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A five-cycle living visual taxonomy of learning interactions

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Abstract

This paper describes my development of a useful, descriptive model that one-to-one practitioners could use to analyse transcripts of their sessions, design new strategies and even test them out. Further, this work has the potential to offer a framework that students, patients, clients and colleagues could use to communicate the types of interactions they prefer.

The narrative in my educational life around the domain of heuristic generates a living-educational-theory as a values-based explanation for my educational influences as a tutor. The living contradictions I encounter, and praxes I make up to help me imagine solutions, are portrayed visually and verbally; and this leads to my proposal of a five-cycle living visual taxonomy of learning interactions.

I consider the application of my living-educational-theory to other domains, for example, confidence; and to power dynamics, autism support, student engagement, expert behaviour, external influences, understanding negative feedback, and remoteness in heuristics.

Interestingly, one future possibility is to use my taxonomy to develop a 'positivist/scientific flavoured' quantitative instrument to support learning analytics and educational data-mining; to optimise learning, and the environment in which it takes place.

Keywords: Living Educational Theory; Open review; Pedagogy; Andragogy; Taxonomy; Learning cycles; Discourse analysis; Heuristic; Confidence; Locus of control; Motivation; Mantle of the expert; Power dynamics; Autism support; Student engagement; Expert behaviour; Quality of teaching and learning; Learning analytics; Educational data mining.

Introduction

This paper draws on values that I have developed throughout my educational life. I believe that this work has helped me to grow as a tutor, and to create a useful model that other one-to-one practitioners may use systematically to identify and explore their own beliefs. This is done by coding transcripts of sessions, designing new strategies and even testing them out. It proposes a framework that any one-to-one practitioner could use as a starting point to develop their living-educational-theory, with the aim of answering the question 'how do I improve this process of education here?' Furthermore, this work has the potential to offer a framework students, patients, clients and colleagues could use to communicate the types of interactions they prefer.

I adopt the position that my living-theory may emerge from posing questions of the kind 'how do I improve my practice?' (Whitehead, 1989). I will use myself as a living contradiction, reporting on a dissonance between my values and beliefs and my actions (McNiff & Whitehead, 2010). For example, I value humanitarianism and believe that I should help anyone to learn, but paradoxically may feel challenged when introduced to a student with severe communication difficulties. I value student-growth and believe that students should experience setbacks during a problem-solving process, but paradoxically I may intervene, in order to save my own time, and suggest a way forward. I value student-comfort and believe that I should adapt to the learning style of the student I am supporting, but may blame the student for any negative feedback they give. Perhaps being human is my only real excuse. A machine-driven algorithm would identify and negate any potential contradictions to inherent values in advance; but I must confess to finding the living human-state more engaging and interesting, albeit much more complex!

Identifying my dominant values

I am indebted to Pip Bruce Ferguson, my mentor assigned by EJOLTS, for encouraging me to reflect further on my values and to express them more overtly. Thanks to Pip, I now understand how values and beliefs differ, and how the creation of my living-theory is a vehicle for becoming more involved in the world around me, (and not *with* the world around me) my life on 'the inside and the outside at once' (Mellett, 2015).

Thinking about values as a subject area has made me aware of the multitude of options possible. Identifying your own values, on your own, seems challenging, perhaps because of 'not being able to see the wood for the trees', as they say. So, I identified some of my values after reflecting on summative suggestions from Pip like '… so perhaps your values include integrity and persistence' and then digging deeper to validate by seeking out further examples.

I eventually realised that there are eight values I would fearlessly defend and that I believe support my development as a learner-academic. These are *comfort, elegance, growth, humanitarianism, humour, integrity, persistence* and *scholarship*. For each of these values I will strive to tease out further 'what truly matters to me', that is, to ensure that my eight foundation stones are not 'just words on a page', Bruce Ferguson (2015, p. 50) in the descriptions below.

Comfort

The one-to-one learning environments I facilitate should be an enticing combination of achievements and challenges, but not too great a challenge, with a concern for students' and my own *comfort*. The learning-dialogue should be lively (relative to the students' inherent pace) and interesting (relative to the students' perception of 'interesting').

I value student-*comfort* and think that it can be maintained satisfactorily by the skilful monitoring and management of confidence, heuristic, locus of control and motivation; and that it is the complexity of this task that emphasises tuition is a high-order skill, involving critical, logical, reflective, metacognitive, and creative thinking (Bloom, Engelhart, Furst, Hill and Krathwohl, 1956). Perhaps I am using this imagery of a 'scientific/positivist-flavoured' laboratory as a prop to remind me of my responsibilities in real time. I respect students and value their comfort; and understand that maintaining a controlled academic environment is not easy. All tutors will inevitably make mistakes, but this does not mean that I have personally given up!

Elegance

Elegance is subjective, but I believe most people have witnessed it in some way, whether it is when listening to a balanced debate, or watching synchronized ice-skaters or skateboarders skate. To me, *elegance* is all around us; it is all of these but it can also be represented by a succinct and aesthetically superior mathematical argument, (Breitenbach, 2013). I value *elegance* because it gives me pleasure, supports the teaching and learning of mathematical ideas, and I believe that if something is *elegant* it is more likely to be true.

Growth

Growing is not always *comfortable*! I recall spending hours, at school and university, straining to understand what I was being asked to do. It was painful, but not physical. It was tormenting and frustrating, and often prolonged. Realisation was liberation, and I remember occasionally sensing real achievement: 'oh yes, got it!' So no gain without pain, then! Which is why, when during a one-to-one session, I sometimes gamble by grasping an opportunity to delicately expose the student to snippets of mild age-appropriate torment and frustration; to help them *grow*.

Sigrid, (Gjøtterud, 2015), however, asked but 'are you really gambling?' as to her it sounded as if I was providing resistance which I truly believe will bring about change, backed up by 'an emotional ability to connect and to be empathetic'.

Underneath it all, I do respect students – anyone who has decided to study – because I value people and scholarship. Student-*growth* is one of my values because I want students to become independent of my input, imagining the process 'nurturing and letting go' as synonymous to weaning in animal husbandry. I want them to judge for themselves when to seek out support, from either resources or other people, in a way that is meaningful to them as individuals.

Humanitarianism

I feel that the 'for all!' slogan in my educational practice has been very close to my heart for a very long time. It will never go away. It is an impossible challenge! One of my line managers once said to me 'I cannot imagine you ever refusing to help anyone, Brian.' I believe I am always willing to do this, but not always able.

As an independent professional, I used the 'maths for all!' logo designed by my children (when aged three and five) to promote my services as a community maths-tutor during the 15 years that I was completely self-employed and independent of any educational institution. The little person with the welcoming open arms they drew, and coloured in, still helps me to focus on *humanitarianism* in my practice.

Following the 'for all!' star has introduced me to many amazing people I would not have otherwise met, and I was privileged to use the autonomy that self-employment gave me to remove economic barriers to learning when needed, by offering free and low-fee options to clients. I did this because I believe education is able to benefit all, and people should not be denied education for economic reasons.

Humour

I value *humour* in my professional practice for two reasons. I believe that people often laugh at something when it seems ridiculous to them; which could mean that they have gained a deeper understanding. I also believe that funny things are easier to remember.

'Laughter is an affection arising from the sudden transformation of a strained expectation into nothing' (Kant, 1951, I, I, 54). I value surprises because I think they teach! The incongruity theory of *humour*, (Morreall, 1989), highlights: ambiguity, logical impossibility, irrelevance, and inappropriateness, and I believe that these concepts are all key to the teaching of mathematics. If mathematics is an abstract language of thought, then perhaps the learning of it may be facilitated by travelling to a comic math's world of make- believe, at least momentarily.

Integrity

The scholarly work of others is something that originates from outside of myself. It is words, or a diagram, on a page that represents something I may understand, may decide to use and internalise, misinterpret or criticise. If I consider the conclusions reached by others are ambiguous, logically impossible, irrelevant or inappropriate, then I will challenge them regardless.

An important example of this is when I was a research student, I read many papers in population animal genetics endorsing mathematical models that excluded some additional effects that I believed just had to be present. It seemed as if deleting terms at the end of an equation was considered good applied science by the animal genetics community I was about to join; but to me, it was cheating, and just a way of getting quick results. So, I generalised the equations to include all the additional effects (Williamson 1984, chapter 7) and then tried to obtain results.

