

*Discussant contribution to the Symposium 'Metalearning in higher education: taking account of the student perspective', European Association for Research on Learning and Instruction, 10<sup>th</sup> Biennial conference, Padova, Italy, August 2003*

## **Exploring the Concept of Metalearning**

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### **Purpose**

The purpose of this symposium is to bring together research work that is currently being undertaken with students from a variety of disciplines and levels of study in the UK, Australia and Finland, aimed at encouraging greater awareness and understanding of themselves as learners and the requirements of higher education. In doing so we are opening up our own practice as professional educators to the same thinking that we are applying to students' learning: a major challenge in a professional field where the norm is not to talk about one's own learning!

The contributors to the symposium are all practitioner teachers engaged in the scholarship and research of teaching and learning in their own disciplinary fields and institutional contexts. All five papers in the symposium are concerned with the idea of metalearning which is the focus for this essay.

The symposium provides us (and particularly me in my role as discussant) with opportunity, reason and motivation to 'learn about metalearning'. The symposium research papers provide important insights into the perceptions of students about their learning and the impacts of teaching and instructional strategies that aim to develop the habits of metalearning. I have attempted to use my own process for learning about metalearning as a vehicle for building knowledge about the concept of metalearning. I am greatly indebted to everyone who has helped me learn (see acknowledgements).

### **A formative experience**

The idea of metalearning is rooted in personal contexts and experiences of learning and the perceptions and beliefs we grow about learning through our day to day engagements with it. So I will begin my attempt to understand the concept through a relevant and recent personal experience.

In July 2003 I was involved in a team-based study visit to the American Association of Higher Education Summer Academy. The Summer Academy is a team-based experience for professional and organisational learning. Over five days, institutional teams engage in discussion and planning interspersed with a programme of activities

that is designed to help people develop a better understanding of large scale complex change. The process is focused on the problem of *how to change* in order to improve students learning or their experience of learning or aspects of institutional practice that will help the institution understand itself better. At the end of the five days my colleagues all agreed that they had encountered a rich and highly motivating experience for learning. They also recognised through the report we had prepared along the way, that we had learnt a lot. It therefore came as a surprise to discover that we found it very difficult to articulate what we had learnt as individuals and how we had learnt it. For example, when invited to say how they had changed as a result of this rich experience, team members were reluctant to admit to any change. This is very disturbing and it is not the sort of response we would expect from students if we had engaged them in five days of intensive rich experiential learning. We realised that we lacked the language to talk about our learning and the confidence and ability to do so. We realised that every team would face this problem.

But we did not give up because we felt that we were on the threshold of important new learning as a result of recognising this deficiency. We created a *framework for sharing what we had learnt* (a series of questions and propositions that could be tested) and tried to engage in reflective conversations via email. But again this proved not to be a simple matter and the results were not entirely satisfactory. So we then constructed one to one conversations and eventually we have managed to explore this complex territory in a way that has enabled to understand a bit more the problems of helping education professionals to understand their own learning.

Connecting back to the symposium, it seemed to me that what RoLI and all the other techniques and strategies that seek to develop more reflective approaches to evaluating and understanding our own learning are trying to do, is to create the language, skills, capabilities, habits and cultures to overcome this difficulty.

### **Is metalearning a valid and useful concept?**

We create concepts to help us explain phenomenon and the relationships between phenomenon and make better sense of the world and to be able to enable us to communicate our understandings to others. My central research question '**is metalearning a valid and useful concept?**' provided my starting point for enquiry. But questions of validity and utility are not simple to answer. We all create concepts that we find useful but others would not and we all create concepts without any scientific evidence of their validity.

In developing this paper I tested emergent ideas and drafts of the paper with the symposium members and a number of knowledgeable peers. I received this guidance from Professor Barry Zimmerman whose empirical research and conceptual thinking about self-regulated learning are highly pertinent to this discussion.

*Extracts from an email dated 13/08/03*

'Dear Norman:

I read your [draft] paper with interest. Your list of terms in Table 1 illustrates a major problem in the psychological literature, which is a plethora of constructs that conceptually overlap. Unfortunately, they often convey the impression to the uninitiated

that underlying phenomena has no discernable boundaries. Psychological constructs are useful if they can be operationally defined and studied. This allows alternative constructs, such as self-efficacy and self-concept, to be compared empirically in terms of their prediction of various outcomes. ...Al Bandura has humorously labeled the penchant of some theorists to create multiple levels of cognition (often depicted as feedback loops embedded within other feedback loops) as “boxology.” Al even resists using the word “knowledge” and prefers instead the word “skill” because he wants to understand the relationship between cognition and performance rather than cataloging levels of passive understanding that are not physically expressed. **I would recommend that new terms be subjected to the criterion of whether there is a scientific basis for concluding that they represent a new construct (different from existing ones).** Questions, such as can the construct be operationally defined? and does it have predictive and explanatory power that other constructs cannot demonstrate? need to be addressed.....’

It would be foolish not to heed this advice, but in order to achieve the level of conceptual clarity required of a psychology construct we need to examine the idea without prejudice through multiple and sometimes ambiguous and conflicting perspectives. This is my understanding of working with complexity (Stacey 2000): working in ways that embrace both scientific (Mode 1) and transdisciplinary (Mode 2) ways of producing knowledge (Gibbons et al 1994).

### **So what is metalearning?**

John Biggs (1985) is credited with creating and defining the concept of metalearning. His conception is framed around the idea of ‘being aware of and taking control of one’s own learning.’ Implicit within this conception are the ideas that:

- people need to have knowledge of how they learn
- they have the motivation to be proactive in managing themselves in this way
- they have the capacity to be able to regulate their learning

This expression of the conception has similarities with the concept of ‘managing own learning.’ It implies that metalearning is a complex mixture of

- Knowledge products - knowledge of learning / own learning and how self learns
- Attitudes - I am going to do it
- Capacities and skills - to think and act on thinking in this way
- Processes – for doing it

But while I am familiar with John Biggs’ conception of metalearning it is not a term I myself use and in the context of the symposium it seemed appropriate to examine the idea further.

Because of other priorities I did not begin to address the task of preparing for the symposium until a few weeks before. This created a sense of urgency (a need to learn quickly): a deliberate motivational strategy perhaps. I then thought about the idea over a few days (a sort of initial immersion in the problem) and through this thinking process I began to construct (it was an emergent process) an enquiry-based strategy for learning (*my process for learning about metalearning*). My thinking was focused not on what I knew but on what I needed to do in order to come to know. What came out of this

thinking was a sense of direction – a process through which I could acquire and construct my knowledge from existing explicit knowledge and the tacit understanding of knowledgeable people. I had engaged in this type of open ended, unpredictable process many times before and I was confident that it would work. I supposed that I was using my metalearning: my personal knowledge of how I learn in this type of situation.

So what did I do? I undertook some basic reading via web-based searches (discovering in the process that there was little written about the topic of metalearning that was easily accessible – a useful motivator for my learning. I read the first two symposium papers I received (discovering that there was little direct reference to the concept of metalearning – a further motivation for my learning because I began to think that trying to explain it was a worthwhile thing to try and do). I also read about what I thought might be related concepts (metacognition and self-regulation) and tried to connect this knowledge to the limited knowledge I had about metalearning. Through this process new possibilities began to emerge. But my task definition was still rather vague and I was really still trying to understand the nature of the problem and how I might engage with it.

In parallel, I developed a help seeking strategy – a *system for learning* which harnessed the intellectual resources of people who I thought might have relevant knowledge and insights and be willing to share it with me. I created a set of questions that I thought I would need to answer, or try to answer, if I was going to learn about metalearning (these grew and changed as I worked with the problem). These questions also revealed my assumptions about the problem called ‘what is metalearning’? I tried to engage people using very simple open-ended questions and then responding in a conversational way to develop the discussion in ways that would be meaningful to that person. I worked in both a deliberate and opportunistic way. Through the process of email conversations and sharing bits of knowledge I began to develop relationships with people I had never met.

