

TEACHING ATL SKILLS

The need for ATL

The need for a direct focus on the teaching of the skills of good learning is clear – studies show that up to 73% of university students report difficulties preparing for an exam and most have been found to have weak or ineffective strategies for processing information both in the classroom and in their own study (Rachel, Daigle, & Rachel, 2007).

Good note making has been shown to be positively correlated with academic achievement and yet when making notes from lectures or from text most students miss between 60 - 70% of the key points (Kiewra, 1985b, O'Donnell & Dansereau, 1993). Unfortunately, material omitted from notes has been found to have only between 5 - 15% chance of being recalled (Howe, 1970, Aitken, Thomas & Shennum, 1975).

Even when they have good notes many students still have great difficulty organising the information they have collected. Fifty-two percent admit that their notes are disorganised and 61% report having trouble sequencing the ideas to make coherent sense (Rachel et al. 2007).

Even given well organised, well structured notes with summaries provided and most of the hard work done, many students still employ ineffective or redundant study strategies to process those notes like rereading and recopying. Two thirds of students at the secondary level have been found to study for tests purely by rereading their notes with more than half of them doing that reading the day before the test or examination. Of those who try to actively process the information they need, many do nothing more than recopy their notes verbatim and 50% use passive repetition of key points as their single study technique (Jairam, & Kiewra, 2009).

The best students in the world - those whose study is most effective in helping them to pass their examinations - all have one characteristic in common, the deliberate use of a variety of learning strategies. In other words they treat learning as a process requiring many different techniques and strategies depending on the subject and the context. They actively seek out options for every stage of the learning process, they try out different things and they notice what works and what doesn't. To do this the best students are continuously engaged with both the subject matter they are learning and the processes they are using to learn that subject matter. They view any learning failure as a failure of process rather than that of the individual, they find better processes and apply them, they reflect on the results and they continually improve the success of their learning efforts (Derry, & Murphy, 1986, Hattie et al, 1986, Kobayashi, 2004, Yaworski, Weber, & Ibrahim, 2000).

Unfortunately the direct teaching of learning skills is still an uncommon topic in most school programmes. Only 20% of teachers believe that teaching students “study skills” is a priority (James, 2006) and only 17% of students report that teachers actively help them to learn or improve their study skills (Saenz, & Barrera, 2007).

The wider need for Learning Skills training:

It has often been said that most of the jobs children in school today will take have not been invented yet and that most of today’s children will have at least 5 different careers in their lifetime and will need to be able to re-invent themselves for each career change. Also it is said that 95% of jobs in the future will involve information processing of some kind through an electronic interface of some kind.

A 2007 survey of 400 hiring executives of major USA corporations quoted in both *The Global Achievement Gap* (Wagner, 2008) and *21st Century Skills* (Trilling & Fadel, 2009) asked what knowledge *and* skills they were looking for in potential future employees. The results were, in priority order:

- 1) Oral and written communication skills
- 2) Critical thinking and problem solving skills
- 3) Professionalism and work ethic
- 4) Teamwork and collaboration skills
- 5) Ability to work in diverse teams
- 6) Fluency with information technology
- 7) Leadership and project management skills

Knowledge of mathematics came 14th on the list just ahead of science knowledge and foreign language comprehension.

In 2009 the Organization of Economic Cooperation and Development (OECD) conducted a survey of 17 countries looking to determine the extent to which key skills - “*those skills and competencies young people will be required to have in order to be effective workers and citizens in the knowledge society of the 21st century*” – were defined, taught and assessed.

The survey discovered that the need was well recognised across the globe in various national curricula but often the 21st Century Skills were contained within the curriculum as smaller sets of broader ‘key’ competencies or skills.

“For example, the New Zealand curriculum makes reference to five key competencies: thinking; using language, symbols and text; managing self; relating to others; and participating and contributing. Poland has the following set of skills and competencies that have to be acquired by the end of lower secondary education: reading;

mathematical thinking; scientific thinking; communicative skills; technological skills; information usage; self-orientation; team working. Other OECD countries that have similar overarching sets of key or basic skills or competencies include Belgium, Italy, Korea, Mexico the Slovak Republic, Spain, and Turkey (Ananiadou & Claro,2009, *21st Century Skills and Competences for New Millennium Learners in OECD Countries*).

In the USA itself (OECD member since 1961) 46 states have now agreed on a common core curriculum of 21st Century skills to be taught at the elementary level. Called the *Elementary Integrated Curriculum* (EIC) it includes:

Academic Success Skills:

- Collaboration
- Effort/Motivation/Persistence
- Intellectual Risk Taking
- Metacognition

Creative Thinking Skills:

- Elaboration
- Flexibility
- Fluency
- Originality

Critical Thinking Skills:

- Analysis
- Evaluation
- Synthesis

The OECD working group summed up their overall findings as:

- 1) Most countries subscribed to the importance and policy relevance of 21st century skills and competences
- 2) Most countries were attempting to integrate these skills in a cross-curricular way, across subject areas
- 3) Clear policies for formative or summative assessment of these skills were lacking in all countries surveyed
- 5) There were few teacher training programmes available in any country that targeted the teaching or development of 21st century skills.

The IB has the opportunity to lead the field world-wide in this area as long as we can create a universal workable framework for the teaching of these 21st Century skills and address the identified deficiencies.