Perseverance

It was when trying to obtain results from my generalized equations that I realised why those applied scientists had deleted the problematic terms! It seemed to be mathematically impossible to solve them, but I persevered. I eventually arrived at credible, necessary and sufficient, conditions for results to be obtained without deleting the terms I believed were important (Williamson, 1984, chapter 7).

By this time both of my supervisors had become concerned that the path I had chosen was too risky and too time-consuming. They encouraged me to embark on a more traditional analysis based on the assumptions I was opposing (Williamson, 1984, chapters 2-6). This sort of applied research was understood at that time to enable students to gain a doctorate. I did what I was told, but would not, and could not, let go of chapter 7. So, my supervisors asked a professor of human genetics to be my examiner, due to my rebellious attitude having alienated key players in the animal genetics research community.

Scholarship

Given the titanic challenges the understanding and perfection of tuition presents to me personally, I value any scholarly activity – empirical studies, theoretical models, new strategies or ideas – and demonstrate below how I am open to learning from the writing of others.

I believe my knowledge is severely restricted by shortfalls in my meta-analytical skill-set and restrictions on my time, so I am certain to miss out on many interesting and important results, patterns and trends in research findings that would make my work with students more remarkable. 'Do not go reinventing the wheel', would be a noble aim, but sometimes I think that parts of my life have been spent struggling to do just that! This is why I consciously seek out and use the work of other authors, and value their ability to contribute to my knowledge.

'I' as my claim to educational knowledge

I became a one-to-one tutor because it was a one-to-one tutor, not a classroom teacher, who rescued me from an early-years schooling in the 1960s that was disadvantaged by absence due to my illnesses, and teachers who either shouted at, or ridiculed me, for not understanding. I was so scared of being hit (caned) by some of those teachers. I believe that even at such a young age, my values *comfort*, *humanitarianism* and *integrity* were firm, and I interpret my feelings of frustration then as a living contradiction: I was crying 'why this?' There was a dissonance between my values and my action: attending that school.

My parents acted, and a one-to-one tutor rescued me, simply by teaching me maths when I was nine years old, and helping me to understand. It seemed like a very *elegant* solution to my problem. As my maths improved it was as if a great fog was lifting from over my head! It was no longer 'Brian, he is the slow one who sits in the corner drawing his pictures', but 'Brian, can you help me with this maths please, I am stuck?' So, I started to peer-tutor others and by the age of 14, I had identified with the maths-tutor role. Jacqui was struck by the clarity, and settled certainty, of my values, saying that my ''I' is extremely clear and loudly expressed' (Scholes-Rhodes, 2015), which I believe is due to these early educational experiences.

Keeping in line with my scientific/positivist-flavoured' education I would work with Pip to establish my values, build my living-educational-theory and then use it to explore the narrative in my educational life. Identifying and writing about values at the start of a paper seems to be unusual. Other living-educational-theory papers I have read do not list values at the start, as if they were the axioms on which a constructivist commentary is to be based. Peter pointed out that doing this echoed the approach of Rutherford (1911) 'who observed the scattering of alpha particles by gold foil and developed an atomic theory that was then used to further explore and understand the properties of other elements' (Mellett, 2015). Perhaps this is why, when reading an earlier draft, Jacqui considered my values to be disembodied from my practice in the moment (Scholes-Rhodes, 2015), missing the 'curiosity and vulnerability that would indicate a *living*-theory'.

A Living Theory methodology would be to generate my living-educational-theory by exploring the narrative around my teaching and scholarly practice. This would involve:

- using myself as a living contradiction, reporting on a dissonance between my values and beliefs and my actions (McNiff & Whitehead, 2010), and then,
- imagining how I improve this process of education here (Whitehead, 1989).

In the tradition of action research I would imagine ways of overcoming my problems, (Lomax, 1986), and proceed to act on a chosen solution, evaluate, adjust my ideas and continue around the cycle. In a similar way Gibbs' reflective cycle would serve to prompt reflective practice through the key words: 'description', 'feelings', 'evaluation', 'analysis', 'conclusion' and 'action plan', (Gibbs, 1988, 1998). 'Analysis' here, and the subsequent synthesis and creation of concepts, would be a natural means of imagining ways of overcoming my problems.

My living scholarship

At university I became aware of the teaching-research nexus, (Neumann, 1992). People there said that you could not do one without doing the other. Was all teaching really research? Was it possible to be a researcher without also being a teacher, or did all researchers count as teachers because they taught themselves new knowledge?

I also noticed that some teachers were encouraged to do research, by being given 'academic status', while others, like me, were not. This illogical partitioning of the education work force did not seem right, resulting in a long-term dissonance between my values, *integrity* and *scholarship*, and my actions: teaching without engaging in research.

Every time I sat down to tutor, usually at a kitchen-table somewhere, it became a fascinating experiment; the maths problems I created were input, and the student's body-language, utterances and written responses were output. I felt that 'teaching = research'. The process is simple, uncluttered, aesthetically pleasing and *elegant*. It seemed to me that anyone with an applied-science background would be continuously sensing data in such a situation, as well as asking for models.

Sigrid, (Gjøtterud, 2015), asked whether I really meant this, bringing me to reconsider. May be 'teaching ≠ research'? She suggested that my expression might reduce the valuable

encounter between I and Thou (Buber, 2004) and contradict the values I have expressed. In my eagerness to engage in my 'fascinating experiments', am I dampening or enhancing my ability to encounter others? Does including words like 'axiom', 'cycle' and 'symmetry' in my self-talk vocabulary erect a barrier to my learning, or provide a new lens? Perhaps I am experiencing two types of encounters when I work: Buberian and Non-Buberian (my 'fascinating experiments'). Perhaps, fortunately, this duality has enabled me to experience my living contradictions as a practitioner.

In order to work towards correcting the dissonance between my values and my actions: teaching without engaging in scholarly activity, I will now attempt to explain the narrative that has contributed to my attempt to construct a living visual taxonomy of learning interactions.

Ned Flanders

Flanders Interaction Analysis (FIA) is now a widely-used method for analysing classroom discourse and involves the recording of total frequencies of predetermined categories of talk at three-second intervals (Amidon, 1966). It provides a visual representation of a teacher's practice and teaching-style ratios, and has influenced my practice by making me aware of the relevance of *elegant* patterns of interactions created during classroom teaching, and possibly during one-to-one sessions as well.

Application of FIA to tuition

Tuition has been hailed as the 'gold standard' for instruction (Beal, 2007) characterised by 'close behavioural observation' of each other, teacher and learner, and by its relative strengths with respect to mutual feedback (Gordon, 2003, p. 543) consistent with my values of *comfort* and *growth*. However, FIA is really a classroom-based tool, which may make it inappropriate for use in the one-to-one environment.

No obligation to take turns

FIA is not an input-output model because it is based on the premise that teacher and pupil may contribute utterances at any time; that is, there is no obligation to take turns. Data for an FIA could be collected and analysed when only different types of teacher-talk are recorded and no teacher-pupil interaction takes place. However, I believe that the black box, input-output framework, is central to learning, both for people (Black & William, 1998) and machines (Maedche, 2004; Tsochantaridis, 2004). Input-output models the conversational nature of learning (Litman, 2004; Clark, 1996). The fact that there is no requirement for the teacher and student to take turns may impede the monitoring and management of *comfort*.

Teacher – student imbalance

In addition, FIA uses seven categories of teacher-talk, just two categories of student-talk and one category for silence. The fact that the number of categories of teacher and pupil-talk are unequal, contradicts my living values of *elegance* and *integrity*, because the model appears to be based on the assumption that teacher-talk is more valued than student-talk.

My values-based explanation for my new understanding

It was encountering these living contradictions: *'no obligation to take turns' and 'teacher – student imbalance'* that empowered me to move on towards generating the living educational theory proposed in this paper. Identifying, and trying to complete, this living gap has been my aim.