I connected my existing knowledge to the new knowledge that was emerging then tried to make sense of this knowledge by ordering and connecting it in a series of concept maps. I engaged in writing as a way of consolidating and reflecting on what I thought I had learnt. By sharing the products of my thinking in a fairly chaotic but entirely intentional way I tested my perceptions and from the feedback I received I gradually began to gain confidence in what I was producing. Eventually, I shared my paper with all the people who had been involved in the process and gained further feedback prior to the symposium discussion. This process is summarised in Figure 1. If metalearning exists then this map must embody my metalearning for this project because this was roughly how I imagined the process by which I would learn and it embodies the actions I undertook to engage with learning. That is my actions and behaviours grew from my thoughts in ways that were more or less consistent with, but not constrained by, the thoughts. I did not know the detail of who would be involved, how they would be involved, what their engagement would be or when they would be involved. But I did imagine the means by which I would progress from a position of not knowing to a state of knowing something within the time available. When I looked at this map at the end of my learning project I had concluded that my metalearning embraced the imagination of how I would learn and also the totality of engagements with learning since knowing how to learn is necessary to regulate all orchestrated actions and behaviours in the learning process.



*learning*. I was conscious that an important part of my learning process was about developing relationships with people who I had never met and acquiring new knowledge about the people who were helping me in the process - this type of relationship knowledge is very important in this type of collaborative learning process. I was conscious of the things that motivated me (like new and interesting ideas, seeing my knowledge grow and getting good feedback from my collaborators) and I avoided the things that detracted me (e.g. other work problems, going shopping etc.). I was conscious that learning was a constructive process (building and connecting knowledge from many sources) and a social process (encouraging others to share their knowledge then sharing my new knowledge and engaging in negotiation as to whether others found it meaningful, valid and useful). I was conscious of the importance of writing (emails, notes, the paper) and producing images (concept maps) as a means of making explicit what I thought I knew and making sense of it. Using these strategies, within a week I moved from a state of dissatisfaction (because of a lack of knowledge and understanding) to a more satisfied state because I could see new knowledge and understanding emerging through the process. I was conscious that my goals were focused on the understanding my process of learning and producing an output from the process.

I did not sit down and think I'm going to use my metalearning to solve this problem. My initial thoughts were *how am I going to engage with this problem* (the problem of being a discussant and making a contribution that others will find useful). The process that emerged over a few days was quite messy. It was grown from many other experiences of working with similar problems in similar contexts: it is learned behaviour, based on personal knowledge of what has worked in the past. I did not draw up a detailed 'battle plan'. Rather I visualised a direction (where I wanted to go) and some strategies for learning. Knowledge of what to do grew through the process of engagement (knowledge grown from action is a rich source of knowledge for metalearning). From this knowledge comes a belief that it is possible to work with the problem in this way and to produce something useful at the end (self-efficacy). New motivations emerged through engagement with the problem e.g. development of new relationships and reinforcing existing relationships, and an understanding of how I might make use of this investment in my other work. These perspectives suggest to me that the use of our own metalearning and the process of thinking about learning / doing it / performing are intimately interwoven. Thinking and action are practically inseparable.

## Perceptions of metalearning

We all infuse words with our own meanings and it seemed appropriate to begin by examining what people understood by the term *meta* (in the senses of higher than and the concepts and results of an academic discipline), *learning* (acquiring knowing). Table 1 includes a list of concepts and propositions that were either volunteered through discussion, are explicit or implicit in the papers contributing to this symposium or were derived from my own perceptions and reflections.<sup>1</sup>

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<sup>1</sup> In preparing for the symposium I was struck by the different ways in which people have tried to explain their perceptions of metalearning. One person used a photograph of a teaching situation, others used a diagram, others told me stories and another provided me with his own worked example.

### **Table 1 Perceptual knowledge about metalearning**

Compiled from email discussions, insights gained from symposium papers and reflections on my own learning.

- A collection of learning methods that people utilise to help them learn
- Higher levels of learning
- Learning about learning
- I see it as learning about learning, reflection.... I prefer the term reflection (but there are different sorts of reflection...)
- Personal knowledge of learning
- Being aware of and taking control of one's own learning
- Changing perceptions of learning
- Knowledge about how other people learn in order to help me learn (selfish or selfless knowledge depending on purpose)
- Metacognition
- Metacognitive skills
- Applied metacognition
- Metacognition in action
- Metalearning embraces more than cognition, it embraces the affective, cognitive, conative and also embodiment... mind, body, emotions/feelings
- Consciousness/awareness of own learning practices and study strategies
- Awareness of own approaches to learning
- Awareness of what works doesn't work
- The advisory function to self about how to learn in a particular situation
- Learning through reflection, reflective skills
- Taking the learning context into account
- Recognising own motivations for learning
- Knowledge of self as a learner in a context
- A sense of identity in the learning process
- A sense of engagement with learning processes
- Regulating own behaviours in order to learn better/more deeply
- Helping people to be more effective learners
- Metalearning as learned behaviour
- A route to further metacognition
- The ability to stand back and see the bigger picture for learning
- The ability to adapt and change approaches to learning as conditions change and new knowledge emerges
- An essential capacity to enable people to change themselves
- Capacity to think about processes for learning
- Imagining possible ways of learning
- Imagining the future
- Ability to connect and use different sorts of knowledge creatively

The list in Table 1 reveals a number of things about the way metalearning is perceived. For example:

- the strong connection of metalearning to metacognition, self awareness, self-identity as a learner and reflection as a process for achieving this self-awareness as a learner;
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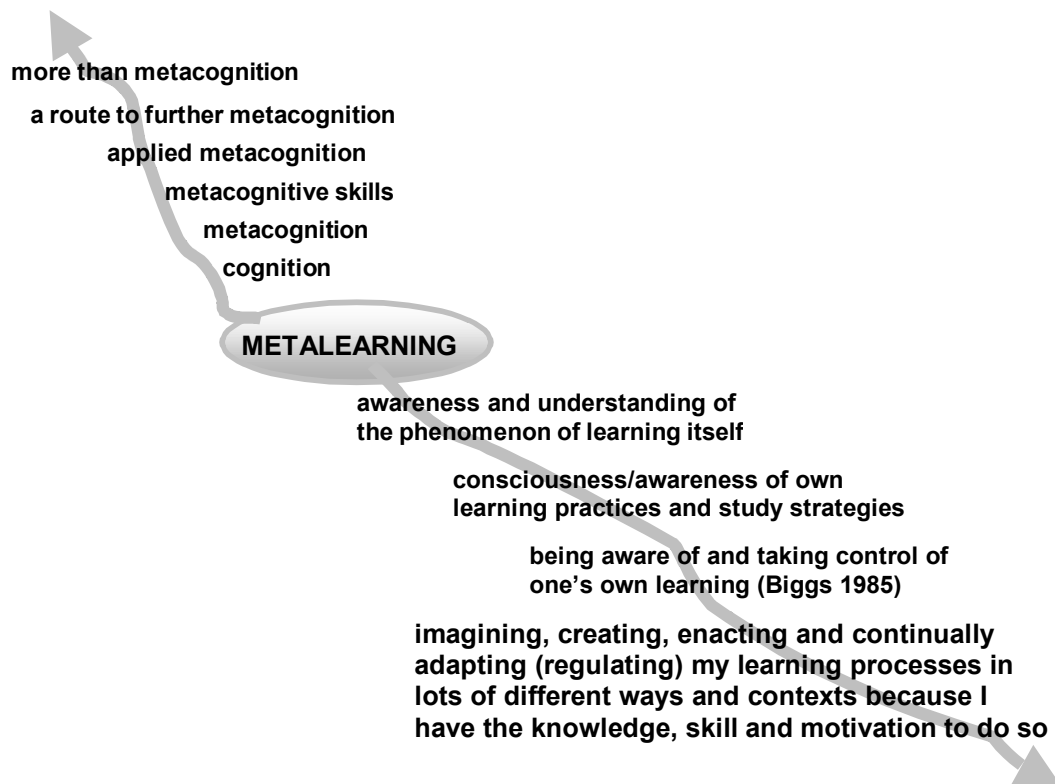
- metalearning as a product (knowledge), a process (a way of thinking to create routes to new learning) an attitude or habit (a way of engaging in learning and life more generally perhaps) and a processes or processes (active regulation of behaviours in ways that will enhance learning);
- a way of growing knowledge about learning by imagining and thinking about the future, the present and the past.