'Learning Skills'

The evidence for the effectiveness of the direct teaching of learning skills is quite robust but in the literature such evidence is usually related to measuring the effects of one specific intervention.

Teaching students self questioning strategies was found to be a successful intervention in learning to read by Huang (1992).

A meta-analysis by Hembree (1988) concluded that training in the deliberate reduction of test anxiety improved test performance and increased grade point average.

Training in the use of structural aids to learning – such as advance organizers, summarizing (Armbruster, Anderson and Ostertag, 1987), rehearsal (Dwyer, 1986), the selection and use of effective task strategies (Schunk & Gunn, 1986), the construction of graphic organizers, summary writing (Weisberg & Balajthy, 1990) and writing strategies like planning, organizing, writing, editing, and revising (Englert, Raphael, Anderson, Anthony & Stevens, 1991) uniformly produce significant improvements in learning effectiveness.

In a large-scale study (Noble, Davenport, Schiel & Pommerich, 1999) of high school students academic performance and proficiency in study skills were found to be directly related to course GPA and standardized achievement score.

In an investigation of the determinants of success of college students the two most significant factors were found to be clear achievement goals and an understanding and application of good study skills (Robbins, S., Lauver, L., Le, H., Davis, D., Langley, R., & Carlstrom, 2004) Interventions for the enhancement of learning have also been found to have very positive effects on affect. For example, students reported greater liking for teachers and increased agreement with the goals of education (Gadzella, Goldston & Zimmerman, 1977) or more positive attitudes towards study and specific subjects (Bean, Singer, Sorter and Frazee, 1986). A more positive attitude also was reflected in reduced anxiety (Nist, Mealey, Simpson, & Kroc, 1990) and increased task persistence (Relich, Debus & Walker, 1986).

The most recent analysis of the effects of learning skill training interventions is from Lavery (2008). In her meta-study of available papers in the field she found that the most effective skills based interventions for improving learning were, in priority order:

- Organising and transforming information
- Learning to use delayed gratification
- Self-verbalisation for focus

- Self assessment
- Asking good questions
- Taking good classroom notes
- Using memory techniques
- Goal setting
- Reviewing information regularly
- Self monitoring success of study strategies
- Using visualisation
- Time management
- Organising the study environment

Lavery also noted though that the greatest improvements in student learning were achieved by strategy interventions that aimed at the *forethought* phase of learning, such as goal setting and planning, self instruction and self evaluation.

Effective Learning

Intrinsically motivated learning is achieved through the application of a dynamic, internally controlled set of metacognitive, cognitive and affective processes that positively influence a student's tendency to approach, engage with, expend effort on, and persist in learning tasks in an ongoing, self directed manner (McCombs, 1984). Exactly what everyone does when they are intensely interested in something.

In order to maintain interest in their learning tasks and implement efficacious learning strategies and skills it is necessary for students to be aware of their own learning competencies, abilities and deficiencies. It is also necessary for them to realise that they can take positive self control in learning situations and in so doing increase both their sense of personal efficacy and their learning achievement. Once perceptions of competency and positive self control have been developed, students are more inclined to try out new cognitive and affective strategies in new learning situations and they then develop more control over their own learning in a self directed manner (Kirschenbaum, & Perri, 1982; Lodico, Ghatala, Levin, Pressley, & Bell, 1983).

It is in the separation of the metacognitive or executive functions of learning from the cognitive and affective skills and strategies that some clarity can be brought to the issue of the relevant learning skills necessary for improved general academic performance of today's school students.

In support of McCombs, Hattie, Biggs & Purdie (1996) also distinguish clearly between metacognitive, cognitive and affective interventions. They describe *metacognitive* interventions as those that focus on the self management of learning - planning, implementing and monitoring learning efforts – as well as gaining the knowledge of when, where, why and how to

use specific learning strategies in their appropriate contexts. *Cognitive* interventions are described as those which focus on developing the particular skills necessary to facilitate the acquisition of knowledge or skill, whereas *affective* interventions are described as those that focus on such noncognitive aspects of learning as motivation, self concept and the skill of selective attribution.

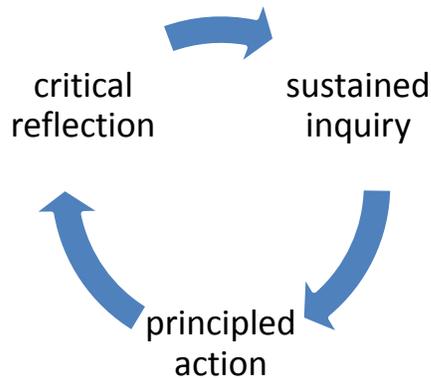
Metacognitive Skills:

Metacognition refers to the learners' awareness and knowledge of their own learning processes, as well as their abilities and tendencies to control those processes during learning (Derry & Murphy, 1986). Metacognitive activities for regulating and overseeing learning as defined by Brown, Bransford, Ferrara & Campione (1983) include planning (goal setting, choosing strategies, scheduling time and resources,), monitoring (checking progress, reviewing, rescheduling), and evaluating outcomes (both process and content). Metacognitive interventions successful in enhancing achievement were found by Wang (1983) to include direct instruction in self-management skills (planning, information organization, goal setting, scheduling and time management) plus providing opportunities for self managed learning.

Karoly and Greiner (1976) found that students that received training in self-monitoring, self reward, and planning strategies significantly outperformed other groups on nearly all measures of academic achievement.