Flanders's cycles

Paradoxically, it was my further study of FIA itself that was to progress my living theory. It was not long before I understood that Flanders *did* apply his FIA to a situation in which students express their own ideas (pupil-talk initiation) – but only following longer, detailed, general or abstract questions asked by the teacher. This inspirational and *elegant* model that Flanders derived to represent the stimulation of independent thought, involves two cycles, an inner and an outer. With the inner cycle there is more emphasis on using the teacher's ideas. On the outer cycle more emphasis is placed on using the student's ideas (Amidon and Hough, 1967, 3, 11).

The inner and the outer

These Flanders' cycles encouraged me to regard the inner and the outer (or intrinsic-extrinsic) dichotomy as an important feature of how tuition worked; showing clearly that scholarship and observation was influencing my practice. I found the contemplation of its application to the domains – heuristic, confidence, locus of control and motivation – helped me to recognise the possibilities of an exciting aural multi-dimensional landscape. For example, hearing '*I am curious'* suggests an inner motivation (Martens, 2004; Candy, 1991; Kingston, 2008). 'Was not me!' suggests an outer locus of control, (Rotter, 1966; Lefcourt, 2014).

A simple taxonomy

The idea that the interactions within the learning support should be determined by the student's learning style profile, 'the central doctrine in a quasi-evangelical crusade to transform all levels of education' (Coffield, 2004, p. 125) may have its appeal if I were seeking out a straightforward solution to the complexities of teaching and learning.

Differentiating students with the aim of being able to select the type of interaction that will lead to their *comfort* and *growth* seems to be central to the methodology preferred by some practitioners. For example, Smith and Renzulli (1984) would support the idea that a *visual learning style* may be mapped to 'use drawings to represent ideas' and an aural learning style may be mapped to 'discuss with the learner'; but is it really that simple? Sometimes it seems to me that a student's learning style actually changes during a one-to-one session, as they learn. I wondered how this might be. My scholarly journey continued to consider the work of the education reformist John Dewey (1859 – 1922) alongside that of the mathematician Andrey Markov (1856-1922).

Dewey and Markov Chains

If 'education must be conceived as a continuing reconstruction of experience' (Dewey, 1897, p. 53) then it seems unrealistic to suppose that an individual's learning style, and corresponding optimal interactions, do not change. In line with Darwin's appliance of Markov Chain Theory, (Markov, 1906, 1971) to FIA data (Darwin, 1959), it seems that individuals may adopt different learning strategies depending on their perception of immediate past learning events and learning objectives. For example, the strategy, 'use drawings to represent ideas', may work in one context but, 'discuss with the learner' may take preference, conditional on the student's perception of past learning events and learning objectives.

'Continuing reconstruction' (Dewey, 1897, p. 53) of chains of interactions would suggest a taxonomy could be achieved by placing chains into themed bundles of pathways. Perhaps the number of bundles would be small. Perhaps each bundle would correspond to a familiar interaction type, for example, demonstrating or lecturing. Labels may work as a sort of 'tour guide' or 'menu' telling us where each bundle goes and what it could show us. Perhaps, this would be an *elegant* imagined solution to my problem.

My living dynamic educational geography

I have heard people talk about their learning being like a journey, and I have used this simile myself. It is geography. A journey over a landscape, walking with a friend until one day they say, 'it is okay I can find my own way now', or 'I am not ready to move on yet'. I will use phrases like, 'I am stuck', 'was not me!' and 'I will try' to describe pedagogic/andragogic regions; types of educational consciousness I have experienced. If it is my thesis, my belief, that my educational consciousness lies within a given region, then I will shade that region green.

My learning journey corresponding to praxis, for example receiving feedback from a student, will be represented by a directed black arrow from my thesis (shaded green) to the anti-thesis (shaded red). This is a journey from one pedagogic/andragogy region to another, and an opportunity for me to learn.

This is the personal way I have been able to map my learning journeys.

What is yours?

Any model would have to be as general as I could make it, so that it is consistent with my *humanitarian* value 'for all!' and my tendency to associate completeness with *elegance* and *elegance* with truth. However, would you have created the same living educational geography, or would yours have been different? Peter asked, 'where on the Readerly-Writerly spectrum, (Barthes, 1974), would I like to place my account?' (Mellett, 2015). Readerly means that my audience is passive and Writerly that they are active. This inspired me to think of ways to invite you into my text.

You may need to develop an alternative living and dynamic educational geography, and exploring this may become a 'fascinating experiment' for you. It seems there are many paths to follow, but this paper is just about mine. I hope the path I have taken will succeed in

prompting you either to build your own living-theory or to apply, validate or challenge the theoretical framework I am developing here.

Pip considered that my particular geography draws on my field-mathematics and devises models based on that form of thinking to help myself, my students and other educators. She pointed out that, 'through creating your living theories you may, at various times, or at the same time, be gathering and organising what is known in your field, implementing a plan of action, or clarifying your concerns' (Whitehead & Huxtable, 2014, p. 18). Where on the Readerly-Writerly spectrum, however, would these mathematical ideas be placed? I am bothered by my awareness that mathematical disciplines are all too curious, have suffered the loss of certainty (Kline, 1980) and do have the 'curiosity and vulnerability that would indicate a *living* theory' (Scholes-Rhodes, 2015). Is then most of applied mathematics, and this work in particular, presenting itself as Readerly when perhaps it is really Writerly?

Heuristic

My pretend roadway

When I was very young one of my toys was a roadway with lots of toy cars on it to play with! One of its features was a right-angled triangle of roads. I knew I knew the triangle was there and enjoyed it being there, because cutting the corner when driving my toy car meant that I could beat my friend in a race, a social reality! (Durkheim, 1895).

Relativity

If the learning-outcome set for me then was 'to experience and appreciate the applications of Pythagoras' Theorem in play' then my level of competency would have been *I know I know*. Alternatively, if the desired learning outcome was set just one notch higher at, 'to demonstrate, by measuring, that the length of the hypotenuse of a right-angled triangle was shorter than the sum of the other two sides', then I would have said, *I am stuck*, perhaps because my teacher was not there to show me what to do. Without support, I may have struggled to understand that the number concept 'less than' is equivalent to the geometric concept 'shorter'. Perhaps it was just my untutored opinion that the travelling along the hypotenuse in my toy car was more fun than going the other longer way. I was in the process of timelessly constructing reality through play.

If I had been transported at this young age to a secondary-school maths-classroom then I would not have even recognised the name 'Pythagoras's Theorem' or understood the algebraic notation used to express this knowledge set. If the desired learning outcome was, for example, 'prove Pythagoras's Theorem' then I would have been completely lost, would not know where to start and felt *that is remote*.

It is obvious to me that levels of competency are not absolute, but are relative to desired learning outcome. I can best understand this by considering a theoretical Gagne Hierarchy of Learning, (Gagné, 1968). Learning outcomes towards the top of the hierarchy are supported by those below.

If the desired learning outcome coincides with my level of attainment then I will sense that *I know I know*. Alternatively, if the desired learning outcome is set just one or two notches higher then I may say *I am stuck*. A desired learning outcome much higher up the hierarchy would be alien, make me feel disorientated and conclude *that is remote*.

The symbols ☺, ? and ∞ will be used to denote these epistemological states: *I know I know*, *I am stuck* and *that is remote* respectively.

Fuzzy boundaries

The region labelled with a question mark in Figure 1 is similar to Vygotsky's Zone of Proximal Development, (Vygotsky, 1978). The positioning of a point in the *I know I know* region could be taken to represent grades of certainty and uncertainty. It follows that the centre of the inner circle represents the most certain of epistemological states: total reassurance.

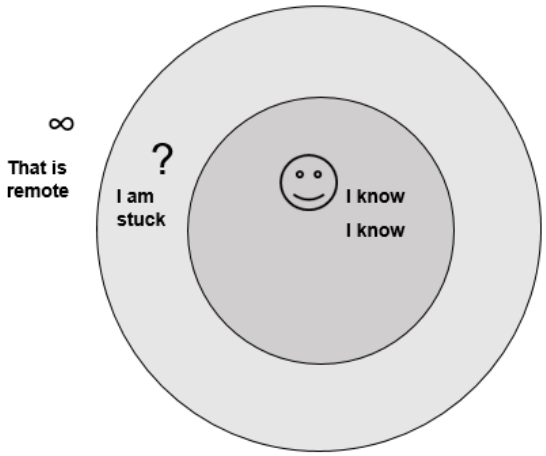

Figure 1. Levels of know-how in myself

I have heard people talk about 'living on the edge' and wondered what are they living on the edge of. Perhaps they are living on the edge of their *I know I know* region, the fuzzy boundary of a fuzzy set (Zadeh, 1965). Perhaps, the same gradations of thought could be made from how I feel when *I am stuck* to when the object of analysis becomes so weird *that it is remote*.