But the list also reveals an important problem that lies at the heart of this enquiry and highlighted in an email from Professor Barry Zimmerman. 'Your list of terms in Table 1 illustrates a major problem in the psychological literature, which is a plethora of constructs that conceptually overlap'.

In exploring the concept of metalearning there is a very real tension between the need (from a psychological perspective) to define the idea as a researchable construct in order to demonstrate scientific validity, while valuing a range of personal views and insights that are unlikely to be accepted by many other people (personal utility). My approach was guided by the belief that we have to explore both of these dimensions.

As an initial step in my sense making I tried to organise the ideas contained in Table 1. Figure 2 illustrates how the ideas of metacognition and knowing about and using learning (the two central ideas in the concept) can be connected in terms of increasing complexity and implication.

**Figure 2 Some of the ways in which key ideas that we associate with metalearning might be connected in an evolutionary sense**



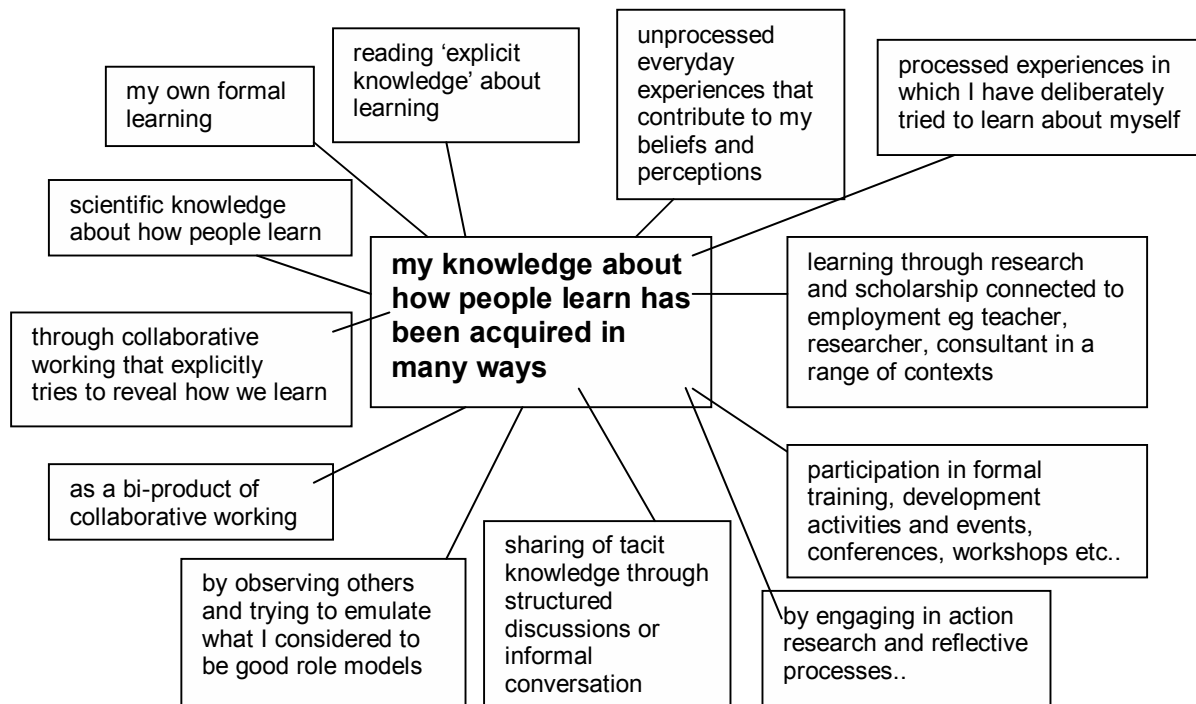
## What is learning?

The question 'what is metalearning?' begs the question 'what is learning?' For the purpose of this discussion I am adopting and slightly modifying the definition of learning provided by Davenport and Prusak (2000) '*a fluid mixture of experience, values, contextualised information and that provides a framework for evaluating and incorporating new experiences and information*' and for imagining new things. I have added the reference to imagination (causing to come into existence) as it seems particularly relevant to the idea of metalearning as a means of viewing and anticipating the future. This conception of learning means that although we may encounter the same experience or be confronted by the same new knowledge the sense we make of it, the value we place on it and our capacity to make use of it, will be unique to each individual. Using this reasoning, metalearning - high level conceptions about learning and how we acquire new learning, must also be unique to each individual.

## How do people learn?

Most of the people who contributed to this discussion on metalearning suggested that it was about understanding how we learn as individuals. It is therefore worth reflecting on how we learn. Our knowledge about learning is constructed everyday of our lives but we rarely think about or discuss the many ways in which we acquire our knowledge about how people learn. I recently did some research for a teaching session on how professional's learn with a group of 15 medical General Practitioners at different stages of their careers and found that between them they used or recognised 44 different strategies to develop their own learning. The main ways I think I have acquired my knowledge about how people learn (primarily in the contexts of higher education teaching, research, educational development and change agency work in higher education) is mapped in Figure 3.

**Figure 3 How I think I have learned about how other people and I learn**



### ***What does science tell us about how people learn?***

Here I am merely looking for an easy research-informed answer that will help us tune in to the problem. In 1999 the US National Research Council published the results of a research synthesis aimed at answering this question. The report <http://books.nap.edu/books/0309065364/html/l.html> identifies three key principles for effective learning.

Principle 1 Students come to the classroom with preconceptions about how the world works. If their initial understanding is not engaged they may fail to grasp the new concepts and information that are taught.

Principle 2 To develop competence in an area of inquiry students must have :

- A) A deep foundation of factual knowledge.
- B) Understand facts and ideas in the context of a conceptual framework.
- C) Organise knowledge in ways that facilitate retrieval and application.

Principle 3 A metacognitive approach to instruction (*presumably self-instruction also*) can help students learn to take control of their own learning by defining learning goals and monitoring progress in achieving them.

While these principles are cast in terms of principles for instruction<sup>2</sup> they can also be interpreted from the learners' perspectives. In particular the ideas that:

- 1) we need to develop the executive function (metacognition) to engage in self-directed learning that is effective (principle 3);
- 2) we need to be able to visualise learning problems and engage our conceptions of these problems in order to ask questions like, what do we need to know? and how are we going to coming to know? (principle 1)
- 3) we need the knowledge to know how to go about developing new factual knowledge, to develop new conceptual frameworks to make sense this knowledge and to be able to consolidate, organise, connect and make future use of this knowledge (principle 2).

If metalearning means anything then it must relate to these fundamental principles about how people learn. In a nutshell, it must be the sort of knowledge that enables individuals to be effective learners. Support for this proposition was provided by one of the researchers in this symposium Sari Lindblom who explained, 'I noticed in my study (using RoLI) that metalearning skills are necessary for successful studying. I noticed that students with the most severe study problems seem to lack metalearning skills. These students need help the most, because they cannot change or develop their study

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<sup>2</sup> Explaining to teachers how students learn in formal educational settings so that they can embed this knowledge in their instructional practices.

strategies and practices on their own. In a previous study I noticed that students whose study orchestrations were diagnosed as clearly dissonant had problems with their study practices and lacked metacognitive skills to evaluate their study practices and the quality of their learning'. Sari's comments also reveal that metalearning provides an essential capacity for people to change (another meaning of meta is change).

### **Metalearning as metacognition**

'Is the whole concept of *meta* not that of "thinking about .....? So metacognition is thinking, to good purpose, about how the processes of cognition work, and in particular, about how they can work for us. Metalearning is thinking about how we ourselves learn, and can learn and develop more effectively'. (John Cowan email discussion 08/08/03).