Metacognitive skills are the umbrella skills which drive the whole learning improvement process and through which the greatest improvements in academic performance can be achieved. Metacognition simply means the executive function of thinking. That is, that part of our thinking that is always reflecting on the success or otherwise of our strategy use, looking to make changes and try out new ideas where necessary, implementing changes and reflecting on results.

Within the IB a focus on metacognition is already well established through the application of the inquiry learning cycle which in itself is intrinsic to the entire curriculum:



Throughout the IB the inquiry cycle is used in a number of ways including content reflection, lesson design, product design and experiential learning. Through the Reflection skills cluster of ATL this cycle will be used to focus students on the processes of learning they are using with the aim of developing awareness of choice in thinking and learning processes and building metacognitive skills.

The implementation of metacognitive skills training helps build self regulated learning. Once a student has built up a *library* of specific cognitive and affective learning strategies and skills they can then learn the skills necessary to employ, monitor, check and evaluate the success of the strategies they employ. (Paris & Winograd, 1990; Weinstein, 1987; Zimmerman & Martinez-Ponz, 1992)

Cognitive skills:

Cognitive skills have the purpose of teaching learner-initiated use and practice of active information processing and retrieval strategies as well as study habits and learning skills. Some of the specific cognitive skills which have been shown in the literature to bring about significant improvements in learning are:

- Making effective notes – in class and for studying
- Organising ,transforming and summarising information – mind mapping, spider diagrams, graphic organisers
- Using structural writing planners – for different types of essays, scientific reports, academic papers, research reports - organizing, writing, editing, and revising
- Timetabling – general task mapping and specific use for assignments, assessment preparation, goal setting
- Memory techniques – mnemonics, multi-sensory techniques, visualisation, review

- Questioning
- Calibrating own learning preferences – mental representation, environmental and experiential preferences
- Self assessment

(Derry et al, 1986, Hattie et al, 1986, Kobayashi, 2004, Yaworski et al,2000).

Research shows that possessing a good repertoire of cognitive learning strategies and applying metacognitive awareness to the selection and use of those strategies correlates well with higher academic achievement (Dart & Clarke, 1991; Pintrich & Johnson, 1990; Nist et al., 1991; Volet, 1991; Westman & Lewandowski, 1991).

These are some of the skills that will be found in ATL in the Thinking, Multiliteracy, Organisation, and Communication clusters which can then be taught either by direct instruction or through embedding within existing subject matter.

Affective skills:

In addition to the cognitive skills mentioned above it is also advantageous for students to learn the skills that enable them to gain some control over mood, motivation and what we tend to call *attitude*. These are the skills needed for students to build resilience in learning, to learn to deal effectively with any setbacks and difficulties, to learn how to bounce back, make changes and persevere – the skills of the self-regulated learner.

The self-regulated learner is the one who is using the metacognitive process, as described above, to not only monitor effective cognitive strategies for learning but also to regulate their emotional or *affective* responses in learning situations. These students, whether through training or natural ability have learned how to monitor their own emotional state and its effect on their learning and how to cope well with the emotional highs and lows of academic endeavour.

Through the PYP students are encouraged to notice and develop positive aspects of emotional control but it is in the MYP where the self-management skills underlying such control will be made more explicit.

Studies of self-regulated learners have found that many of these students have strategies that they use in a deliberate way to help them generate self-belief and an intrinsic motivation to learn. They tend to focus on effort rather than ability, on learning for understanding rather than grades and they maintain a belief in the malleability of their own intelligence (Dweck, 2007). They deliberately use delayed gratification and positive self-talk to generate self-motivation,

they exhibit good impulse control, and in order to improve performance and learning often use attention focusing tactics to screen out distractions and improve concentration (Pressley & Woloshyn, 1995).

Students who employ self-regulated, self-determined approaches to learning not only achieve higher levels of academic achievement than those that don't, they also experience a sense of personal satisfaction in their work and are more inclined to make adaptive changes to enhance future performance (Pintrich, 2000; Ryan & Deci, 2000; Zimmerman, 2000).

Students, who experience a greater sense of competence and self-direction in their daily learning, are more likely to persist with difficult learning tasks and they experience an enhanced sense of personal well being and satisfaction on completion (Baard, Deci, & Ryan, 1998; Sheldon & Kasser, 1998).

While every teacher would probably agree with the research findings above the question still remains – are these affective attributes of students which predispose them to self-regulated, self-motivated learning based on innate disposition or personality or are they teachable skills?

The best evidence for the *teachability* of affective skills comes from the research on attribution retraining. Teaching children how to deliberately change what they attribute as cause, particularly in situations of learning failure or poor performance has proved to be a successful intervention, resulting in:

- improvements in reading persistence (Chapin & Dyck, 1976, Fowler & Peterson, 1981)
- higher levels of completion and higher scores with computer assisted mathematics instruction (Okolo, 1992)
- increases in mathematics scores (Horner, Gaither, Gaither & Gaither, 2004)
- improvements in motivation (Koh, 2008)
- improvements in reading comprehension and retention of improvements over time (Berkeley, Mastropieri & Scruggs, 2011)

Other affective skills training that has been shown to produce changes resulting in higher academic performance include:

- relaxation training for reducing exam anxiety – (Hembree, R. 1988)
- developing an internal locus of control (Nowicki, Duke, Sisney, Stricker & Tyler, 2004)
- improving motivation, performance and self esteem (Meuller & Dweck, 1998, Niiya, Crocker, and Bartmess, 2004).
- improving achievement motivation (Dweck, 2007).

