent are our systems of education like outmoded content-heavy web pages?

How can we make them more dynamic and interactive?

Recode

The ‘*what’* (content), ‘*where’* (context), and ‘*how’* (process, capability, or mode of learning and practice) are locked in combination within disciplines. Unlocking these combinations and recombining them in new ways can innovate and reveal new connections of meaning and practice.

Table (A) identifies twenty-seven permutations, where Process, Context, and Content are placed in one of three states: Static, Sequential, or Dynamic.

	Process	**Context**	**Content**
A1	Static	Static	Static
A2	Static	Static	Sequential
A3	Static	Static	Dynamic
A4	Static	Sequential	Static
A5	Static	Sequential	Sequential
A6	Static	Sequential	Dynamic
A7	Static	Dynamic	Static
A8	Static	Dynamic	Sequential
A9	Static	Dynamic	Dynamic
B1	Sequential	Static	Static
B2	Sequential	Static	Sequential
B3	Sequential	Static	Dynamic
B4	Sequential	Sequential	Static
B5	Sequential	Sequential	Sequential
B6	Sequential	Sequential	Dynamic
B7	Sequential	Dynamic	Static
B8	Sequential	Dynamic	Sequential
B9	Sequential	Dynamic	Dynamic
C1	Dynamic	Static	Static
C2	Dynamic	Static	Sequential
C3	Dynamic	Static	Dynamic
C4	Dynamic	Sequential	Static
C5	Dynamic	Sequential	Sequential
C6	Dynamic	Sequential	Dynamic
C7	Dynamic	Dynamic	Static
C8	Dynamic	Dynamic	Sequential
C9	Dynamic	Dynamic	Dynamic

Table A

This is the foundation of a framework for progression that sees increasing levels of variability and opportunities for self-directed agentive learning. In this way, it provides a structural approach to planning for the emergence of skills, meaning, understanding and knowledge that is inclusive of all disciplines and their now *meta-typical* components.

This scheme confirms a central proposition of MetaPraxis: the greater the emphasis on developing and applying capabilities, particularly the tools of creativity and interpretation, the greater the opportunity for equitable, agentive, and self-directed learning.

Encode

Applying these now recoded combinations results in new encodings for different learning scenarios. Examples below describe how this might translate in practice, through which the balance of emphasis changes.

Content Emphasis

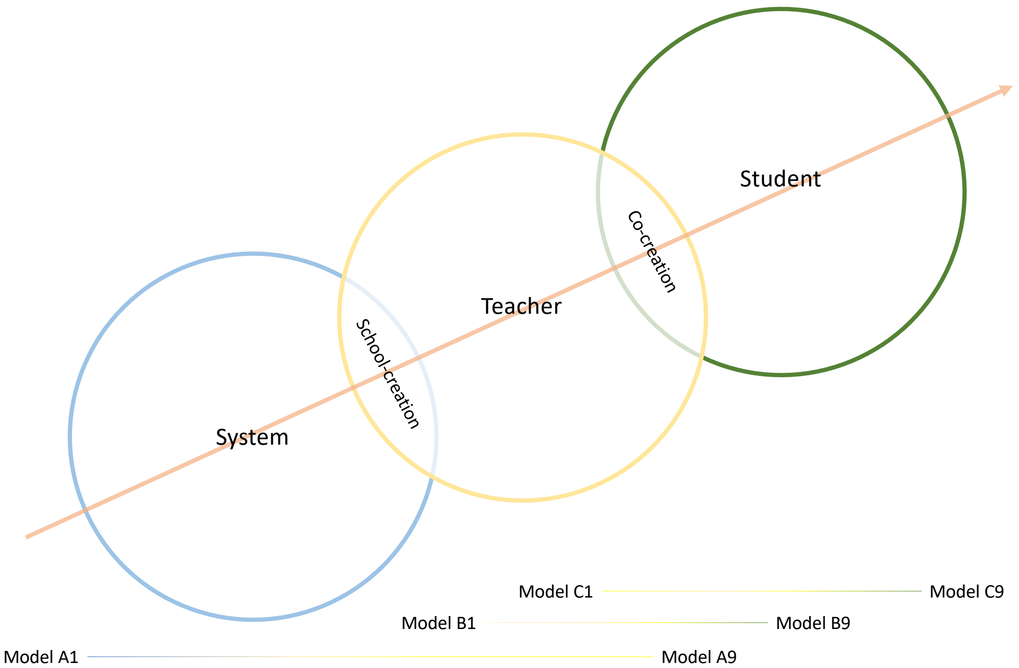
A1 – Fixed content within a subject or discipline
(e.g., factual / rote learning, developing a practical skill through repetition)
A2 – Sequential content within a subject or discipline
(e.g., subject knowledge / topics explored conventionally)
A3 – Variable content within a subject or discipline
(e.g., subject knowledge and topics chosen are variable: student-led project)