Flavell (1979) defines metacognition in terms of higher order thinking to actively control the cognitive processes engaged in thinking and acquiring knowing (learning). It involves thinking about thinking and by this logic it must include learning about learning which we associate with the idea of metalearning. By this logic metalearning is a subset of metacognition (I am indebted to Professor John Cowan for his very helpful conversation on this matter).

A concise and useful summary of the concept is provided by Livingstone (1997). Activities such as planning how to approach a given task, monitoring understanding and learning needs and evaluating progress towards completion of the task or modifying the task as additional factors emerge, are metacognitive in nature. Wenden (1998 p34) described 'metacognitive knowledge' as the 'facts learners acquire about their own cognitive processes as they are applied and used to gain knowledge and acquire skills in varied situations'. People consciously or unconsciously use this knowledge to create metacognitive strategies 'strategies about learning rather than learning strategies themselves' (Cook 1993). These strategies include for example:

- ❑ planning – deciding what to do and how to do it (pre-planning) and modifying plans while you are doing it (panning in action)
- ❑ directed attention – deciding in advance to work on the general aspects of a task
- ❑ selective attention – deciding in advance to concentrate on certain things
- ❑ self-monitoring – checking one's performance when engaging in a task
- ❑ self-evaluation – appraising one's own performance in relation to self- or external criteria or standards
- ❑ self-reinforcement – rewarding oneself for success

According to Flavell (1979) metacognition consists of both metacognitive knowledge and metacognitive experiences of regulation. Metacognitive knowledge refers to acquired knowledge about cognitive processes, knowledge that can then be used to control cognitive processes. Knowledge is considered to be metacognitive (rather than cognitive) if it is actively used in a strategic manner to ensure a goal is met. Flavell distinguishes between knowledge of: 1) person variables 2) task variables 3) strategy variables.

*Knowledge of person variables* – refers to knowledge about how human beings learn and process information, as well as individual knowledge of one's own learning processes.

*Knowledge of task variables* – include knowledge about the nature of particular tasks or more generalised knowledge about types of task as well as the processing demands that will be placed upon the individual.

*Knowledge about strategy* – variables include knowledge both cognitive and metacognitive strategies, as well as conditional (contextual knowledge) about when and where it is appropriate to use such strategies. The basic metacognitive strategies are:

- connecting new information to existing (personal) knowledge
- selecting thinking strategies intentionally
- planning, monitoring and evaluating thinking processes (Dirkes 1985, quoted by Blakey and Spence 1990).

**Flavell's description seems to embed the idea of metalearning fairly and squarely in metacognition: that part of metacognition that is devoted to the act of learning.**

But Ursula Lucas takes the view that, 'Metalearning is not the same as metacognition.... Metalearning embraces more than cognition, it embraces the affective, cognitive, connative and also embodiment...mind, body, emotions/feelings.'

We conclude with a cautionary note from Professor Barry Zimmerman (extract from an email 13/08/03)

'One of my main concerns is that the behavioral side of human functioning often gets lost in models with multiple levels of cognition. Metacognition despite its attractiveness as an idea has been difficult to measure. For example, I am not aware of a firm body of evidence showing that metacognitive measures can be separated reliably from cognitive measures. Thus, theories are constructed wherein one level of mental functioning is linked to other levels with no clear way to determine if the multiple levels exist physically in a way that teachers can exploit. One of the reasons that social cognitive theory has appealed to me is its triadic nature: person processes are linked to observable behavior and environmental outcomes in an empirically verifiable way.'

This was something that had been niggling me too from the moment I mapped out my strategy (Figure 1) and asked myself the question, 'is metalearning about the vision that orchestrates learning or the thinking required to enable the vision to be realised or both of these things at once?'

### **Self-regulation and metalearning**

John Biggs' definition of metalearning included the idea of 'taking control of one's own learning.' This requires learners to consciously regulate their thinking and behaviours in ways that will achieve desirable outcomes and results. It is therefore important to consider the idea of self-regulation. Schunk and Zimmerman (1994, 1997, 1998) and Zimmerman (2000) and Zimmerman and Sachunk (2003) provide us with a well developed scientific construction to explain the links between thinking, actions and the environment (problem working situations and contexts) within which thinking and action occurs.

Social cognitive researchers describe self-regulated learning in terms of self-determined processes and associated self-beliefs that initiate, change and sustain learning in specific contexts. These processes and beliefs are linked to three fundamental questions about students self-regulated approach to learning (Zimmerman 2000 p221).

**How** questions refer to students use of metacognitive processes such as planning, organising, self-instruction, self-monitoring and self-evaluating. **Where** questions pertain to behavioural processes such as selecting, structuring and creating learning environments that optimize growth. **Why** questions refer to processes and beliefs that motivate self-regulated students to learn, such as beliefs about their capabilities to learn, intrinsic interest in the task and satisfaction with their own efforts...High levels of motivation are necessary to self-regulate when short term goals must be subordinated to long term goals and ultimate gratification must be delayed. In summary, self-regulation refers to metacognitive, behavioural and motivational processes and beliefs used to attain personal learning goals in specific contexts.'

The processes and beliefs that underlie self-regulation are constantly adjusted in response to changes in three sources of control: personal, behavioural and environmental. Each of these sources is also changing during learning and each source must be self-monitored and adjusted using feedback mechanisms constructed by the learner (see Zimmerman 2000 p 222). *Behavioural self-regulation* involves self-observing and strategically adjusting motoric processes e.g. the physical responses to a particular situation. *Environmental self-regulation* involves observing and adjusting the environmental conditions or outcomes e.g. removing things that are a distraction. *Covert self-regulation* involves monitoring and adjusting cognitive and affective states such as using imagery to remember or relax. Highly self-regulated people are strategically flexible, environmentally resourceful and perceptive of personal agency. A self-regulated system for learning can be represented as a continuous process (Figure 4) involving forethought - performance- self-reflection operating within a context specific environment that is structured by the learner to provide resources for learning.