Affective self-management skills are teachable and they can make a huge difference to a child's motivation and resilience. Self Management skills training is the newest addition to the ATL portfolio of skills and has within it the potential to address some of the most critical influences on a student's learning which lie at the heart of helping students to achieve the characteristics of the learner profile.

Through the affective skills component of the Self Management Skills cluster teachers will get an opportunity to focus on and reinforce examples of:

- persistence and perseverance
- focus and concentration
- overcoming distractions
- reducing anxiety
- practicing delayed gratification
- managing self talk

The Skills Framework

The Key Skill Clusters are elaborated here as a guideline only, they are neither exclusive or exhaustive and many skills overlap between clusters.

The skill clusters as outlined in Table 1 can be simplified or added to by individual schools or individual teachers.

The key questions to be answered with respect to every skill cluster are:

- what are my present skills in this area and how do I measure them?
- what skills can I improve on?
- how do I improve those skills?
- what evidence will I need to generate to demonstrate improvement in those skills?

Skills Cluster	Definition	Key Skills
Communication and Collaboration	<p>Effective exchange of thoughts, messages, and information</p> <p>Working cooperatively with others</p>	<ul style="list-style-type: none"> - active listening - giving and receiving feedback - interpreting meaning through cultural understanding - clear speaking - writing for different purposes - presenting to an audience - non-verbal communication - negotiating - actively participating in social media networks - respecting socio-cultural differences - accepting others - demonstrating empathy - respecting different opinions - delegating - taking responsibility for own actions - resolving conflicts - working as a team - accepting others - helping others - building consensus - building social media networks
Self Management	Effective management of time, resources and information	<ul style="list-style-type: none"> - keeping to class schedules - keeping to assignment deadlines - creating study planners, homework planners and sticking to them - time- lining all assignments - turning up to class with the right gear - filing all information systematically - goal setting, planning and implementation - finding information for all school subjects in different media - organising information logically - structuring information correctly in essays, reports - using different information organisers for different purposes - calibrating own sensory learning preferences

	<p>The skills of emotional management</p>	<ul style="list-style-type: none"> - demonstrating persistence and perseverance - practicing focus and concentration - developing mental quiet - overcoming distractions - learning to reduce anxiety - practising delayed gratification - managing internal self talk - managing impulsiveness - anger management - dealing with bullying - developing resilience - attribution retraining - identifying self-motivation strategies and using in different contexts
<p>Information, Media and Critical Literacies</p>	<p>Understand, use and critically evaluate multimodal , multimedia information</p>	<p>Information Literacy:</p> <ul style="list-style-type: none"> - reading and comprehension - identifying gaps in knowledge and formulating key questions - researching from a variety of sources - collecting, recording and verifying data - identifying different points of view, bias - organising, interpreting data - implementing intellectual property rights and plagiarism rules - referencing, citing, footnotes, constructing a bibliography - indentifying primary and secondary sources - making effective notes, in class and for studying - transforming and summarising information - using structural writing planners for different academic tasks - identifying preferred personal sensory modes of information processing, storage and recall - using memory techniques for information storage and recall - speed reading - representing information in multimodal forms

		<ul style="list-style-type: none"> - ‘translating’ information from one sensory mode to another <p>Media-literacy:</p> <ul style="list-style-type: none"> - using a variety of technologies to source information - sourcing from a variety of media platforms - interpreting and analysing visual media and multimedia - understanding media transmission and interpretation of ideas, values and beliefs <ul style="list-style-type: none"> - making informed choices about personal viewing experiences - investigating social media influences <p>Critical literacy:</p> <ul style="list-style-type: none"> - compare different media interpretations of common events - critically analyse various ‘text’ forms for underlying meaning - explore the effect of different media platforms in influencing popular opinion - interrogate media representations of societal issues for prevailing structural themes <p>Modal fluency:</p> <ul style="list-style-type: none"> - demonstrate awareness of the effects of different modes of information representation and presentation - demonstrate awareness of different media interpretations of events and ideas - utilise different media to obtain perspectives - utilise multimedia and multi-modal technology in presentations - actively make connections between different media resources in presentations
Critical Thinking	Developing the skills of critical analysis	<ul style="list-style-type: none"> - identifying problems - aims, goals and objectives - considering from all perspectives - understanding other points of view

		<ul style="list-style-type: none"> - developing contrary arguments - breaking down into component parts - planning - considering consequences and sequels - identifying obstacles - applying arguments logically - combining parts logically - deductive reasoning - inductive reasoning - designing improvements to existing machines, technologies - making logical, reasoned judgements - creating arguments to support judgements - systems thinking
Creativity and Innovation	Exercising initiative to consider challenges and ideas in creative ways	<ul style="list-style-type: none"> - generating ideas - generating questions - considering all alternatives - creating novel solutions - generating impossible ideas - making connections between random things - utilising old ideas in new ways - combining parts in new ways - designing new machines, technologies that do not exist yet - making intuitive judgements - guesswork - generating 'what-ifs'
Reflection	Reflecting on learning and experience in order to support personal development through metacognition	<ul style="list-style-type: none"> - considering ethical, cultural and environmental implications of issues - considering personal relationships to people, ideas and concepts - building understanding of personal learning strengths and weaknesses - developing awareness of the processes of effective learning - implementing different learning strategies - measuring effectiveness of different learning