Context Emphasis

A4 – Sequential shift in context in a subject or discipline
(e.g., transposing fixed concepts to different domains in a fixed mode of inquiry)
A5 – Sequentially changing context and content in a subject or discipline
(e.g., planned changes in context and content in a fixed mode of inquiry)
A9 – Variable content and contexts, applying a single mode of inquiry, consistently.
(e.g., scientific method, statistical analysis, interpretive focus)

Mode Emphasis

B1 – Sequential shift in modes of inquiry in a subject or discipline
(e.g., exploring content and contexts from different perspectives)
B5 – Sequentially changing context, content, and modes of inquiry
(e.g., cross-disciplinary theme-based curriculum / carousel)
B9 – Variable content and contexts, applying a planned sequence of modes of inquiry
(e.g., student led project exploring modes of inquiry)
C4 – Variable modes of inquiry through a sequence of contexts, with fixed content in a subject or discipline
(e.g., exploring the impact of a range of contexts upon the interpretation and understanding of a fixed range of content)
C8 Variable contexts and modes of inquiry, through a sequence of content
(e.g., sequence of student-designed projects)
C9 – Variable content, contexts, and modes of inquiry
(e.g., students acting with agency and autonomy to select and apply skills and modes of inquiry relative to a range of contexts)



Although this scheme is numbered in a table, it is intended to be non-hierarchical, so that teachers and students collaborate in applying permutations dynamically. This recognises, for example, that sometimes A1 (explicit teaching of skills or dissemination of information) will be required to support C9 (dynamic, exploratory student-directed learning).

This model provides opportunities to integrate modes and content across different disciplinary contexts, scaffolding multiple opportunities for multidisciplinary and transdisciplinary learning.

MetaPraxis has sought to develop capacity in teachers to seek new combinations, to develop expertise in decoding, recoding, and encoding.

The team at Trinity College, Gawler River enriched *"interdisciplinary learning opportunities through curriculum mapping of themes, outcomes, and graduate qualities. Hexagonal planning posters were displayed in the staffroom to encourage professional discourse and inspire further pedagogical innovation and teamwork".*

Trinity College, Gawler River

The deeper ambition of MetaPraxis is to see this opportunity also embedded as practice for students, so that curriculum and learning design is an agentive process, as well as a context for agency.

A case of changing the rules of the game as one of its moves![2]

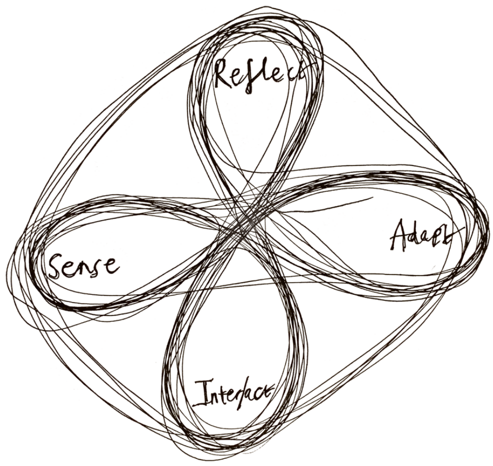
[2] See *A Self-Modifying Game (Hofstadter, 1979:687)*

Nested Learning Loops

Another learning pattern applied in the project is that of a scalable learning loop or algorithm. This meta-process can be applied at multiple levels within a project and across disciplines – e.g., capabilities, projects, meta-spaces, project teams, learning areas, schools, MetaPraxis.

The pattern consists of 4 key elements:

- Sense – gather information
- Reflect – analyse information relative to context
- Inter/Act – act or interact with context, to generate information or to support reflection
- Adapt – adapt behaviour, model of understanding, or learning algorithm relative to previous combinations of sense, reflect, inter/act, or adapt



The pattern coheres with Piaget's model of equilibrium, disequilibrium, accommodation.

