How can we improve our understanding of reflection? – A metareflection through the glasses of an evolutionary biologist.

By Hans Gelter

Background

This paper is about my exploration of the meaning of and my struggle to improve my understanding of *reflection*. In February 2001 I took part in a graduate course in Action Research at the Department of Teachers Training, Luleå University of Technology, Sweden, given by Professor Tony Ghaye, Institute of Reflective Practice, UK. I embarked during this course an exiting journey into for me new scientific territory that opened the gates into a new research paradigm.

Through reflective discussion the course identified a key question of shared concern – a common interest in *reflection* and how to improve the process of *reflection* in education. The participates of the course identified it as an interesting research question as reflection is a key element in the Action Research process of cyclic inquiries of Action – Observation – Reflection - Action (Handbook …) as well as a key factor in the practice of teaching and learning (Boud et al. 1988) and a main element in the theory of experiential learning (Kolb…). Our task during the course was to live through the action research process in addressing our research question and to reflect on the processes and actions that emerged during the process of understanding refection.

My validity to contribute anything to the understanding of *reflection* was in my opinion limited in the onset of this process, as I have used the word *reflection* in a highly unreflective way, a common practice among many teachers. Also being an evolutionary biologist trained in the paradigm of natural science made me doubt my ability to contribute to this for me new research paradigm in social science. I hoped, however, that my critical scientific training would let me transgress the common view of reflection and address it from an evolutionary perspective. I cannot give a full account for our exploratory process during the course in the spirit of true Action Research, as the voices of the other participants were not systematically recorded. My exploration of the understanding of reflection was also limited only in its initial stage as a collaborative process with my course mates, most of my work for this paper was done by my own reflection and exploration after the course. As many researcher and teacher use the word *reflection* unreflected, I hope this work can contribute some to our understanding of the word.

The course process

During the course, after the process of identifying the research question, we were divided into subgroups to discuss *reflection* and our understanding of it. We quickly identified the general problem of our unreflective used of the word in our teaching practice and general lack of metareflection. We felt also ashamed of the realization that we very often demand our students to reflect over their practice and learning without giving them any tools or guidelines for the reflective process. We identified our needs to describe, analyse and evaluate the process of reflection. We also expressed a desire or need to improve our own reflective skills, however, without specifying why we wanted to improve it. We asked the basic questions:
- why should we reflect?
- What should we reflect over?
- Does reflection always lead to an improvement?
- What is improved reflection
  - More time for reflection?
  - Better quality of reflection?
  - Better understanding of reflection?
- Are there different kinds of reflection?
- How does reflection relate to intuition?

From this we learned, that regardless of our scientific paradigm, we all lacked basic understanding of *reflection*. This strengthened our commitment to the research question. Our final collaborative task was to try to address our research question. Each group came up with a variety of suggestions of how to improve our understanding of *reflection*, mostly different research approaches to quantify the

understanding of reflection. We ended up with a long list of a multi-method approach that if applied would drown us in data. Concluding that "less is more" we got the task to address the research question individually or in small groups using only one approach. I decided to apply an analytic and reflective approach from my personal professional view as evolutionary biologist. By this the course ended and I vas left alone to address my research question.

My initial reflective step

My first obvious question was – what is reflection? I started off with a dictionary inquiry, which gave me a messy and inadequate picture. By its etymology, *reflection* consists of two words, *re* meaning back, return and *flectere* meaning bending, turning. Its Latin meaning is thus "act of bending back". This is also the natural scientific meaning of the word, the physical bouncing of a subject or a wave (*The Oxford Guide to the English Language*). The dictionaries described the human reflection as "think deeply, remind oneself of past events" (*The Oxford Guide to the English Language*) or "to think carefully" (*Cambridge Dictionary Online*) or "a though, idea, or opinion formed or a remark made as a result of consideration" (*Meriam-Webster's Collegiated Dictionary on the web*). From this I draw the conclusion that reflection in a human context is about something bouncing into the brain, being "thinked" on and bounced back out from the br ain as a solution, new knowledge or new understanding (figure 1).