		<p>strategies</p> <ul style="list-style-type: none"> - demonstrating a preparedness to make changes to ineffective learning strategy use - creating a reflective journal/portfolio of personal learning experiences focused on both process and content - creating a record of personal learning change and improvement
Transfer	Transferring learning by making connections and applying skills, knowledge and understandings in new situations	<ul style="list-style-type: none"> - exploring conceptual learning across multiple subject areas - making connections between learning gained in different subject areas - creating projects and products using knowledge and skills gained across different subject areas - utilising effective learning strategies in a variety of subject contexts - using familiar learning skills with unfamiliar content - changing the context of an inquiry to gain different perspectives

Inquiry Learning, Metacognitive Awareness and Reflection

The structural element that most differentiates the IB from other curricula approaches is the emphasis on inquiry learning. At the PYP level inquiry is pursued through the 3 phase cycle as illustrated below.

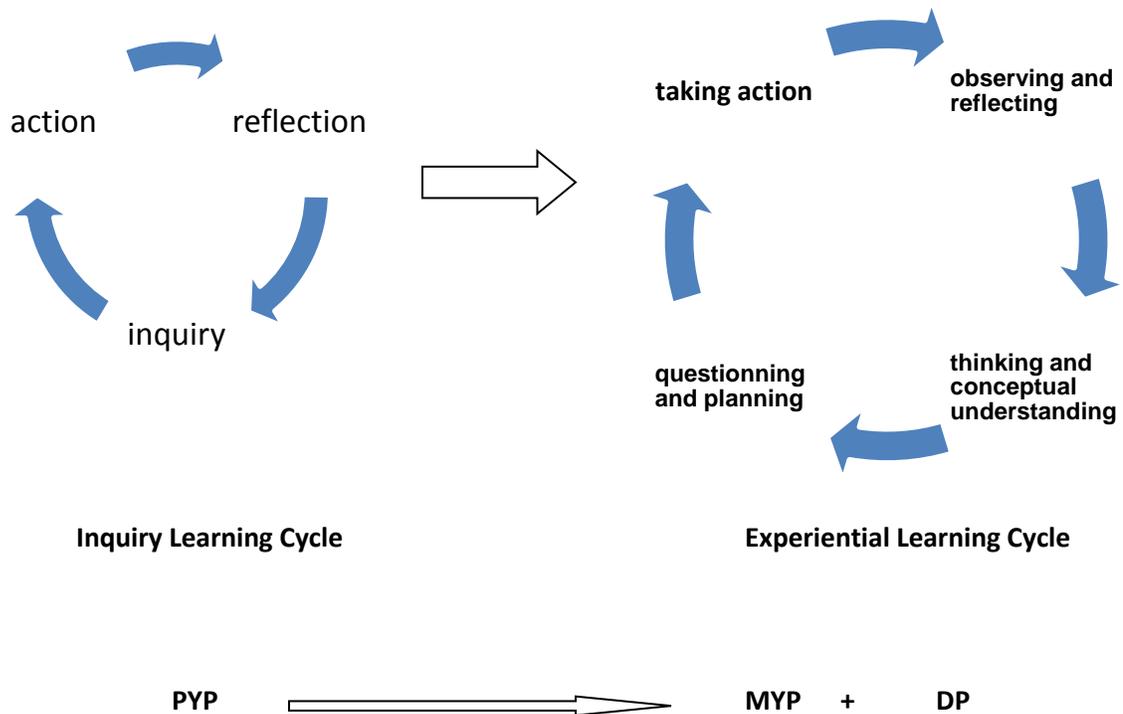
This cycle is the age appropriate means of beginning the development of metacognitive awareness through reflection.

At the MYP level students will be asked to engage in concept based inquiry learning which will include a reflection phase where they will reflect on three things:

- 1) the subject matter they have explored and learned – from the point of view of social, environmental, ethical implications, future developments, global impact etc. depending on the subject
- 2) the ATL skills they were focused on and their observable level of comfort and competence with that skill

- 3) the learning strategy or strategies they employed through the unit of work and the impact on their learning success

This level of reflective inquiry learning uses the same principles as exemplified in the 3 phase PYP inquiry learning cycle but adds in one more age appropriate step to raise the cognitive level and develop into the full experiential learning cycle



The experiential learning cycle can be used as a pedagogical framework for inquiry lesson design as well as a reflective framework for developing full metacognitive awareness within the student of both of both product and process .

The most effective method of improving the learning and thinking skills of students is through ongoing, process focused teaching by subject teachers within standard subjects. The process focused teacher is the one whose highest value is the development of excellent learners and who uses their particular subject matter or content as the vehicle through which to teach effective learning processes. This is not to deny the importance of any taught content but is an approach which brings about a dual focus in the classroom – on both content and process. Many studies have shown that the most uniformly positive results in terms of academic engagement,

understanding, transfer of skills and high performance in assessments come about through a focus in the classroom on learning strategy training in a metacognitive, self-regulated context in connection with specific content (Hattie et al, 1996).

This is the aim of bringing ATL to the heart of the MYP as the learning skills training base through which the aspirations of the learner profile can be achieved for every student.