The sequence and recurrence of each element is determined through analysis of the processes of cognitive or practical capabilities across disciplines. For example, the addition of two numbers could be analysed as a sequence of actions that could be described by the elements of the learning loop:

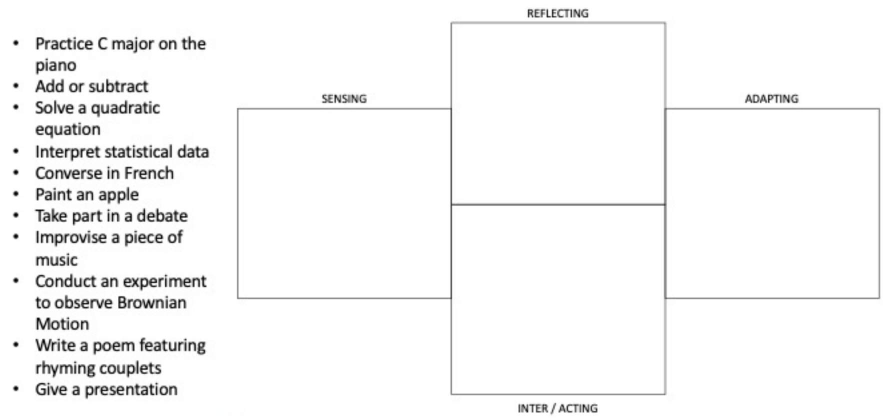
SENSE VALUES A AND B; **REFLECT** ON METHOD TO APPLY; **INTERACT** BY COUNTING UP INCREMENTALLY FROM VALUE A FOR THE VALUE OF B; **REFLECT** UPON RESULT; **INTERACT** TO CHECK ANSWER; **ADAPT** MODEL OF CAPABILITY THROUGH REINFORCEMENT.

In this simple example, it is also possible to identify algorithms within the algorithms – there are a further set of recall and analysis processes involved in the step of *reflecting on the method to apply,* for example. Likewise, the whole addition algorithm could form a subset of a more complex problem-solving process. In this way, learning loops can be nested within other learning loops.

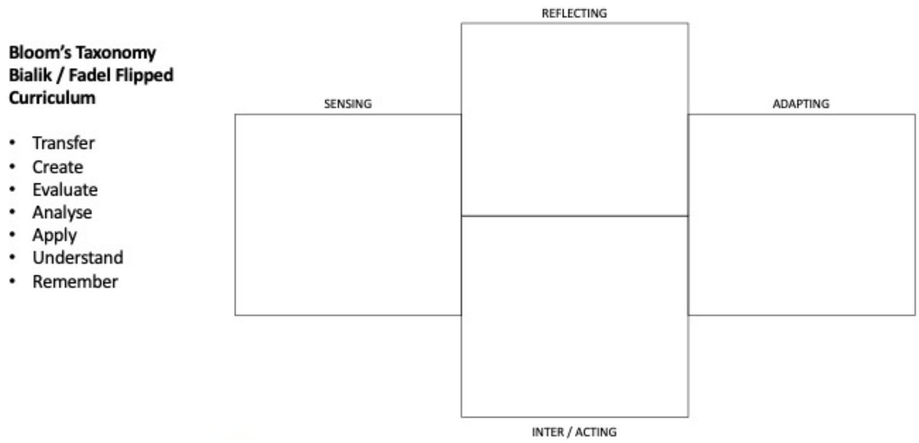
This meta-typical learning process features four elements, which are inclusive of and can describe learning patterns and their elements at multiple levels of scale: vertically (i.e., capability, project, year level, school) and horizontally (across disciplinary and interdisciplinary categories).

To create deeper connections between disciplines in interdisciplinary combination, a process of analysing and collating the different ways in which disciplines *sense*, *reflect*, *inter/act,* and *adapt* can enable the development of a lexicon that is inclusive and transferable.

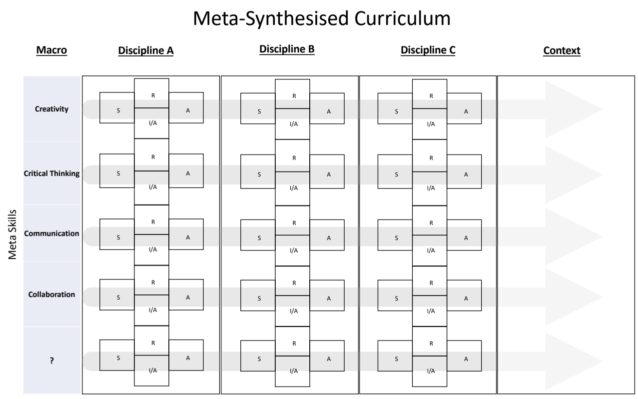
Through meta-synthesis elements are integrated, and cohere because they share the same meta-concept (e.g., sensing).