Figure 1: The two basic meanings of reflection/reflextion.
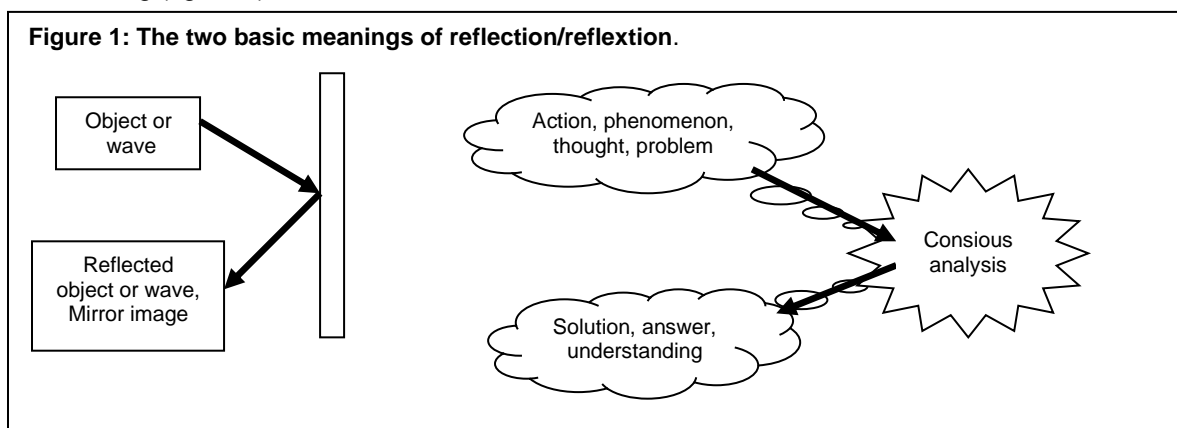
This limited "common language" definition did not clarify anything, so I did a on line search in *Encyclopeadia Britanica Online* which resulted in 1129 articles on reflection, of which the majority was within natural sciences. A search in *Cambridge Scientific Abstracts in social sciences* on *Reflection* gave 4501 hits, while the same search in *Earth & Environmental Sciences* gave 2676 hits. A brief look on the articles listed in the search results shows that the word *reflection* is used in many different contexts (Table 1), and the most frequent use was "reflection on..." or "a reflection of....".

TABLE 1: Some semantic use of the word *reflection* in social science articles

Noun:	Adjective:
Creative reflection	Reflective abilities
Critical reflection	Reflective action
Cyclical reflection	Reflective activities
Descriptive reflection	Reflective assessment
Flexible reflection	Reflective consideration
Focused reflection	Reflective contract
Global reflection	Reflective conversation
Guided reflection	Reflective interviews
Holistic reflection	Reflective inquiry
Intentional reflection	Reflective journal
Interactive reflection	Reflective organisation
Multicultural reflection	Reflective practice
Philosophical reflection	Reflective practitioner
Transcultural reflection	Reflective profession
Self reflection	Reflective questions
Structured reflection	Reflective teaching
Systematically reflection	Reflective teams
	Reflective thinking
	Reflective writing

From this I learned that although the word *reflection* has it origin in the natural sciences, today it is more frequently use in the social sciences. I also learned that there is a huge amount of literature using the word *reflection* in a wide range of contexts, giving me the impression that either the word has a very wide use or has become a politically very popular word. Few of the articles using the word in a human context addressed the meaning or understanding of the word, which often is taken for granted. This gives me the impression that our course conclusion of an inflation in the use of the word associated with a vague definition gives room for many interpretations and use of the word in many different contexts. This vagueness of the semantic use of the word *refection* got me wondering about its boundaries towards similar words. I thus constructed a mind map over similar words associated with "thinking" and reflecting (figure 2).