Developing the Self-regulated Learner

“One source of the differences between the highest- and lowest-achieving children is the degree to which they become self-regulators of their own learning” (Biemiller & Meichenbaum, 1992).

“SRL [Self-regulated Learning] is defined as a goal oriented process, proceeding from a forethought phase through self-monitoring and self-control to self-reflection. SRL can foster deep and meaningful learning as well as significant gains in student achievement” (Pintrich, 2000, 2004)

“Students who are more cognizant of themselves as learners and who can better regulate their own intellectual activity are more successful in learning, problem solving, and transfer, and function better in overall academic capacity” (Vrieling, Bastiaens & Stijnen, 2010)

Self-regulated learners have learnt how to:

- set learning goals
- plan out their study
- ask good questions
- self-interrogate as they learn
- generate motivation and perseverance
- try out different learning processes
- self-monitor the effectiveness of their learning
- work to deadlines
- reflect on achievement and
- make changes to their learning processes where necessary

(Zimmerman and Schunk, 1989)

When any child has reached this level of self-regulation, they are ready for all forms of higher education, for the demands of a changing workplace, and for the world of work and enterprise. They have gained all the capabilities they need to be a lifelong learner.

Surely this is the goal of all school-level education?

If we, as teachers, make the primary focus of our teaching the development of the skills of the self-regulated learner, using our own subject material as content to practice these skills on, then we will produce students rich in both subject and process knowledge, fully capable of continuing learning for life.

Teaching for Self-regulated learning

One characteristic of self-regulated learners of all ages, when engaged with a learning task is their employment of 'surplus' or 'metacognitive' capacity. As they work, they tend to maintain a dialogue with themselves and their peers about the task itself and their progress in undertaking it. This self-talk seems to help them call on the skills they need at appropriate times and to work their way through problems by providing a constant running overview of their own progress. Children who haven't learnt how to apply this ongoing metacognitive self-monitoring often become overwhelmed by the task itself, they get stuck in repeating a poor strategy and they tend to talk less and less as they get more frustrated. At some point they are likely to ask someone else how to do the task or to spontaneously comment about their own lack of ability – "I can't do this..."

This process was clearly demonstrated in a 1992 study of 70 1st – 6th Grade students focused on particular learning tasks, in which the highly self-regulated learners were seen to talk twice as much about the task and to talk much more to their peers and less to the teacher than were the less self-regulated learners. More significantly when considering teaching processes, the students' teachers were seen to 'help' the less self-regulated learners at 8 times the rate they helped the others. The net effect of this teacher 'help' was to allow one group of students to practice self-regulation and the other group to practice dependency on the teacher for their thinking and learning strategies.

	Student Self Regulation	
	high	low
Self initiated task statements	22 per hour	11 per hour
Questions asked by students	questioning peers half the time	mostly asking the teacher
Task directed sentences from the teacher	2 - encouraging the child's own thinking and planning	17 - doing the thinking and planning for the child

(Biemiller & Meichenbaum, 1992).

In the early '90s *learning functions* - "psychological functions that have to be fulfilled for high-quality learning to take place" (Schuell, 1993; Simons, 1993) were identified and were classified into three groups, processing, affective and regulation functions – all of which have direct parallels with the cognitive, affective and metacognitive learning skills described in this document. These learning functions were then found to be either 'teacher initiated' or 'learner initiated'. Teachers were found to initiate learning functions either by "substituting the learning function for the learner (eg. provide overview of the material to be studied), or by activating the students to use a particular learning function (eg. encourage comparison through the use of questions)." Learner initiation of these same learning functions was found to occur either when activated by a teacher (as in the second case above) or when no teacher direction, influence or help was available or forthcoming (Vermunt & Verloop, 1999).

With these findings in mind teacher regulation of student learning can be described in a continuum from *strong* through *shared* to *loose* regulation as described below:

Regulatory styles of Teachers

- **Strong teacher regulation**
 - teacher controls all information, regulates student processing , answers all questions, clarifies, explains, summarizes
 - student thinking at a minimum, teacher as mental 'crutch'
- **Shared regulation**
 - teacher provides access to resources, skills training, questions, problem statements, concepts, ideas, learning outcomes
 - students actively engage with information in order to answer questions, follow leads, solve problems
 - students thinking engaged, teacher as guide and support
- **Loose teacher regulation**
 - teacher's only functions are supplying the learning objectives and assessing the students level of achievement against them
 - student thinking at a maximum, teacher not involved in student thinking or learning at all

The degree of teacher regulation can then be paired up with the degree of student self-regulation in a matrix which helps to identify both congruence and friction between teaching and learning.

Degree of Student-Regulation of Learning	Degree of Teacher-Regulation of Learning		
		Strong	Shared
High	Destructive friction	Destructive friction	Congruence
Intermediate	Destructive friction	Congruence	Constructive friction
Low	Congruence	Constructive friction	Destructive friction

(Vermunt & Verloop, 1999)

Destructive friction occurs when teaching and learning regulation are mismatched to the point where the teaching strategy has a negative effect on the learning process, outcome or skill development of the student. This happens in two situations

- I. when the student has the skills needed to regulate their learning to a much higher level than they are being enabled to by the teacher, and
- II. when the student's self regulation skill level is much below what is expected by the teacher.