A further layer is to analyse and meta-synthesise some taxonomies and progressions:



This also enables coherent vertical and horizontal connections between Meta-Skills.

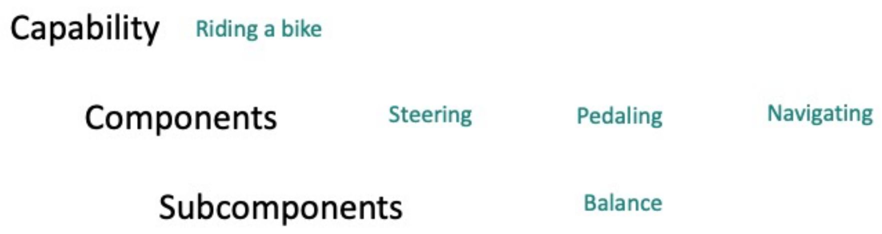


Meta-analysis and meta-synthesis have led to mapping of algorithms and their components using the impact map, featured later in this paper.

Learning Gestalts and Complex Capabilities

A gestalt is a "complex of properties occurring together [that] is more basic to our experience than their separate occurrence." (Lakoff and Johnson, 1998:71)

It's as simple as riding a bike.

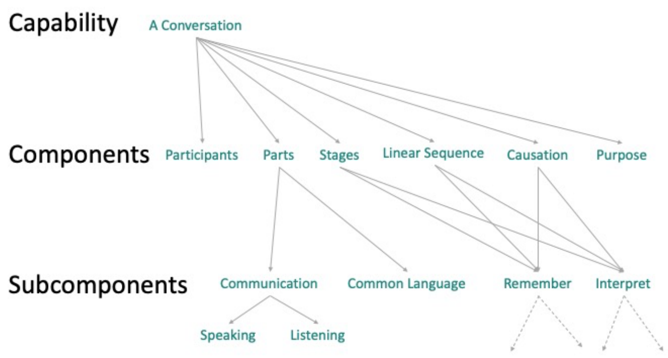


Once we have learned to ride a bike, it becomes automatic, to the extent that being too conscious of some of its components as we carry them out – steering, pedalling, navigating – might lead to a breakdown in the subcomponent of balance: we fall off.

Paradoxically but authentically, the complex of capabilities that perform the *riding of a bike* is more basic to us when experienced as a whole.

Likewise, balance is fundamental to the performance of all aspects. We could say that riding a bike is *a way of balancing*, as coherently as saying that balance is a required component of *riding a bike*. There is a certain loop of interdependence that does not match the hierarchy of capability, component, subcomponent.

Lakoff and Johnson provide a deconstruction of a conversation. They identify components of a simple two-party conversation: participants, parts, stages, linear sequence, causation, purpose.



In this incomplete diagram, the process of identifying subcomponents has begun, and we find again that we are caught in a similar loop. A conversation, which we could categorise as a *way of communicating,* features subcomponents of the same type: communication nested within communication.

We are caught in a Mobius loop of skills. A unity of components and effects.

Considering concepts and complex capabilities as gestalts, can provide a model to incorporate the quantitative and the qualitative, the components and effects of a learning process.

We have already encountered a recursive loop in which 'each component part is a set of wholes'; that the effects of the combination of these can be more basic to our experience, than individually; and that often complex capabilities can contain nested versions of themselves, which creates further contradiction: Which is more fundamental? Which has greater impact?

Reductive approaches that seek only to quantify the value of component parts of complex capabilities will not capture the effective impact or potential of a skill. Likewise, qualitative approaches that seek only to qualify the effect of a capability such as communication, may under-represent the nuanced development of component skills and their impact and potential.

A holistic mixed method seeks to capture both *particle and wave state*, recognising the ambiguous and paradoxical relationships between component parts and the effects of their combination, which will be unique to each individual learner as they develop capability.

In this sense, one could argue that every capability is *complex*, relative to the stage of learning development and growth, and as a uniquely patterned distribution of component skills and their effects for each learner.