Figure 2. My mind map of associated words to "thinking".
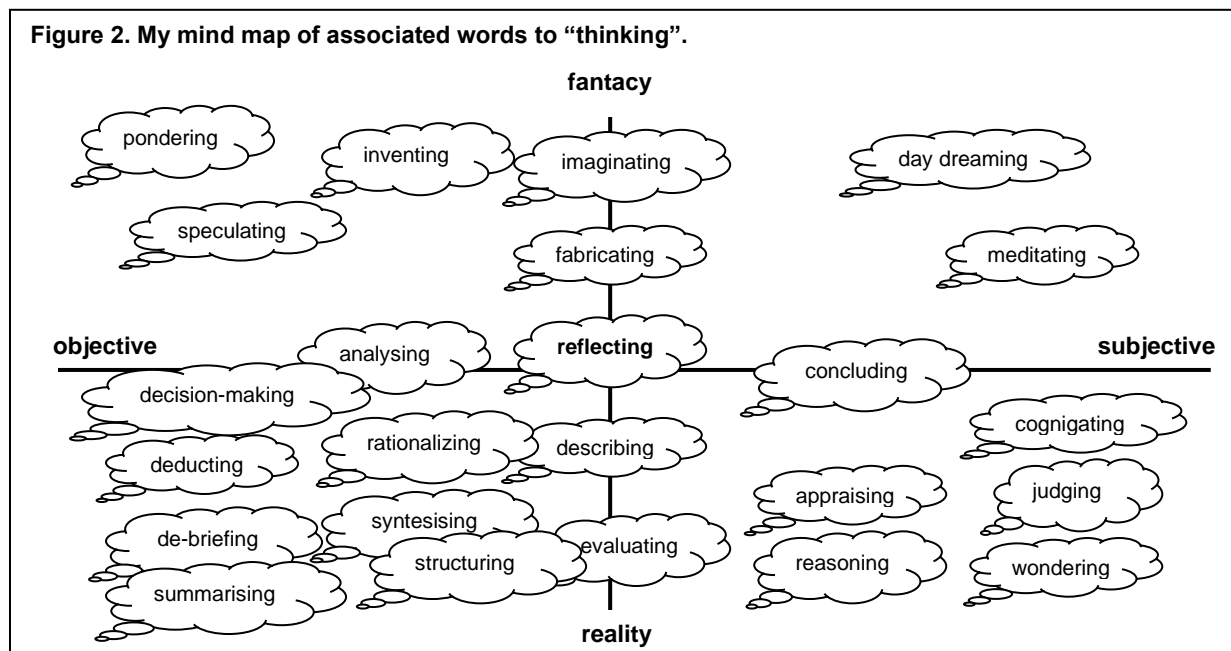
What I noticed from figure 2 is how many more word we have for analytic and rational objective thinking than for irrational subjective thinking, which is in accordance to our western rational society. I soon realised, however, that this trail would get me lost I in the semantics of the English language and I left it with the feeling of that this is a subject worth further exploration. Now I was in a desperate need of a clarification of what reflection stands for, so I started to look for exploratory articles about reflection. Luckily, Tony Ghaye gave an excellent lecture on "Learning through Reflection" during the course based on his writings on reflective practice (Ghaye…) introducing me into the jungle of understanding *reflection*. Using the initial work of Dweyer (19…) Schön (…) Gayhe (….) m fl.
I leaned that we could look at reflection in many different ways without any clear single definition

What is reflection?
Digging into the exploratory literature I found that reflection is not a modern concept – already Aristoteles…..phronesis

Reflection is regarded to be about learning and improving (Gayhe & Lillyman 2000). If we analyse learning by reflection, we have to ask how we learn by reflection and what to we learn.
Ir we regard reflection as improving we must ask us what do we want to improve and how do we measure improvement?

Why do we learn? A simple biological answer is "to survive". In human evolution survival occurs in an ecological setting, now a day's survival is in a social and technological setting which fundamentally differs from our original ecological settings. But to understand our learning abilities we have to consider not only our modern socio-technological setting, but also our evolutionary ecological setting, where our learning abilities have developed. So, my question here is – is reflection a evolutionary-ecological natural way of learning?

Reflection is "thinking", that means it is a cognitive process, not a physiological or mechanical (physical) process. Thus only "thinking" things with a cognitive capability can reflect, that means that so far as we know only humans can reflect. Thus, a machine or an organisation cannot reflect, only the humans within an organisation. Having localised reflection to humans and the function of the human brain and its capability to "think", I wanted to define how reflective thinking is distinguished from other kinds of thinking. Reflective thinking is focused on something, that of what we are reflecting *on*. To be able to be focused on it must be a problem (Dewey 1933, 1985), an object, an observation, a person, a phenomenon, a thought, an idea, a theory, a piece of knowledge or wisdom, a conclusion, an instruction, a situation, or an action (praxis) - thus anything that our mind can focus on. I found however that most literature on reflection is about reflection on action (Ghaye and Lillyman 2000, Schön 1982, 1987) while more original work (Dewey 1933) also focused on problem solving through reflection.