Three levels of know-how in myself

I have become aware of three levels of know-how; that is three epistemological states, in me; represented by the three non-overlapping regions (Figure 1), and the learning experiences I have had moving between them. *Building up* from ∞ to ?, and from ? to ☺. *Knocking down* from ☺ to ?, and from ? to ∞.

1. I feel secure when *I know I know* but can also be proud, guilty and fed up. Proud because it is an achievement, guilty because there is a danger that I could become lazy and

fed up because I have nothing to challenge me. Feeling secure when *I know I know* contradicts *growth* and over indulges me in *comfort*.

Knocking down

But *I know I know* may be a transient state on the way to *I am stuck* brought about by posing further questions, challenging what *I know I know*. *Knocking down* existing knowledge to build new. The process of *knocking down* is consistent with my value of *growth*. I *knock down* to *grow*.

2. *I am stuck* is a feeling I can put up with for a while, but if it is prolonged, if completing the task is high priority with a deadline, there is no one to ask for help and no recourses to consult; then I could become stressed. If a student I was supporting experienced this then my practice would not be consistent with *comfort* or *growth*; and I would encounter a living contradiction.

Building up

On the other hand moving on from *I feel stuck* to *I know I know* may be pleasant, sometimes extremely. Expanding my horizons. I feel a real sense of achievement when I do this. I *grow*.

Knocking down

But deciding to move from *I am stuck* to *that is remote* is a brave step in my opinion! I think that if someone observed me trying to do this then they would consider it weird as it would involve a 'U' turn. That is, instead of trying to *build up* from being stuck I would be posing further questions, challenging and abandoning my shaky knowledge. In fact literally knocking it down. Making more work for myself and everyone working with me, but perhaps for the sake of *growth* in the future it is made possible by my integrity and *persistence*.

3. I feel *that is remote* when a problem is completely new and not connected to anything I have previously experienced. I feel that the vast majority of all knowledge is remote, but this does not mean that I cannot experience knowing. However, if I am being asked to stay engaged with an activity that I feel *that is remote,* then I am often intrigued; but there is a high risk that my attention will wander! Feeling *that is remote* for a prolonged length of time would contradict my living values of *comfort* and *growth*.

Building up

Moving from *that is remote* to *I am stuck* would require a very lucky break, well prepared learning resources, teaching or learning support. It would be a challenge, but one well worth engaging in. Perhaps I should seek out this *that is remote* feeling more often, and encourage students to do the same, provided however, that I can identify potential exit strategies they could use in the short to medium term.

Building up is gaining know-how. *Knocking down* is raising doubts.

Into my unknown, into your unknown

Meeting students from a wide range of disciplines who expect you to help them learn material that is outside your subject area is incongruous and seems like a serious professional challenge. Perhaps it is a joke taken seriously by higher-education institutions. However, this is what is expected of you if you work as a university disability-support tutor. I asked myself, how I could help someone learn something that I know very little, or nothing, about and still maintain their *comfort*, and still support their *growth*? After all, should not my *humanitarianism* urge me to help everyone learn?

It was as if my cognitive authority, my know-how, had been stolen, made irrelevant, and all that remained was my tutoring experience (of maths) and the strategies I had used to tutor it. My work at the university puzzled me because it was different, but somehow the same as I had done before.

Building up: into my unknown

One day a physical chemistry student at the university asked me to explain the meaning of a mathematical expression and also showed me the expressions for a family of equations she was trying to learn. I noticed that the expression she was asking me about was different to the others, and asked her to explain why she thought this was the case. She expounded alternative interpretations of each term in turn, using her knowledge of physical chemistry. I listened carefully and replied by stating a tentative proposition, based solely on her exposition. It began 'so that must mean …..' That was all it took! She thanked me and said that now she understood the meaning of the mathematical expression. I felt myself inwardly calling out 'but wait a minute, I still do not get it!' but it was too late, she had gone.

Later I thought that perhaps all that mattered was that the student reported she understood now. Initially we both did not know the answer to the question, and I had learnt apparently nothing from the session; so what type of learning support had taken place, and how risky was this interaction? When the student decided she knew it, could she have been wrong? If the student had realised how little I knew about physical chemistry would she have been *comfortable* with that?

This event represented a dissonance between my values: *comfort* and *integrity*, and my actions: teaching a student physical chemistry when I knew very little about it. I had assisted the student to *build up* her knowledge, but the learning taking place had just made me feel more confused, making me feel I was falling deeper and deeper into *my unknown*.

Knocking down: into your unknown

Furthermore, if the student had stayed, what might then have been achieved? It seemed that she knew she knew it now, so there was nothing left for us to do. Perhaps I would have asked her to give me an example of how the formula could be used? She may have had to think a while about that, and that would have perhaps given me the impression that she was stuck again. But no doubt, despite my ignorance, I could have supported her through this phase. Then, maybe, I could have asked her whether she was aware of any hitches, i.e. reasons for the formula not to work. This additional challenge could have returned her to a *that is*

remote state, but again hopefully she would be able to recover from this given my support, and perhaps even *build up* her knowledge again later, establishing a cyclical pattern to the learning.

Please note, that I am claiming that all this could have been done without me knowing anything about physical chemistry myself!

Nine contextual regions of knowhow in others and myself

Jacqui senses that 'developing the *I* without considering the *we* feels uncomfortable' and asked do I have a 'notion of co-creation', of the model, with the students, (Scholes-Rhodes, 2015). At times, reviewing my paper has made her feel 'unheard' but later she considered this to be due to her living-theory 'simply not having relevance' to mine (Scholes-Rhodes, 2015). Perhaps comparing and contrasting living-theories in this way is just as important to the discovery process, as individuals growing their own.

Peter emphasised the importance of my work's validation/evidencing being rooted inside my practice, (Mellett, 2015). Could I assume – as for example Gagne and Vygotsky have done – that the students I tutor experience the same as I do? Learning to understand others would then be equivalent to learning to understand myself. If the levels of know-how I experience are universal, that is to say they apply to all, then three levels of know-how in myself and three for all others would make nine (3 x 3) contextual regions of know-how in total, and they are shown in Figure 2.

I feel that a notion of co-creation may become clearer as I emerge and evolve through my research, EJOLTS guidance at http://ejolts.net/node/220, supported by a heightened awareness of living contradictions and anti-theses. My practice with respect to developing my understanding of the 'other' and the 'we' is supported by perpetual and reciprocated guesswork:

I believe, you do, I learn, or;

you believe, I do, you learn.

My understanding of the 'we' forming as beliefs or theses are either validated or contradicted by praxes; multiple opportunities to learn. But, will this mean that the validation/evidencing of my taxonomy is rooted inside my practice? Perhaps it does.

I listen to others describing how it feels when our pedagogy/andragogy is located in one of my nine contextual regions. I have identified the beliefs and praxes of others in relation to the framework drawn in Figure 2. And although I have incorporated insights from the literature, my analysis of those texts was, at least in part, value-based and rooted in my narrative. Primarily, then, my evolving understanding *has* been derived from a values-based explanation for my educational influences.

I will now map praxes onto the conceptual framework in Figure 2 in order to imagine ways of overcoming my problems.