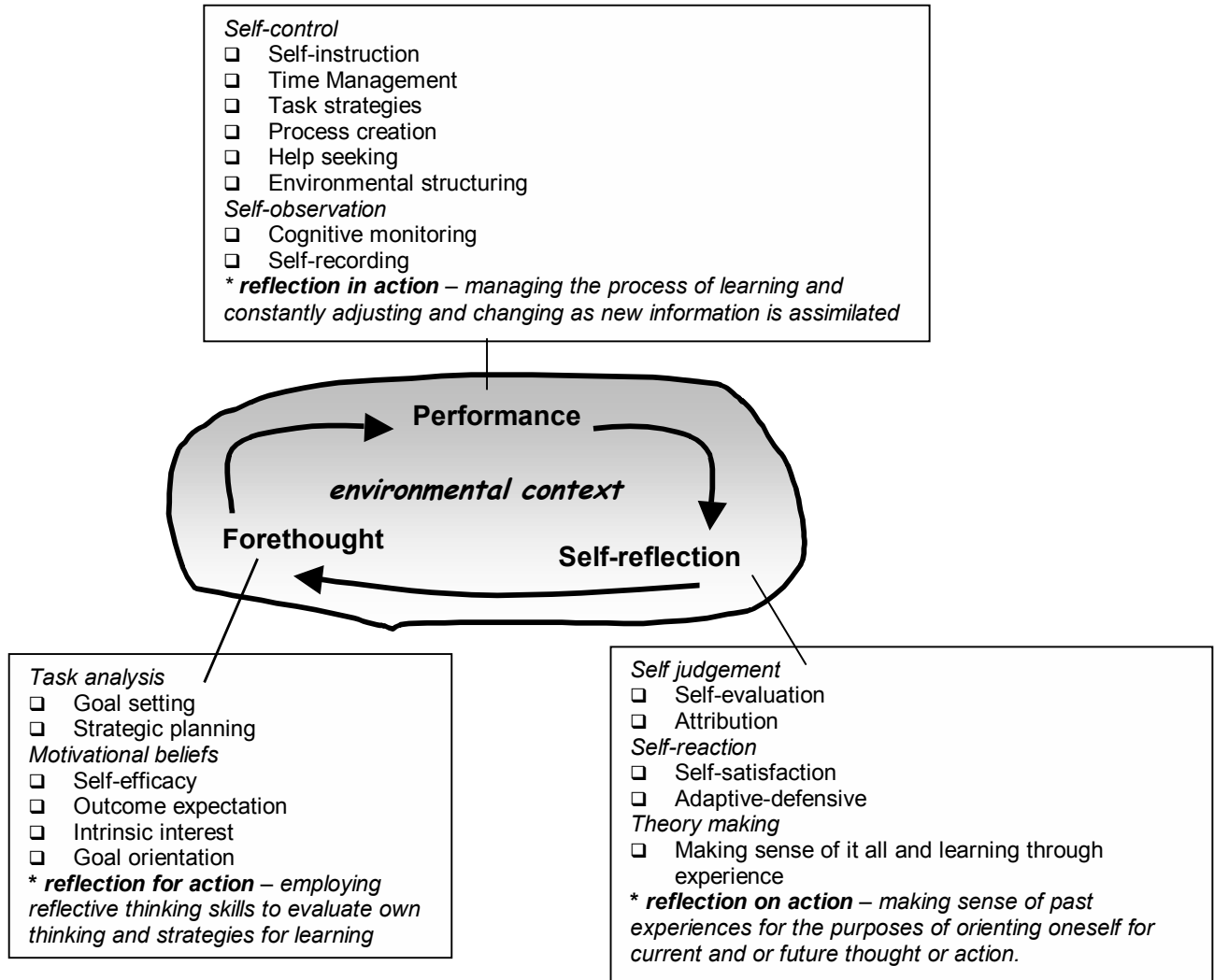
*Forethought* – involves thinking about the tasks, problems and contexts for learning. The model identifies two subordinate categories – task analysis and self-motivational beliefs. People do not engage in tasks or set learning goals and plan and work strategically if they are not motivated by strong personal agency (Zimmerman 2000 p.226). In particular, self-efficacy – personal beliefs about having the means to learn or perform effectively and outcome expectations – personal beliefs that the outcomes will be worthwhile are key features of personal agency.

*Performance* – is the doing part of the process. It includes the capacities and attitudes to instruct self and seek help to learn, the self-management of tasks, the creation of processes for learning and the structuring of the environment in order to learn. These processes enable learners to optimise their effort. A second set of subordinate processes used during the performance phase is self-observation. It involves the cognitive monitoring of performance and the conditions that surround and influence it. This process (also called reflection in action) enables the people to adjust their actions and performance in response to their observations on the impact they are making.

The *self-reflection* phase involves both self-judgements and self-reactions to those judgements. The two key self-judgement processes are self-evaluation and attributing causal significance to the results. Self-evaluation involves comparing own performance

with a standard, criteria or goal. It might also involve comparing own perceptions of performance with the feedback given from students or peers. Attributional judgements are pivotal to self-reflection because attributions to a fixed ability prompt learners to react negatively and discourages efforts to improve. By contrast attributions of poor performance to inappropriate learning strategies sustains perceptions of efficacy.

**Figure 4** model of self-regulated learning Zimmerman (2000 p. 226) coupled to notions of reflection\* Ertmer and Newby (1996).



Self-reactions include self-satisfaction and adaptive inferences. Self-satisfaction involves perceptions and associated effects regarding ones own performance. Courses of action that result in satisfaction and positive effect are pursued. Whereas actions that produce dissatisfaction and have negative effects are avoided. Self-regulated learners condition their satisfaction on reaching their goals, and these self-incentives motivate and direct their actions.

We might also anticipate that through this deliberative process people would generate their own theories of why things worked and happened in the way they did feeding into new perceptions of the way the world works for them and new beliefs.

Zimmerman and Schunk (2003) draws the distinction between proactive and reactive self-regulators in terms of self-regulatory processes and beliefs. Reactive learners avoid forethought and attempt to regulate functioning during and after performance whereas

proactive learners engage in forethought in order to improve the quality of subsequent phase functioning.

### **Metalearning as self-regulation?**

I was interested to explore with participants their understandings of the relationship between metalearning and self-regulation. My email exchange with Professor John Cowan is instructive.

'Self-regulation, as practised by many of the level 3 students who send their journals to me, is a blundering about, in an illogical way, without any review after the event of effectiveness, making unsound decisions - but still self-regulating. Badly self-regulating. *Effective self regulation* is when a journal experience, for example, can get them to stand back and ask themselves such questions as, What are the options? How should I choose between them? How will I decide if that has been a choice I want to stick with next time? - They are getting into what I'd hate to add to the vocabulary as meta-self-regulation.'

*My reply ...*'I need to think about what you have said. I agree about the differences between self-regulation as a meta concept involving high levels of self-awareness and intentionality and self-regulation as a less deliberate somewhat haphazard process. Perhaps metalearning is also like this with lower and higher states of awareness and intentionality.

Here is a good example of the social construction of perceptual knowledge. Sparked by Johns comments about reflection within the self-regulating model of learning I went on to say. 'You quite rightly emphasise the reflectivity in the process of creating the knowledge that enriches and refines our metalearning. I think we also need to look at it from the other end of the thinking process - the imagination *bringing ideas into existence...* or perhaps reflection for action. In fact I can now see how we could use the model of self-regulation to distinguish different aspects of reflection.

*Metalearning as imagination:* I can envisage a metalearning process that begins with imagination. I attach in confidence a working paper I have just prepared which contains a lot of my imagination (and the shared imaginations of others) fused into a rough strategy (sense of direction) for learning. Is this a manifestation of my metalearning? It's based on a lot of personal knowledge about how a HE system works and could learn about itself and how we might engage people and organisations in processes for learning. Would you see something like this as a tangible expression of metalearning or would you require more understanding of the reasoning underlying each proposal? eg the why I want to do it this way and not another way type of thing. Understanding what level of sharing of the tacit is required to convince an objective observer that this embodies metalearning is essential if we are to recognise other people's metalearning.

*Metalearning used during performance:* At the action / performance stage we are constantly monitoring the effects of what we do (cognitive monitoring of Zimmerman's model). In this current work process I am trying to be conscious of the way I respond to individuals and adjust what I do according to my perception of what will work for that person. This is clearly reflection in action and draws on a different type of metalearning: of the type 'how I think individuals engage through the medium of email.' What will encourage or discourage people? How do I develop relationship knowledge that makes people want to be part of the enterprise?

*Metalearning used after performance*: when something has been completed is where the reflection on action occurs and another lot of knowledge for metalearning develops. This enriches the pool for all the next times we need our imaginations and knowledge in action.

In reflecting further I had the thought that perhaps it is the proactive self-regulators of Zimmerman (2000) who are displaying the qualities and behaviours that one might associate with metalearning<sup>3</sup>.

I was pleased to receive this endorsement in an email from Professor Barry Zimmerman

'I agree with your responses to your colleagues regarding self-regulation. All students attempt to self-regulate; the question is how effective and motivated they are when they desire to attain specific goals. Most theorists treat self-regulation in process terms rather than as a stage of development. Your answer on page 13 about the proactive self-regulators captures this distinction well.'

I will connect this story to another email story told by Professor John Stephenson.

'In 1996, I brought Donald Schon to the UK for a Higher Education Capability conference at Regents College. 250 people attended. I recorded his 'master class' of questions and answers. I sent him a transcript for checking and for filling in some gaps where his voice was occasionally indistinct (he walked around a lot). He duly returned the transcript with the following note. *"When checking the transcript I found myself asking 'Why did I choose to answer that question in that way?'. I then began asking myself 'What have I learnt from the way I chose to answer those questions?'. And finally I asked, 'What can I now say about the issues people raised, and indeed other issues, having answered my first two questions?'. "* I interpret this to be meta learning in action!