Reflection is not only thinking on something, like "my car, my car is red, my car is nice…", the thinking must also have a goal, an aim, a consequence, something must come out from reflection. The outcome can be a solution to a problem, or understanding of a phenomenon, object, action or thought or an improvement of an action or praxis. I found that the general understanding of reflection is that the outcome is learning about the "thing" that is reflected on – thus a sole problem solving ("my car is broken – what do I do? I fix it at a garage!") or problem identifying is not reflection, but learning from the problem solving or doing something about the problem is (Ghaye & Lillyman 2000). Reflection is thus a metaphoric word for a specific learning situation for understanding or improving. Reflection is learning by a cognitive process about a specific situation, problem, subject etc. Reflection is thus an active cognitive work on "something" with the goal to learn from it.

Getting so far in my understanding of reflection, I found that the literature about reflection is mainly focused on questions like when we reflect, how do we reflect, what do we reflect through, levels of reflection and the applications of reflection on for example Action Research and reflective practice.

Reflection and the mind

As a biologist I now got interested about the physiology and psychology of reflection – where does it occur? Its quite obvious that's it is a conscious driven active process – it's not free-floating thoughts but focused thoughts on a problem or event. The question of origin of thoughts is interested here is reflection only a canalisation of thoughts into a subject – the problem or is reflection even more structured according to an agenda or curriculum? The word reflection implies that the thought floats away and bends back, bends back to the problem under reflection. It appears to be a process where the problem is in focus and the thought floats away in different directions and bends back again to the problem. This free floating and exploration of different possibilities, angels or solutions appear to be the reflective process:

Figure 3: Reflection, thoughts and the mind.
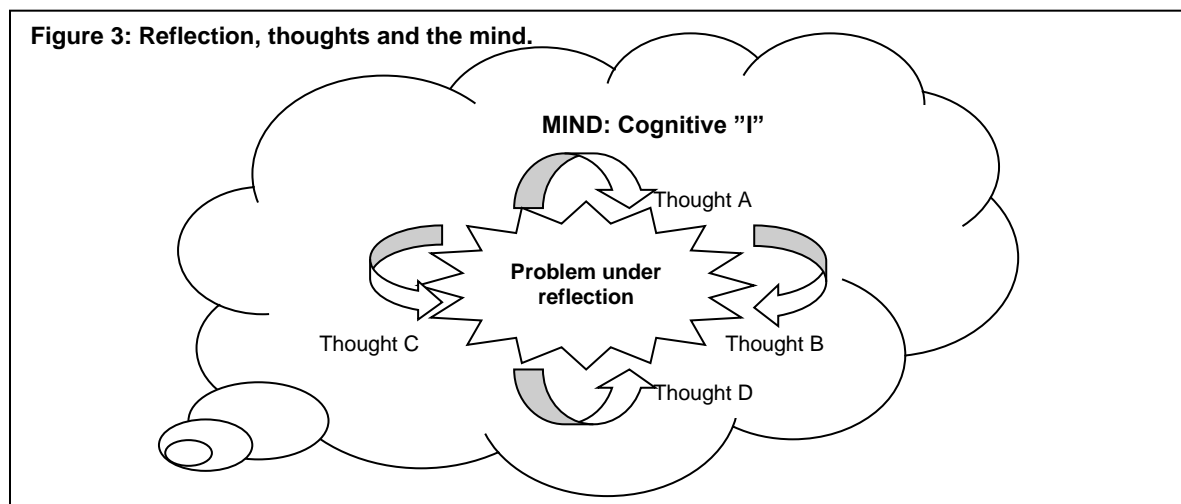
Is a narrow band reflection always better than a broadband intuitive learning?
1) Action ☐ Reflection ☐ Action
2) Experience (unreflected) ☐ Intuition ☐ Action

Meta-reflection and thinking in reflection
What is actually meta-reflection – the reflection on reflection? Is is a structured "thinking" in my "structured thinking" with the goal of of understanding my reflection with the goal of improving my reflection?

Then my question became – what is improving? What is improved reflection?

Reflection and learning
My next question became how is reflection related to learning? Is it a learning method or is reflection a learning process?