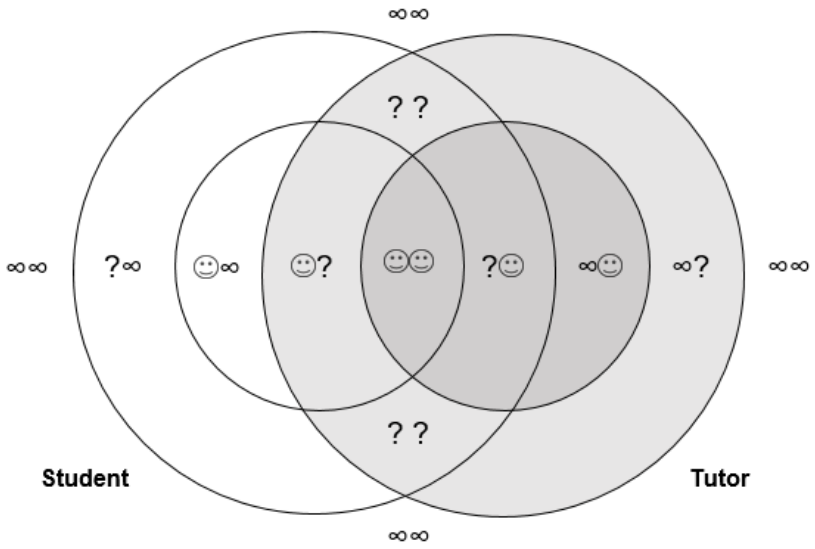

Figure 2. A Conceptual Framework: Nine contextual regions of knowhow in others and myself

Praxis: 'Should not the + be a -?' (Anonymous student, April 2014)

Sometimes it seems like best practice to show a student how to work out a problem, an action I believe can be consistent with *growth* and *comfort*. This would involve me taking the lead and demonstrating each stage of the process on paper, and at each stage seeking the student's acknowledgement that they understand and agree. My belief or thesis at the start of this process (shaded in green) is that the student is stuck and *I know I know* (Figure 3).

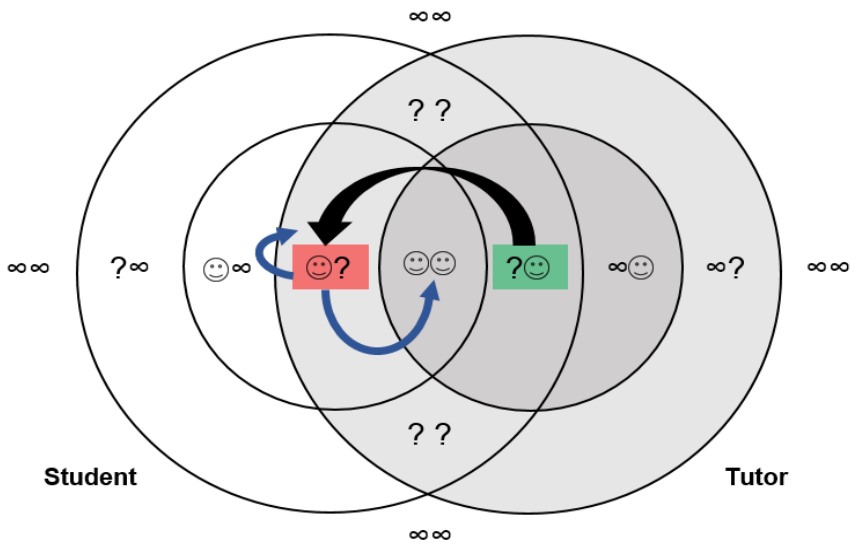

Figure 3. Praxis Map for 'Should not the + be a -?'

Everyone makes mistakes, and I do tend to mix up my signs sometimes; so a comment from the student (praxis represented by the black arrow) like 'should not the + be a –?' would not come as a surprise to me. However, it would nevertheless establish an anti-thesis (shaded in red) to my thesis that is a reflection in the vertical axis, a mirrored response. The student's praxis sort of turned the tables on me, and woke me up!

The question is now how should I reply. Which praxes would led on to a thesis that would make me experience a living contradiction, and which ones would not? Let us imagine solutions to my problem and test it out.

Praxis made-up to help me to imagine solutions: toy praxes: the blue arrows

My toy praxis 'no sorry, please explain?' just confirms the student's anti-thesis: 'student knows and I am stuck', and could facilitate *comfort* and *growth*, so no living contradiction there. My toy praxis 'oh yes, thank you!' may establish ☺☺ a symmetrical anti-thesis: reminiscent of 'I am OK – You're OK' (Harris, 1967). The student would have *built up* my knowledge; in the spirit of a collaboration, a 'learning alongside each other', and perhaps facilitating *comfort*.

There are nine potential toy praxes in total (Figure 3 and Table 1). I have completed and shaded the two rows in Table 1 that correspond to the discussion above. Labelling toy praxes is personal, so opinions may differ. Consider how you would label and describe your values-based explanations for each of the remaining seven possible toy praxes (Table 1). I have suggested some labels and values-based explanations, but you may consider this differently.

Praxis: 'What, that cannot be right!' (Anonymous student, October 2014)

I say that maths is my subject, which seems to give me a personal identity, and (tongue in cheek) ownership of a subject area! Calling myself a maths tutor seems to promote the conventional subject specialist - student dynamic; allowing me to take the cognitive initiative. For example, I may ask students, 'what would you like to learn about today?' Perhaps they will derive comfort from this. Perhaps it would annoy them. They may bring me a list of questions – things they have an *I am stuck* or *that is remote* feeling about. Or they may secretly plot to usurp my dominance.

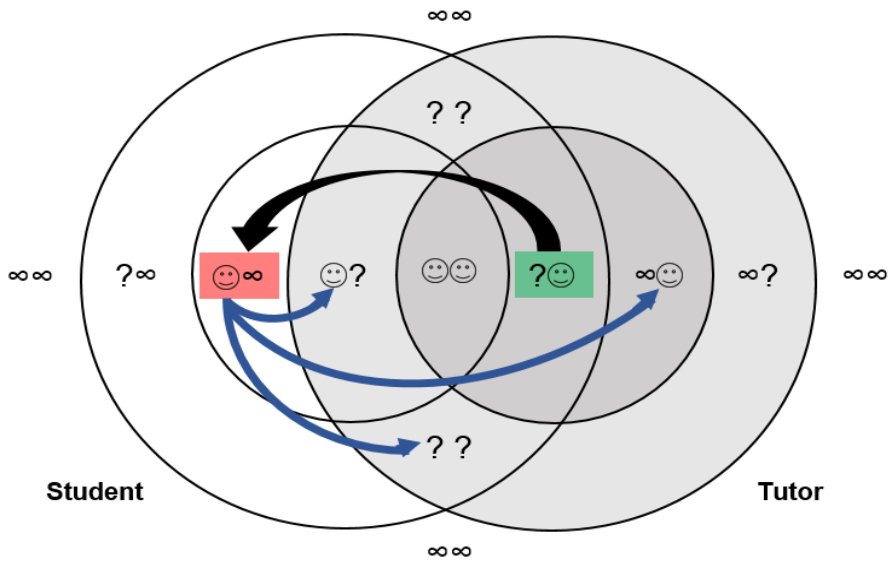

Figure 4. Praxis Map for 'What, that cannot be right!'

My thesis at the start of this process is that the student is *I am stuck* and *I know I know* (Figure 4), a thesis that defines my role as a maths tutor, in my opinion; at least until an anti-thesis has been established.

Table 1. *Praxis made-up to help me to imagine solutions to* 'Should not the + be a -?'

Anti-Thesis	Toy praxis (my personal label)	Toy thesis	My values-based explanation (consistent with or contrary to)
☺ ?		? ∞	
	I have no idea what you mean	☺ ∞	Contrary to comfort
	'No sorry, please explain?'	☺ ?	Consistent with growth
	'Oh yes, thank you!'	☺☺	Consistent with comfort
		? ☺	
	You have no idea what I mean	∞ ☺	Contrary to comfort
		∞ ?	
	It is an open question- who knows?	∞ ∞	
	Oh dear, I think we are both stuck here	? ?	

So a student saying 'what, that cannot be right!' proposes an alternative thesis which has the potential to be a 'red-face' moment for me. It says that the student knows something, which I would feel is remote, a paradigm shift, and a sort of mini-revolution. If I know that the student's claim is unfounded then I have the opportunity give a 'knee-jerk' reflection response: 'NO I am right! You have forgotten that ….' proposing the anti-thesis ∞☺ that no actually this tutor knows something that is remote to you (Figure 4). But, this reflective response seems invasive because it exposes the student to a direct counter-example all of a sudden. Pip suggested that this *'*could also be seen as a put-down to the student'*,* causing the student *discomfort, which I realise,* would matter to me. Pip commented 'is it more important that the student is free to express him/herself, or that your ego *is maintained* intact?' Perhaps I would be claiming to be facilitating student learning in a way that is *comfortable* to them, when really my toy praxis would be contrary to both *growth* and *comfort* because it would make them feel put down.