This anecdote reinforces the connection of metalearning with proactive self-regulation by showing that it is a living process, an attitude, a habit a way of thinking and behaving. For me, this conception ties in well with the idea that it infuses the most authentic and connected models of self-regulated learning: living the proactive self-regulated model of learning requires a person to be engaged continuously in metalearning.

### **Concept maps for metalearning**

In trying to apply a metacognitive (metalearning) approach to my own learning I tried to chart the changes in my own understanding by creating a series of concept maps that made explicit, in ways that were meaningful to me, how the fragments of knowledge, insights and thinking that this collaborative enquiry had produced might be related.

Appendix 1 was produced prior to the symposium it was developed alongside and the perspectives offered in this article but did not embody the most complete stage of thinking outlined in the previous section.

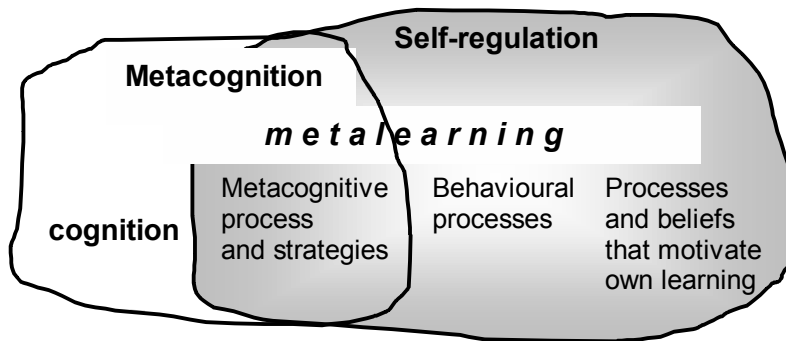
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<sup>3</sup> By the end of my project I had in fact convinced myself that proactive self-regulation was in fact metalearning in action.

Metacognition is the highest order concept on the map with metalearning and cognition as subconcepts and learning a subconcept of metalearning, cognition and metacognition. At this stage in my thinking the place of self-regulation seemed problematic. I was conscious that it was superconcept that tries to accommodate the enormous complexity embodied in learning as both a cognitive and social process.

In thinking more about the proactive forms of self-regulation and considering the views of Professor Barry Zimmerman I began to reorganise this map to the form represented in Figure 5 in which metalearning is a subconcept within metacognition and self-regulation. In my mind it is a sort of creativity that that is best displayed by proactive self-regulators for whom deliberate self-regulated learning is a way of life. This conception is consistent with the 'awareness' and 'taking control of' elements of Biggs' original definition.

**Figure 5 Simplified concept map for metalearning**



A biproduct of this process of developing thinking through concept maps was the realisation that the technique could be used as a way of building knowledge about the visualisation, planning, implementation and evaluation of specific learning projects and therefore could be an important aid to the developing capacity for metalearning.

The sharing of concept maps, that embody ones own understanding with colleagues, provides opportunities for others to challenge or validate perceptions and conceptions. Here are a some examples of email discussions.

'Your concept map makes very much sense! I think it clarifies very nicely the complex relations among metalearning, metacognition and self-regulation..... I would also say that RoLI is a helpful tool when developing metacognitive and regulation skills. Thus RoLI (or some other inventory - I have previously also used another inventory in the same way) is a practical extension' of the concept map'. (email Dr Sari Lindblom-Ylanne 04/08/03).

'I've been over it (the concept map) in fine detail this morning, and found no place where I wanted to scribble a wee note, and then comment to you.....It seemed logical to me, I can identify with it, I can't think of anything I'd argue to add or take away'. (email Professor John Cowan 07/08/03).

The sharing process also provides opportunities for colleagues to reveal their own preferred and alternative conceptions – this is particularly useful in developing knowledge for collaborative metalearning. Here is an example.

'I'd prefer to see learning as the central concept... as I see metalearning as a part of learning. The map shows metalearning as a subconcept of metacognition but I see the reverse as more illuminating, metacognition as a subconcept of metalearning. This is because I see metalearning as relating to more than just cognition. It would encompass:

- Cognition
- Feelings (affective)
- Connative
- Bodily know-how (Hager, 2000).

However, I don't assume that these are separable in practice. I know that the term 'self-regulation' is in widespread use... but I prefer a term such as 're-formulation' or something similar. This is because, for me, the use of the term 'regulation' implies a known outcome, or a state of homeostasis, or an enduring 'self'. Whereas I see the 'self' as ever-changing and elusive. After all, Marton et al's sixth conception of learning is "changing as a person" or maybe "developing as a person".

The concept map distinguishes between intuitive and intentional learning. Under intentional learning is a list of strategies/activities that aid learning. To extend the concept map, I see the value of these activities as supporting an immersion in, or encouragement to listen to, intuitive responses. Reflection then allows the student to become aware of the nature of those intuitive responses. Sometimes I think that students suffer too much from being wholly 'in the head' about learning and would benefit from a little bit of playing around and going with their intuitive responses. So I'd put a link in between intuitive and intentional.... I see it as a reiterative cycle.

I'd like to put in a shadow concept map behind yours... one that highlights underlying assumptions about the nature of knowledge and being. One of the problems in trying to discuss metalearning is that often the underlying assumptions are not identified. Much discussion around metalearning is founded on a Cartesian dualism, whereas it will be apparent that I would take a more humanistic, embodied approach' (email Dr Ursula Lucas 10/08/03).

The process of sharing concept maps also helps others to extend the thinking embodied in the concept map. It helps the learner extend their metalearning by being exposed to the metalearning of others. Here is an example of an exchange with Dr Denise Chalmers.

'I loved your concept map. Really lovely conceptualisation. The only thing I would add for consideration is the way in which education and specific teaching of learning strategies and practice in them in an educational environment. A number of the strategies you identified are self reflective and reflective/analysis type strategies but you can also teach students to plan - by teaching them planning heuristics, getting them to engage and apply these etc so quite a lot of the work I was engaged in was teaching the students the cognitive strategies and then explicitly teaching them the

principles and reasoning behind what was being taught - how and where the strategies might be used so I guess much more on explicitly building the tools of self-regulation, self monitoring not just by engaging them in the activities but also in understanding how and why they work and when and where to use them based on their goals etc'. (email Dr Denise Chalmers 07/08/03).

## Discussion

By asking lots of people the question 'what do you understand by metalearning?' I established that the word is not widely used or recognised as a concept in UK Higher Education. But even though people do not use the concept they can construct meaningful explanations. This response is fairly typical.

'It is not a word I have used consciously - or one I'm likely to use unconsciously! – but some of my.....colleagues in staff development use it. I translate it as being about learning to learn or encouraging staff and students to stand back and to think about the way they go about learning'..... I very much like the idea, because I think it is important and gets beyond just trying to equip students with study skills and then expecting them to know what to do with them, but I find the term itself unhelpful'. (email Dr John Peters 06/08/03).

People who were familiar with the concept reasoned that it meant how I think about how I learn, or learning about learning. Flavell's (1979) conceptualisation of metacognition as : knowledge about how human beings learn and process information, as well as individual knowledge of one's own learning processes; knowledge about the nature of particular tasks or more generalised knowledge about types of task; and knowledge about strategy – the cognitive and metacognitive strategies, as well as conditional (contextual knowledge) about when and where it is appropriate to use such strategies, firmly locates metalearning within metacognition.

The way I acquire knowledge about the 'how' of 'my' learning is highly contextualised. It involves the contexts of me (the way I perceive and engage with the world, my beliefs and values and reasons for doing things) and the contexts (focus, problems) and environments for my learning. If I am learning in a formal higher education context then the epistemologies and knowledge production methods of the discipline I am studying are centrally important to the how of my learning<sup>4</sup>. If I am working in a work/professional context then the epistemologies of transdisciplinary problem working will be paramount. This self-knowledge, grown from observing my own experience and results of learning, is central to my metacognition and metalearning.