Figure 4: The two basic basic ways of learning – conscious and subconsius.
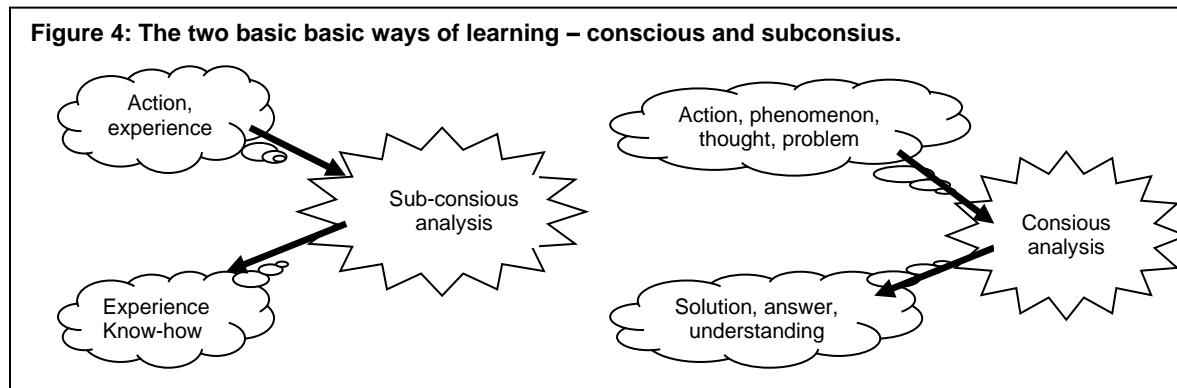
Learning occurs when the person revaluates his actions after having reflected on his experiences (Paul Moxnes)
Learning occurs when experiences transform to knowledge and skills, give meaningfulness and understanding for my own practice (Jan Bengtsson)
Learning is a process where qualitative changes occur in the persons thinking and acting (Mikael Alexandersson)

Why do we want to improve our understanding of reflection?
- to use it more often?
- to use it more efficient?
- to use it more powerful (in regard to its product)?
- to use it in extended contexts?
- to improve our learning process?
- to improve the power of our actions?
- to learn about learning?

How to improve our understanding
My final question was "How can I/we improve reflection?" A question stated during the group discussions in the course. Reflecting over this question we quickly saw that it is very ambiguous! Is reflection always beneficial? Does reflection always lead to an improvement? Do we understand better after reflection? What about its opposite - Intuition? Here the level aspect is important, do we want to improve the subconscious reflection, cognitive, social or cultural reflection? If we only reflect on personal reflection we may improve reflection in two basic ways, quantitatively and qualitatively (table xx)

TABLE xx Ways of improving personal reflection

Quantitative improvement:	How:
- extended time for reflection	longer time
- increased frequency of reflection	more often
- increased spatiality of reflection	before, during, after

- extended deep (level) of reflection   individual, group, social, cultural

Qualitative improvement:
- increased conscious "bandwidth"   allow intuitive reflection
- increased problematisation of reflection   ask more diversified questions
- more structured reflection
- more metareflection
- explicit goals and aims of reflection
- explicit defined target of reflection   process, product or client

From this I learned that on an individual basis we can improve reflection in many ways, both quantitatively and qualitatively. This is probably true also for the other levels of reflection (subconscious, social, cultural, intercultural). But have we improved our understanding of reflection by this statement? What evidence of improvement do we need? How can we measure improvements in thoughts, emotions, feelings, and values (ethically)

If we know how we can improve reflection we need to know what do we mean by *improve*? What do we mean by understand reflection? Do we mean improve qualitatively or quantitatively or both? When is something becoming improved, when its better? What then is better? Better then what? We here come into subjective judgments or can we judge improvements objectively? What kind of improvement do we seek, time fore reflection, the quality of reflection, the understanding of reflection, the content of reflection?
How can we recognize improvement of understanding?

What do we mean by *understanding*? Do we mean logical cognitive understanding, by constructing, models about mathematical relationships? Or do we mean intuitive understanding by "feeling" who to act/think? And *when* do we understand something? When we have heard it, done it, repeated it, expressed it, communicated it? A common answer is when we have learned it, but when have we learned it, what does it mean to learn? A change in thinking, in intuition, in behaving, in feeling, in relating, in being? What is understanding?
- on a cognitive level
- philosophical level
- physiological level
- biochemical level (in the brain)
We thus need to defy our level of discussion

Finally, what do we mean by *reflection*? This is the most critical question when reflection on the question *How can we improve our understanding of reflection?*

In doing this metareflection I learned that we have to explicit discuss the meaning of the components of the question to be able to formulate any answer.
"The problem is not to solve problems, but to discover them!" (Calgren 1994 p 26)

My final question is – where do in fact learning occur – in action or in reflection?

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