Could I improve my practice here by saying, 'no sorry, please explain?' which is less 'all of a sudden'? This is still a reflective response☺? but this time, it is a reflection of the original thesis (Figure 4). I like this more because it invites the student to *grow* by confirming the student's cognitive authority.

Alternatively, I could grasp the opportunity to make the student my cognitive equal, by saying 'I know it is wrong, and I am really trying to work it out, guess you are too?' Hopefully the student would not interpret this as sarcasm; and accept my offer for us to collaborate ??.

Again there are nine potential toy praxes in total (Figure 4). Consider how you would label and describe your values-based explanations for each of the remaining 6. Perhaps make your own version of Table1 above.

'I could not have done it without you! (Anonymous student, June 2015)

Taking the role of an academic supervisor and supporting a student working on their final year undergraduate dissertation is a privilege. It can be an opportunity to oversee some very interesting work as a subject specialist, a privilege because the student does the 'donkey work'!

At the end of a supervision a comment like 'I could not have done it without you!' (praxis shown by the black arrow in Figure 5) may be offered, in a social context, as a 'thank you'. In heuristic terms 'I could not have done it without you' perhaps implies that, throughout our time working together, the student considered that it was only me who knew what to do, but now they have graduated and done *'it'*; ☺☺ achieving equal know-how status to me! I will now label, discuss and give my values-based explanation for each of the nine toy praxes (the blue arrows in Figure 5) I associate with 'I could not have done it without you!'

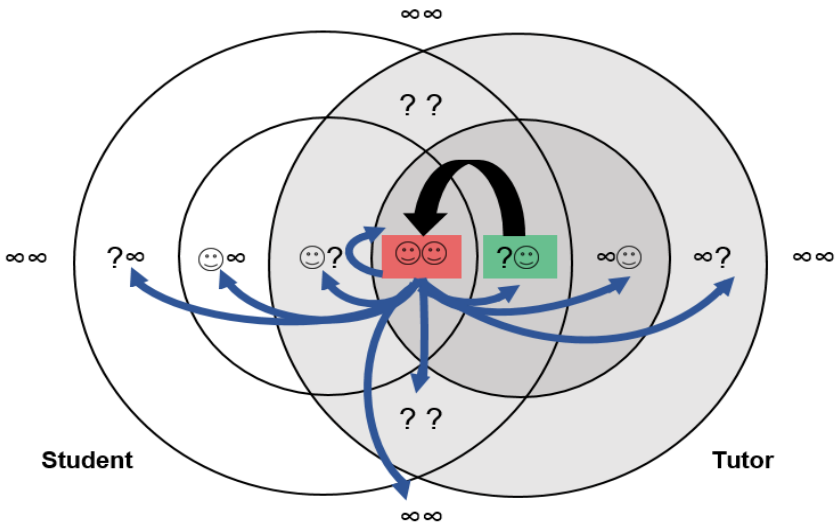

Figure 5. Praxis Map for 'I could not have done it without you!'

Recurrent toy praxis

My toy praxis 'yes' would just confirm the student's anti-thesis: ☺☺, an acknowledgement that the student has joined the elite heuristic class of *I knows I know*ers. This may be *comfortable*, but it is contrary to *growth* (there would be nothing more to learn if we stay here) and contrary to *humour* (there would also be no more surprises!)

Toy praxis to the left: show me more

Could I support the student's further growth here by saying, 'will you help me now because it is me who is stuck?!' ☺? This would be a reflection of my original thesis (Figure 5). It is challenging or prompting the student to show me more.

Saying 'what are you going to do next – I am asking you this because I feel it is remote' ☺∞ underlines the notion that the student's agency is now stronger than mine. Again this is prompting the student to show me more. Perhaps using the word 'do' in this toy praxis might suggest that whatever the student does will be problem-free – an unrealistic message contrary to my value integrity.

Toy praxis to the left: a *precipitous flash!*

Alternatively; asking 'what are you going to work on next – I am asking you this because I feel it is remote?' ? ∞, is different. It acknowledges that the student will struggle '?'. I will call this a *precipitous flash*, because in this praxis both levels of know-how change. It may be more heuristically supportive than ☺∞ and consistent with my value integrity.

Toy praxis to the right: trust me

If a working relationship with the student is to continue, perhaps if I were to become their Ph.D. supervisor, then how could I improve my practice here? Saying 'you are always welcome to ask me for help again' ? ☺ , regresses to the original thesis (Figure 5) and is contrary to my value growth. It suggests I am asking the student to trust me again, but should not I be acknowledging that the student has moved on and that they are a postgraduate now? Some people may advise against staying at the same university department to study for your doctorate (as I did) because some staff will always see you as an undergraduate (Hopwood, 2010).

Alternatively, saying things like 'ok, would you like me to show you what you could do next?' ∞☺ is saying trust me completely, stripping the student of all agency. It is contrary to *growth*, *integrity* and *perseverance*. Perhaps external pressures, fear of failure, restrictions on time and the need to meet deadlines set by funding bodies may facilitate this disagreeable praxis in real life.

Toy praxis to the right: a *precipitous flash!*

Saying, 'would you like me to try to work out something for you to try?' I am asking you this because I know you feel it is remote?' ∞ ? (Figure 5) is different. It acknowledges that I will struggle. In this praxis both levels of know-how change (it is a *precipitous flash*) but it may be more heuristically supportive than ∞☺, as it relinquishes some of my cognitive control, consistent with my values *growth* and *integrity*.

Collaboration

A proposal (Figure 5), to collaborate when stuck, asking: 'are you free to work with me on this problem here – we need each other' ??; would imply a cognitive (and social) equality that aligns with my values *comfort*, *elegance*, *growth* and perhaps *integrity* as well.

A proposal (Figure 5), to collaborate when *that is remote*, calling over: 'hey, see what is not happening here! I guess you feel that way too' ∞∞; would again imply a cognitive equality, a shared disability, a working in partnership that may involve a reflecting apart before being able to reflect together again. A praxis that aligns with my values *growth* and *perseverance*.

How do I improve this process of education here?

At the macro level, appreciating and responding to student expectations is a duty of higher education institutions (Miller, Bender, and Schuh, 2005); but at the micro one-to-one tuition level, managing expectations is literally 'make or break'. The student sitting next to you is your entire student population at that time!

Table 2. Student learning interaction menu

Student Learning Interaction Menu

See me build it up
See me knock it down

Observe just how painful it can be for me to learn!
It is not always an easy ride…
So, just remember this when you feel like quitting.
~
Follow me
Trust me

I think I know what you need to learn,
I will be your teacher
One lesson at a time.
~
Into my unknown
Into your unknown

This interaction involves:
me helping you understand something that I never will
…. and then help you to find out even more than that!!
~
Show me
Show me more

Puts you in the driving seat
…. I am just here for the ride!
You teach, I learn
~
Let us build it up
Let us knock it down

We would be partners, in it together
…. through the good times and bad
~
Precipitous flashes!
(None of the above)

Choose this if you just want to experiment
~

Managing expectations

If I could only find out which type of tuition a student is expecting, and deliver it, then would that make them more *comfortable* and more likely to *grow*? If I could communicate alternative tuition styles to students, then would this enable us to negotiate sessions more overtly, avoiding silent disenchantments? Could I then achieve a greater alignment between my educational influences and my values, facilitating improved student and tutor metacognition? If any of this could be achieved, then possibly I would have made a difference to the process of education here, by helping to manage students' expectations.

Tomato soup and rice pudding

However, providing choices – a menu – requires categories or taxonomy for otherwise, how would we ever know the difference between tomato soup and rice pudding?

The reader will have noticed, and now become familiar with, my use of some special phrases: '*building up'*, '*knocking down'*, '*into my unknown'*, '*into your unknown'*, '*show me more*' etc. These living concepts, based on my journey as a tutor, will now form the building blocks of a visual taxonomy of learning interactions shown by Figures 6 - 10, and summarised by Figure 11 and the 'menu' in Table 2.