The idea of metalearning works best through a social constructivist view of the world where learning is viewed as both a social process and a process of construction. This means that our individual environments for metalearning will be heavily influenced by our ability to construct meaningful learning for any context, and other people's conceptions of how the world works. As HE students for example, our tendencies to engage or not engage in metalearning will be a function of the pedagogies we are subject to as students (which reflect the beliefs, values and capacities of our teachers and the

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<sup>4</sup> The idea of metalearning might usefully be viewed from the perspective of the knowledge production model provided by Michael Gibbons et al (1994) which recognises disciplinary and transdisciplinary modes of learning.

opportunities that they create for us to learn). Our opportunities for application will also be conditioned by the facilitation skills of individual teachers (that engage us as unique thinking individuals), and the role models we observe (the ways we see our teachers and peers engaging or not engaging in and benefiting from metalearning). Outside formal education settings our ability to construct meaningful learning will be heavily influenced by the level of autonomy we can exert over our own learning and the opportunities we can create for ourselves to learn.

If these propositions are accepted, then metalearning must be important to our sense of identity who I am, what I feel, what I stand for etc. in the particular social contexts within which I am operating. The idea that metalearning embodies the identity of the person. 'I am my metalearning' was echoed in the conceptions of one of the symposium participants Ursula Lucas, '*metalearning embraces more than cognition, it embraces the affective, cognitive, connative and also embodiment... mind, body, emotions/ feelings*'. If this conception of metalearning is adopted then our conceptions of what it is will be unique to each individual and reflect the contexts called me and my life. Adopting such a perception would again embed metalearning within the concept of metacognition.

If metalearning is learning about learning and knowledge about ones own learning, is it a process, a product or an attitude? The discussion within this paper suggests that it is all of these things. It must be knowledge (a product or result) that is grown through experience (the process of doing learning). Like the phenomenon of change we come to know the meaning of change (or how we learn) through the process of doing it. Our metalearning knowledge causes us to behave in certain ways (attitude/habit) as we engage in processes that we have constructed in particular ways because of our metalearning.

What the symposium demonstrated was that all the contributors believe that it is important to help students develop their knowledge about, and competence in, metalearning so that they become more expert at learning. Ertmer and Newby (1996p1 and p6) define expert learners as people who 'use the knowledge they have gained of themselves as learners, of task requirements and of specific strategy use to deliberately select, control and monitor strategies needed to achieve desired learning goals.....Expert learners notice when they are not learning and thus are likely to seek a strategic remedy when faced with learning difficulties... Novice learners, on the other hand, rarely reflect on their own performance and seldom evaluate or adjust their cognitive functioning to meet changing task demands or to correct unsuccessful performances'. Metacognition and the particular form of metacognition called metalearning, together with conscious and deliberate self-regulation are central to the notion of expert learner whether the learner is engaged in learning in formal educational settings or in more informal contexts (e.g work contexts). Metalearning is particularly important in situations of rapid change, in unfamiliar contexts and situations where existing knowledge and practice is inadequate. In such situations the metalearning (knowing how to learn) becomes more important than the content knowledge we possess (Ertmer and Newby 1996).

Following on from this line of reasoning we might open up the concept of metalearning to notions of fitness for purpose. Are the types of metalearning we are seeking to develop in higher education appropriate for all learning situations?

We live in a vibrant and dynamic world in which we continuously encounter new situations and problems that require us to learn. In higher education our primary concerns have traditionally been focused on learning to learn and knowing how to learn in the contexts and requirements of disciplinary study. Universities have institutionalised this form of learning (embodied in courses, teaching and learning methods and assessment practices). These practices place high value on the learning and learning methodologies that are associated with Mode 1 'scientific' knowledge production (Gibbons et al 1994). The term embodies the cognitive and social norms and processes that must be followed in the production, legitimization and diffusion of knowledge of this kind. Mode 1 'scientific' knowledge is the knowledge that academic communities create and universities and colleges propagate. HE curricula are fundamentally concerned with this type of knowledge and assessment processes test its acquisition and use through a range of assessment methodologies that reflect the way it is produced in the subject. The RoLI instrument is designed to help people (students and teachers) understand the extent to which beliefs about, attitudes to and perceptions of learning are consistent with theories of learning that relate to such contexts. But higher education has to be concerned with more than disciplinary learning. Barnett (2000a and 2000b) puts this quite nicely in a discussion of complexity.

'Higher education is faced with not just preparing students for a complex world, it is faced with preparing students for a supercomplex world. It is a world in which we are conceptually challenged and continually so.... This supercomplexity shows itself discursively in the world of work through terms such as flexibility, adaptability and self-reliance. In such terminology, we find a sense of individuals having to take responsibility for continually reconstituting themselves through their life span..... The curriculum might be understood as a set of more or less intentional strategies to produce – in each student – a set of subjectivities...but the required set of subjectivities (required for this supercomplex world) is unlikely to be made clear to higher education..... What is clear however are the essential features of performance namely - understanding (how do we develop the knowledge to learn?), self-identity (what are the unique set of qualities, abilities, attitudes, behaviours and beliefs that we bring to our engagements with the world?) and action (what repertoire of actions give us control over our own destiny?).'

This world of professional and work-based learning – the world that most of our students will inhabit for most of their working lives – is not constrained by the cultures and methodologies of disciplinary learning (although many of the cognitive strategies for learning are the same). This world requires capacity and understanding for working with many different sorts of knowledge in order to work with complex emergent problems for which there may be a range of possible solutions. Gibbons et al (1994) used the term Mode 2 for knowledge production in transdisciplinary, social and economic contexts. Such knowledge has to be useful to someone and fulfil a particular purpose and this imperative is central to the knowledge production enterprise. Mode 2 knowledge is produced through a process of continuous negotiation and, because of its transdisciplinary nature, the consensus as to the appropriate cognitive and social practice in its production is derived from a heterogeneous constituency. Mode 2 is characterized by knowledge production in a continuous succession of transient and emergent problem working contexts and situations. Mode 2 knowledge production is not so dependent on the existence of codified knowledge to solve current and emergent problems that are local and heavily contextualized, although it also draws upon Mode 1 knowledge where it is relevant and useful. Rather, it seeks to harness the know how

embodied in current and emergent practice residing in working communities and the markets where such knowledge will be used. Knowledge about the practice of teaching and the promotion of students' learning in particular contexts is transdisciplinary knowledge and students working in employment or voluntary work will be working with this type of knowledge. Curricula that are designed to promote capabilities, behaviours and creative habits of thinking and learning that are necessary for the transdisciplinary world pay particular attention to the processes for learning (Jackson 2003, Jackson and Ward in press). Knowing how to learn and how other people, groups of people or whole organisations learn is essential knowledge for this world and we need to ask serious questions as whether our curricula designs, teaching and assessment strategies provide opportunities for this type of metalearning.

### **The symposium on metalearning**

I need to connect this personal examination of a concept to the important research that triggered my enquiry. I want to do this via one of Professor Zimmerman's comments on a draft of the evolving paper.

'How one labels the overall model (self-regulation, learning to learn, metalearning, metacognition, etc.) is in some ways less important than the distinctiveness of sub-processes, such as goal setting, strategy use, self-evaluation, etc. If these processes are too abstract, teachers will not be able to use them as part of their tools to help students to learn. Teachers need to diagnose specific dysfunctions, such as setting goals that are unattainable or trying to learn without using an effective strategy, and remediate them in a focused way.'