Constructive friction occurs when the mismatch between teacher and student regulation has a positive effect on the learning process, outcome or skill development of the student. This happens in two situations:

- I. when the teaching process focuses on helping the student develop their skills of self regulation, and
- II. when the skills themselves enable a student, in the right environment, to self-develop those skills to a higher level

Congruence is the third possible interaction state within this model and it occurs when the degrees of regulation of teacher and student are perfectly matched.

Of the three degrees of teacher regulation described above only within the situation of *strong* regulation is there no possible growth of the skills of self regulation within the learner. With both *shared* and *loose* teacher regulation there is opportunity for developing students' skills of self regulation but only with *shared* regulation does that growth happen with the guidance and support of the teacher. In the *loose* regulation situation growth in students' self-regulation skills can occur but only through the instigation and application of the student alone.

Adopting a *shared* regulation style in the classroom appears, within this model, to be an excellent means to achieve a growth in self-regulated learning skills within students, with the provisos that:

- 1) the self-regulation skill levels of the students are being constantly monitored, particularly to identify when any individual reaches a high level proficiency, and
- 2) independent study materials and resources are available for any such student to use once they reach demonstrable high level proficiency in self-regulation in order to progress their learning and avoid any possible destructive friction.

If the focus of teaching is on the development of the skills of self-regulated learning and the pedagogy employed is one of *shared* regulation of learning then the student will be enabled by their school learning experience to gain the skills needed to be a lifelong learner.

This can be achieved by the implementation of what has been called Process Oriented Instruction.

Process Oriented Instruction (POI)

“The aim [of process oriented instruction] is to teach domain-specific knowledge and the learning and thinking strategies that students need to construct, change and utilize their knowledge of the subject domain, in coherence” (Vermunt, 1995).

“When learning is conceived more as self-regulated knowledge construction than as taking in already existing external knowledge, the role of teaching changes too, from transmission of knowledge to supporting and guiding self-regulated knowledge construction” (Lonka, 1997).

“Process-oriented teaching is teaching that facilitates independent learning, supporting students to become proficient learners in the field concerned and preparing them for lifelong learning” (Bolhuis & Voeten, 2001).

Three general information processing styles have been identified in the classroom:

- 1) *Traditional teaching* - where the emphasis is on the transmission of information, the teacher spends most of the time explaining the subject matter and the main activities expected from the student are listening and possibly writing notes. The teacher does not engage much with students except to answer questions, nor assign tasks or give instruction concerning the learning process
- 2) *Activating teaching* - teaching that actively involves students in processing information where the teacher is asking questions, paying attention to student responses, giving feedback, stimulating peer interaction, giving learning task instruction, generating collaborative and cooperative activities

- 3) *Process-oriented instruction* – similar to *Activating* but with the focus of the teaching being placed on the strategies and techniques the students are using to process the subject information. The teacher ‘teaches’ learning skills by modeling, demonstration, creating skill-based tasks, monitoring performance, asking for feedback and helping build the student’s metacognitive awareness.

The main problems with the *Traditional* teaching style are that there is little or no focus on how the student is processing the information, no development of learning, social or emotional skills and no practice of self-management happening in the classroom. This style does not help students to improve their learning ability or to become independent self-reliant learners. They may still be able to do so, on their own, but they are not supported to do so in the classroom.

The *Activating* style achieves greater engagement of students, which helps to improve student motivation, levels of understanding and retention of information and may raise the degree of self-regulation of the students if learning exercises are designed to do so but if there is no focus placed on the strategies, techniques and skills of learning there will be little development of the attributes of independent or lifelong learning.

Only by using a *Process-oriented* approach in the classroom can teachers be engaged directly with the development of the student’s learning and self-regulation skills and be able to guide and help the students to improve both. POI is the approach that is needed to develop the metacognitive awareness necessary for the successful self-regulated learner but it is not a common approach.

In a 2001 study across 130 lessons delivered in six Dutch secondary schools (in Dutch (10%), foreign languages (21%), mathematics (16%), science (24%), social studies (26%) and arts (3%)), the time spent by teachers using each of these teaching styles was found to be:

- 30% transmission – teacher explains students listen, questions by teacher of students
- 40% activating – teacher getting students to process information through directed tasks, using student feedback to guide lesson
- 25% procedural and behavioural instruction
- 5% process focused teaching – teaching students to set learning goals, choose and execute learning strategies, diagnose and monitor the learning process

For teachers, learning to move from a traditional subject focused style of teaching to a skills based, process oriented, style aimed at promoting self-regulation of learning by students will be great challenge but one which should yield excellent results in terms of student engagement and learning skill development.

The implementation of process-oriented teaching in schools, particularly in the Netherlands since 1999, has helped clarify six key principles. They can be read in any order, each is important and linked to the others. Teachers are advised to:

- 1) Focus on developing metacognitive awareness – modelling, think-alouds, process reflection
- 2) Teach the cognitive skills important for knowledge development in your field using your content as subject matter
- 3) Treat learning as a social phenomena – observing, questioning, relating, engaging with others collaboratively and cooperatively to achieve results
- 4) Pay attention to the emotional aspects of learning – teach affective skills - fostering resilience, perseverance, effort, intrinsic motivation, positive attribution patterns
- 5) Develop reflection on both process and content
- 6) Move gradually from teacher regulation to student regulation of learning – help students to gradually acquire the competencies to regulate all aspects of learning:
 - setting learning goals
 - choosing and executing learning strategies
 - diagnosing and monitoring the learning process
 - self assessing
 - evaluating learning results

(Bolhuis, 2003, Bolhuis & Voeten, 2001, Hattie et al., 1996, Hattie, 2009).