These Images show five cycles of heuristic, each with a *building up* and *knocking down* phase: visual aids that I have constructed to help me to imagine ways of understanding and overcoming my problems.

Scholarship

More on 'building up', and 'knocking down'

Constructing, or *building up*, and deconstructing, or *knocking down*, are known in the fields of psychotherapeutic discourse, (Parker, 1998) and Social Constructivism, (Stetsenko and Arievitch, 1997); and, of course, constructivism is well known in psychology and learning theory with its origins in the work of Jean Piaget and Lev Vygotsky. However, the meaning of the special phrases: *building up*, *knocking down*, used here is derived from their usage in my living narrative.

The word 'taxonomy'

I consider the word 'taxonomy' to be of interest in this paper due to its biological and scientific undertones; for as biologists traditionally benefit from the classification of plants and animals, then I feel that so should I, as a learning support tutor, gain understanding from creating and using a taxonomy of learning interactions.

Of course, the word taxonomy is not new to the field of education. Taxonomies of educational objectives, (Bloom *et al*., 1956) and of learning outcomes, (Gagne, 1968) are well known, but these taxonomies are based on experimental (as opposed to living education theoretic) studies in learning. Is setting out to establish a taxonomy, reminiscent of the

hegemony of the disciplines approach of education (Allender and Allender 2008) and perhaps something which a Living Theorist should not do?

Wait, what is <u>really</u> important here?

Somehow I feel myself drawn into this convention, perhaps due to my own schooling and maths/science background. Perhaps I am seeking reassurance that the Living Theory approach I have adopted is 'fit for purpose', a respected methodology. Perhaps I am thinking; my paper must be good if it produces graphs, models and tables that look as if they have been taken from a scientific journal. Will this knowledge here ever be' legitimated by universities' (Whitehead & Huxtable, 2014, p. 2) and does that matter? If the images in this paper were hand-drawn by me rather than digitally produced then would that make a difference? Surely it is the validity of the knowledge proposed, (Whitehead and Foster, 1984), that is important here, not the means by which it came about?

Application to confidence, locus of control and motivation

The focus of this work so far has been on heuristic, but I believe other domains may be just as relevant in some situations, for example, over and under confidence, (Moore and Healy, 2008), the locus of control construct, (Rotter, 1966; Lefcourt, 2014) and intrinsic and extrinsic motivation, (Ryan and Deci, 2000).

Modeling these domains could involve, for example, rephrasing 'levels of know-how in myself' to become 'levels of confidence in myself', 'levels of control in myself' and 'levels of motivation in myself' respectively; and redefining the states, ☺,? and ∞ using the phrases in (Table 3).

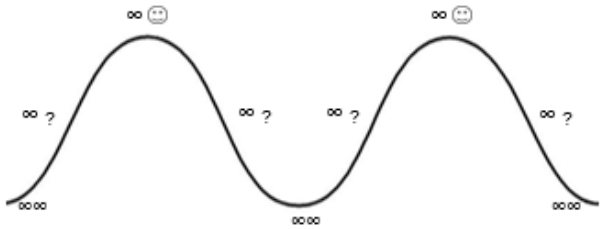

Figure 6. Cycle 1: See me build it up/see me knock it down

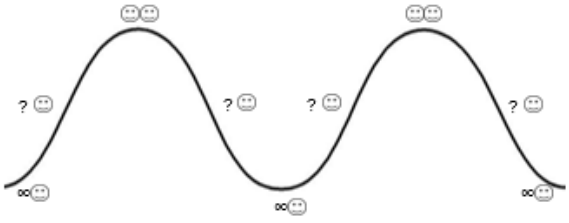

Figure 7. Cycle 2: Follow me/trust me

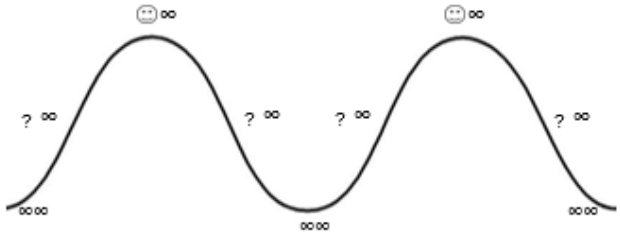

Figure 8. Cycle 3**:** Into my unknown/into your unknown

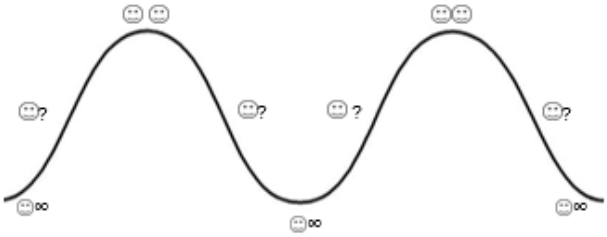

Figure 9. *Cycle 4: Show* me/show *me more*

Figure 10. Cycle 5: *Let us build it up/let us knock it down*

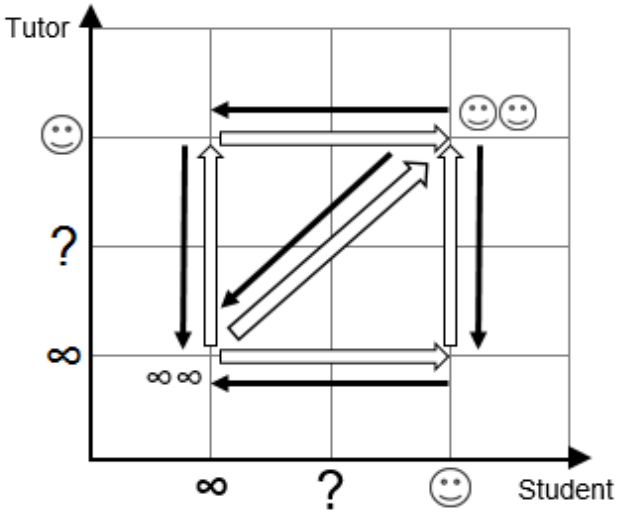

Figure 11. A five-cycle living taxonomy of learning interactions

‘Building up’ moving towards shared .
‘Knocking down’ moving towards shared ∞∞.

Table 3. Levels of confidence, locus of control and motivation

Symbol	Confidence	Locus of control	Motivation
☺	*I can do it* *(internal confidence)*	*All because of me* *(internal locus)*	*I am curious* *(internal motivation to learn)*
?	*I will try*	*Share the praise, share the blame*	*Persuade me*
∞	*I am great!* *(unmerited confidence)*	*Was not me!* *(external locus)*	*Only if* *(actions conditional on a rewards)*

Building up and knocking down in other domains

Moving to another domain would then automatically raise questions. For example, *building up* and *knocking down* in heuristic is familiar now, but what does this *look like* in confidence, control and motivation? What would the interpretation of, for example, Cycle 1: *See me build it up/see me knock it down* be in confidence?

I will now consider a potential application of my living-theory in each of the domains, confidence, locus of control and motivation, in an educational context.

Confidence

Gender-linked confidence of teenagers has been identified as a potential influence on math's attainment (Hart, 1989) so using my living-theory to examine learning interactions around confidence could be of interest.

Locus of control

Students who have been diagnosed, or over-diagnosed, with dyslexia may blame their 'dyslexia' for the growing pains they encounter when *knocking down* in heuristic (Macdonald, 2010). So, using my living-theory to examine praxes around locus of control could be of interest in this situation.

Motivation

Using my living-theory to design praxes around motivation could be of relevance to the learning support of children entering secondary school, students working at home, or anyone expected to be able to work independently for any length of time (Stroet, Opdenakker*, and* Minnaert, 2015).

Wider Contexts

Studying confidence, locus of control and motivation in contexts outside of education may also be of interest. For example, using the framework to map, and discuss, praxes around confidence in the work place, (Baillien, Neyens, Witte and Cuyper , 2009), locus of control in aging (Lachman, 1986), and the motivation of patients receiving physiotherapy (Middleton, 2004) may be useful.