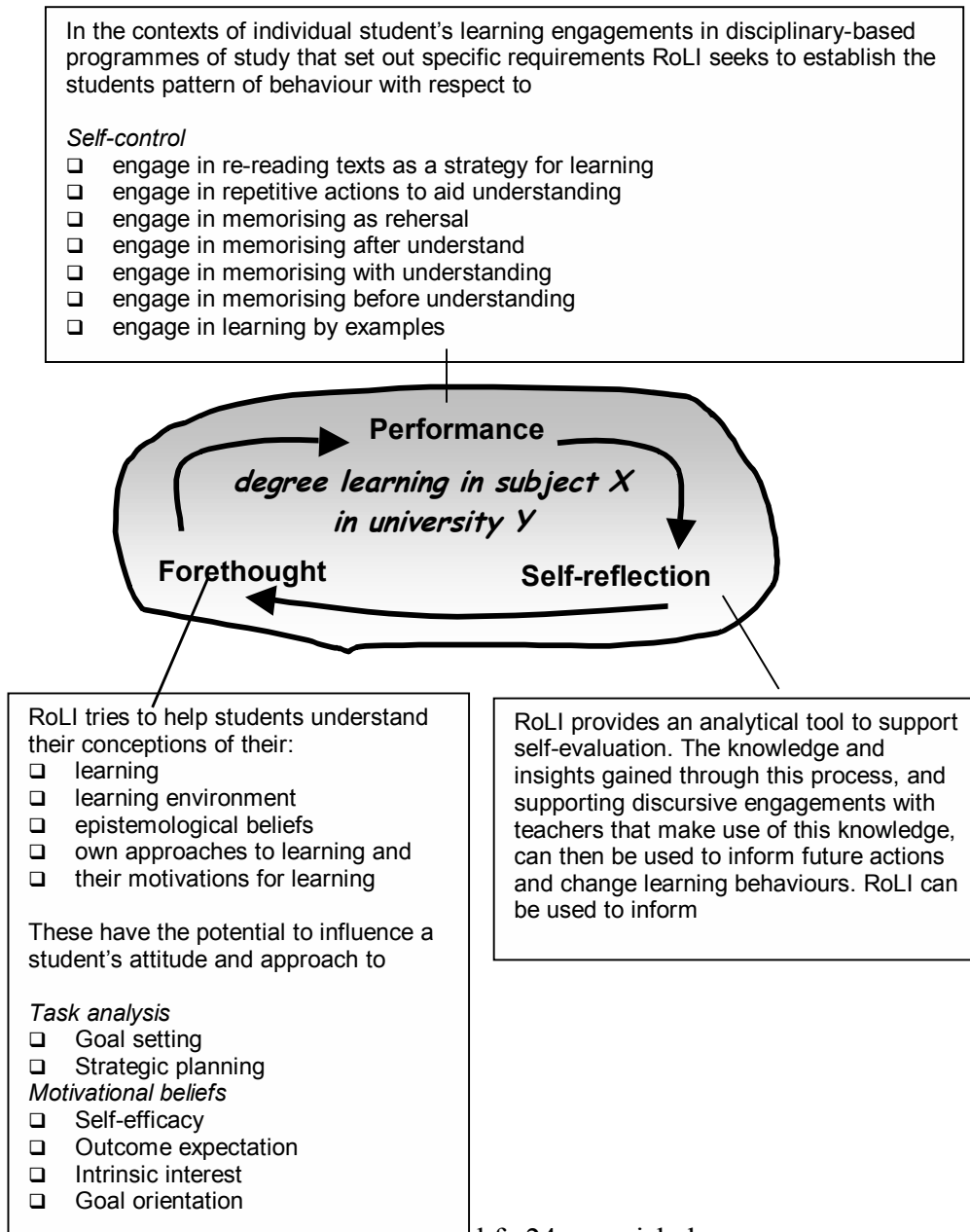
The researchers in the metalearning symposium sought to do exactly this through the use of the Reflections on Learning Inventory (RoLI) developed by J.H.F. (Eric) Meyer (Meyer 2000). The inventory is designed to engage students in a self-analysis of the way they as individuals learn. After processing the data, the results are fed back to students in the form of learning profiles, together with information that helps them interpret their profiles in terms of the potential consequences of the profile for their learning. This reflective process is aided by curriculum or counseling strategies that enable teachers to explore with students their understanding of their profile for their own learning. The researchers show that student engagement in this process can be encouraged by embedding the analysis and reflection in an assessment strategy that is consistent with the developmental intentions of the process. The results of these interventions (Lindblom-Ylänne 2003; Lucas, U and Meyer and Shanahan 2003; Norton and Owens 2003; Wisker 2003 and previously published studies) provide convincing evidence that patterns of learning behaviours and related beliefs about learning can be revealed through research tools like RoLI and the reflective facilitation processes that extend the use of such tools. Through their collective accounts the researchers demonstrate that the process yields enhanced levels of students' awareness of their conceptions of, and approaches to learning, thus fulfilling that part of the metalearning conception that relates to metacognition.

The studies also show that teachers can use this new knowledge about how their students are learning (a type of metalearning) to help individual students develop learning strategies that are more appropriate for particular study contexts. They show that students develop personal knowledge about the ways they are learning (their own metalearning) and that in some cases this new knowledge can change beliefs and

values and result in new ways of learning that are more consistent with the demands and requirements of the study environment. Thus the researchers provide some evidence that that metalearning influences future behaviours fulfilling the part of the Biggs' definition that relates to proactive self-regulation.

In applying RoLI the researchers did not bother too much about what metalearning might be. Rather they believed that if they could engage students in thinking about their learning through a carefully constructed tool like RoLI, new knowledge and understanding of this type would emerge. For them it was more important to help students focus on particular aspects of their learning behaviours and beliefs in ways that both students and teachers could operationalise so that practical strategies could be implemented for improving learner effectiveness.

**Figure 6 An attempt to relate the Reflections on Learning Inventory (RoLI) to the proactive model of self-regulated learning (Zimmerman 2000 p. 226).**



I reasoned that if RoLI was developing metalearning and I believed that metalearning infused the model of self-regulated learning then I should in some way be able to relate the two. Figure 6 tries to do this. It opens up a new problem called how does RoLI relate to the model of proactive self-regulated learning.

## Closure

Journeys of discovery require closure in order to achieve the necessary sense of satisfaction that permits us to let go of a learning problem. I had begun my journey thinking that I might be able to develop some useful perceptions about metalearning and ended it believing that for me (at this point in time) the idea of metalearning is probably contained within the concept of proactive self-regulation as explained by Zimmerman (2000) and Zimmerman and Schunk (2003). I concluded that for me it does not warrant a separate conceptual identity. But I was still not happy with my understanding of the relationship between self-awareness and the acts of self-regulation that this inspired. And then I came across a paper by Barab et al (2000 p3) which offered another perspective on knowledge and learning

'In our thinking cognition and knowledge are interchangeable terms that characterize the dynamic relations among the changing world and changing individuals. Knowledge is not some ontological substance that lies in people's heads (or in the pages of text books) waiting to be actualised through cognitive processes. Instead, and consistent with our relational or situated perspective, it is a term that delineates a person's potential to act in a certain fashion. Such an active and contextualised redefinition of knowledge eliminates the distinction between knowledge conceived as a thing and knowing about or cognition described as a process. Barab and Duffy (2000) describe individuals as being knowledgeably skilful and use the phrase '*knowing about*' to describe what is frequently defined as 'knowledge'.

- a) knowing about refers to an activity - not a thing;
- b) knowing about is always contextualised - not abstract;
- c) knowing about is reciprocally constructed within the individual environment-interaction - not objectively defined or subjectively created
- d) knowing about is a functional stance on the interaction - not a fundamental truth

Conceived in this fashion, cognition and knowing about are not entities owned by individuals or environments but instead are distributed acts that exist in the flow of activity and involve persons acting in a functional (progressive) manner with other persons and available social, physical and intellectual resources. Although it is pervasive practice to attribute knowledge as the pre-requisite or the outcome of learning, in our conception knowing about, cognition and learning are simply different ways of describing the dynamics of evolving participation. Becoming knowledgeably skilful, from this perspective, is characterised by an individual's increasing potential to build and transform relations with the material, psychological and social worlds. Learning is thus conceived as fundamentally connected with and constitutive of the environment (including people) within which it is nested (Cobb and Yackel, 1996; Lave 1997). Conceived in this way the boundaries among individual cognition and the material and social world become difficult to identify.' In the context of my metalearning project this set of perspectives and explanations seemed to make sense to me.

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