My commitment to explore future possibilities

Validity

My hope for the future would be to test the validity of my taxonomy in relation to explanations of my educational influence. I believe that trying to apply my living-theory in a range of settings, and being ready to modify it if the fit is disappointing, would enable me to work towards this goal.

Dorothy Heathcote's Mantle of the Expert

Some of the five cycles of heuristic described in this paper seem to resemble familiar learning scenarios, for example, could I successfully convince you that *show me/show me more* (Cycle 4) is equivalent to the living educational theory Mantle of the Expert Approach, (Heathcote and Bolton, 1995)? Further, how close are *follow me/trust me* (Cycle 2) and *let us build it up/let us knock it down* (Cycle 5) to traditional classroom-teaching and project-based learning, respectively? I feel I need more time to observe and learn.

Discourse analysis

There is a possibility that the framework (Figure 2) proposed in this paper may serve as a tool to complement established discourse analysis methodology; that is, to provide an alternative means of classifying praxes. Learning interaction data could reveal combinations of, or sections of, the cyclic patterns noted here, or sequences of *precipitous flashes*. I would like to know whether information of this type would be valued by researchers.

Power dynamic implicit in the learning relationship

Learning interactions may occur between any pair of individuals; perhaps the 'tutor' and 'student' label being arbitrary and transient in some situations. My baseline assumption would be that a social equality implies that patterns of interactions are *elegant* and symmetrical. Perhaps then the framework (Figure 2) would uncover traces of 'implicit authority that is unacknowledged' in the one-to-one dynamic, (Scholes-Rhodes, 2015).

Scope

Further, I would find it interesting to widen the scope of this work to include a discussion of perhaps non-traditional learning relationships, for example, interactions between family members, medical practitioners and their patients, politicians, colleagues or, in fact, any two individuals in our community. Further still, is there a learning relationship between people and things, for example, between a reader and the written word (a paper's ability to communicate) or a geometric puzzle (finding an exit route out of a multi-story car park!)? Is it possible for a learning interaction to occur between an individual and a power or tradition, for example a law or the British custom of queuing? Is this pushing the scope of my living-theory just too far?

Autism support

In particular, I would like to explore the possibility that this visual theoretical framework could support autistic children and adults, who may find their social environment volatile and perplexing, (Baron-Cohen, Leslie and Frith, 1985). Could my living-theory offer some Theory of Mind in which 'selves can only exist in definite relationships to other selves' (Mead, 1934, p. 63). Could the construction of an identity, i.e. the way someone understands themselves and is understood by others (Bagatell, 2007) be supported here, by playing an 'if-you-map-your-praxis-visually-here-then-I-will-map-my-praxis-visually-here-as-well' interactive mind game?

Student engagement

I would like to apply my living-theory to gain a greater understanding of student engagement (Kahn, 2014; Kuh, 2003) in the context of the application to spiral curricula (Brennan, 1985) and input and output (Black and William, 1998). Praxes between the two contextual regions ? ☺ and ☺☺ seem particularly relevant. I have named this union of two regions my '*Region of Engagement*'. I am very aware of its manifestation in my practice, and would like to understand it more.

Expert behaviour

Peter, following the work of Dreyfus and Dreyfus, (Dreyfus & Dreyfus, 1981) comments that, 'describing competence is fairly straightforward in terms of behavioural outcomes and is the current fetish of managerialism' (Mellett, 2015). However, 'carrying out a similar analysis to describe the behaviour of an expert is much more problematic' (ibid., 2015). He suggests that my living-theory is a system that attempts to describe this expert behaviour, and I believe that discussing, and investigating, this claim could lead to a fresh understanding of the quality of teaching and learning.

Exploring negative feedback

An opportunity arises to explain my educational influence in my learning, and in the learning of my students; when students give negative feedback. I then need to understand, not feel threatened! Putting my living-theory to work could help me to do this. For example

the student praxis, 'I have to correct him and explain things to him when it should really be the other way round' (anonymous student, March 2015) establishes the anti-thesis? ∞, that is, the student is stuck and I feel *that is remote*. Mapping toy praxes onto the framework in Figure 2 could help me to understand.

External influences

I would like to study the influence of a third individual or outside influence in the one-to-one session, for example, a parent, teacher, manager, syllabus, curriculum, diagnosis or social convention. I believe that this could be achieved using triplets rather than pairs, of levels in each of the domains. For example, the thesis ? ☺ ∞ : could represent one of 27 (3 x 3 x 3) contextual regions of locus of control (Table 3): *share the praise share the blame* for the student, me believing it is *all because of me,* and the parent having an external locus of control. Praxis from all three parties would then influence the learning.

Five - cycle radar charts

A future possibility would be to assume a learning analytic, or educational data mining, approach and develop questionnaires to determine which of the five learning cycles is closest, second closest etc., to the way a student is expecting to engage with learning at a given time. This could lead to the construction of radar charts (Figure 12), which may open discussions on curriculum design, online and classroom practice, and the optimization of learning and the learning environment.

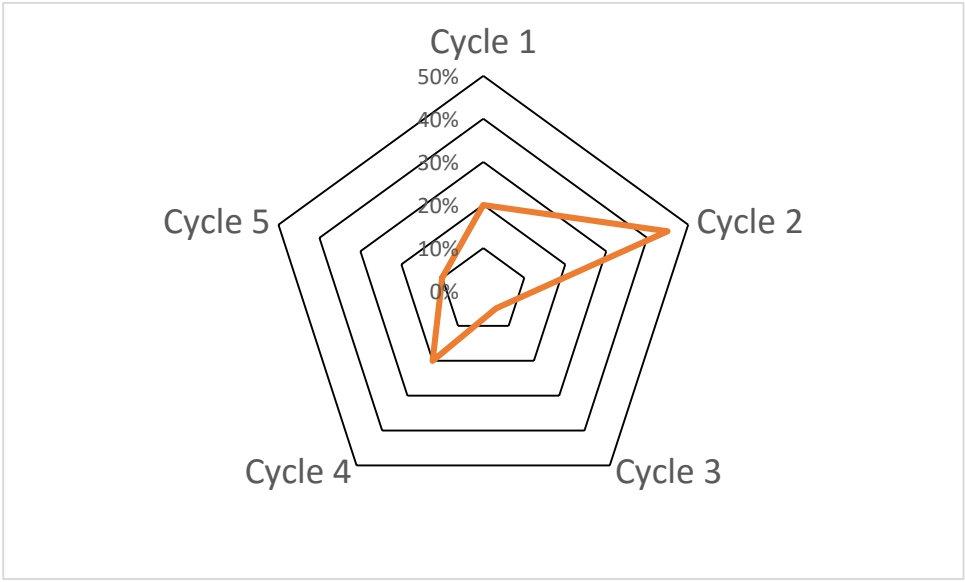

Figure 12. Five-cycle radar chart. Hypothetical student scores: percentage preference assigned to each learning cycle suggesting a preference for Cycle 2 (45%) with Cycle 1 (20%) and Cycle 4 (20%) in joint second place.

The implementation of quantitative tools, for example, the Effective Lifelong Learning Inventory (E.L.L.I.) (Deakin Crick, Broadfoot, and Claxton, 2004; Deakin-Crick and Yu, 2008) resembles this future possibility. However, an important difference here is that E.L.L.I. is based on statistical results collated, '…. over successive factor analytic studies, allowing the identification of seven dimensions of learning power and reliable scales to assess these' (Deakin Crick *et al*. , 2004, p. 247), while the underlying theoretical framework and taxonomy underpinning the questionnaire suggested here, is a living educational theory.

Wow ….∞…that is remote!

I would also like to explore further the use of the *that is remote* level of heuristic, ∞; because I believe it is associated with extremes and praxes that surprise, trick, cause laughter and even offence! Praxes from me such as, 'sorry I have not read the question' (anti-thesis: ?∞) may be interpreted as a trick, using the power of *that is remote*, on the student to support *growth*. However, I have witnessed students experience high levels of anxiety when they feel *that is remote*. I have also seen how fascinated a person can be when they are made aware of the idea that out there exists knowledge *that is remote*. In this situation people are not crying for help, but rather are giving out an awe and wonder response to a magical realisation. I would like to explore ∞ in heuristic and also in confidence, locus of control and motivation, because I suspect that this could give more insight into learning.

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