Changing Roles:

The implementation of process oriented, skills based teaching will be a challenge for both teachers and students. The teacher's role will become more facilitative and the student's role more inquiring. Many students, especially those comfortable with or habituated by transmission teaching will find it difficult to adjust to a classroom scenario where they are expected to do the learning for themselves rather than be told what to learn. We can anticipate some student confusion and maybe even rebellion but if, as has been suggested, the change to self regulated learning is gradual every student should adjust successfully.

Teachers can expect to take on a number of different roles:

- 1) Teacher as diagnostician – in process-oriented instruction teachers have to develop skills in diagnosing students' learning and thinking strategies to be able to match teaching and learning to avoid any destructive frictions
- 2) Teacher as challenger – teachers need to constantly challenge students to try out new thinking and learning strategies, to transfer learning strategies into different contexts, and to continually raise the level of difficulty of learning exercises to maintain growth in learning skill proficiency

- 3) Teacher as model learner – teachers need to demonstrate the learning and thinking strategies, techniques and skills for the acquisition and construction of knowledge within their subject domain so that students can get a clear picture of what is required
- 4) Teacher as activator – once students have a clear understanding of the method and use of particular learning strategies, the teacher can then activate that understanding by getting students to apply the strategies to their particular subject matter
- 5) Teacher as monitor – once students start to gain proficiency in self-regulation, the teacher's role changes to one of monitoring the effectiveness of the strategies they are employing and helping maintain the links to established learning objectives and assessment criteria
- 6) Teacher as process assessor – proficiency in learning skills needs to be regularly assessed independently through psychometric testing or the use of self-reflective journals and portfolios or tested in-situ by raising the level of difficulty of information to be processed and monitoring the strategy use

(Vermunt & Verloop, 1999)

Assessing Learning Skills

“In the traditional teacher-centred, content-focused transmission model of teaching and learning... assessment focuses on the products of learning rather than the how and why of student learning” (Anderson, 1998).

“We don't pay a lot of attention right now to giving students feedback on their progress as learners. Mostly, students get grades that tell them how they have done relative to their classmates. That information is not useful feedback on their progress as learners, nor does it do anything to help students develop skills for self-assessment” (Cross, 1998)

“If the improvement of learning is the priority for the twenty-first century, teachers and students need to be able to use the results of their assessment to improve their own performance. This is unlikely to happen unless students and teachers have information not only about students' content knowledge but also about how they are developing as lifelong learners in terms of cognition, metacognition, motivation and affect” (de la Harpe & Radloff, 2000)

Students' cognitive, affective and metacognitive skills can be assessed using many different and widely available instruments – usually questionnaires. Some examples being:

LASSI – Learning and Study Strategies Inventory (Weinstein, Zimmerman & Palmer, 1988)

available at <http://www.hhpublishing.com/assessments/LASSI/>

MSLQ - Motivated Strategies for Learning Questionnaire (Pintrich, Smith, Garcia & McKetchie, 1991), available at <http://www.indiana.edu/~p540alex/MSLQ.pdf>

ILP – the Inventory of Learning Processes (Schmeck, Ribich, & Ramanaiah, 1977)

LTS - Reasoning Learning Tests (Guthke, 1982)

LPQ - the Learning Process Questionnaire (Biggs, 1987)

and there are many others.

All characteristics of the self-regulated lifelong learner can also be assessed separately or in combination using teacher constructed assessment techniques such as CATs – Classroom Assessment Techniques (Angelo & Cross, 1993) available at <http://www.celt.iastate.edu/teaching/cat.html>

Student cognitive and metacognitive characteristics can also be assessed using personal interviews using SRLIS – the Self-Regulated Learning Interview Schedule (Zimmerman & Martinez-Pons, 1986)
http://technologication.com/files/2010/03/Zimmerman_Pons_Student_Self_Regulation.pdf

Students can also be encouraged to use Learning Logs (Dart & Clarke, 1991) where they write, on a weekly basis descriptions of their learning strategies and reflections on their effectiveness.

Whatever the means employed it is important for teachers, on a regular basis, to assess and monitor the development of learning skills within students and their movement towards the goal of self-managed learner.

For every teacher in every subject area the key questions to ask when planning any unit of work will be:

- what are my students' present skills in this area?
- how will I measure these skills?
- what exercises can I develop to i) introduce and teach these skills – possibly using subject matter outside my subject area and ii) practice the use of these skills within my subject area?
- what evidence will I want to see from the students to demonstrate improvement in these skills?

Four possible criteria for the formative assessment of stages of skill mastery that could be used in the lesson planner or assessment schedule by teachers are:

- Observation – the student is becoming familiar with the strategy or technique through observing demonstration of its use by the teacher or others and may be recording steps and stages in the strategy,

- Emulation – the student is practicing the skill, strategy or technique on simple content to get familiar with its use
- Self-control – the student is demonstrating the use of the skill, strategy or technique with significant, subject related content
- Self-regulation – the student is choosing to use the particular learning strategy without prompting or advisement from the teacher and is demonstrating efficacy through achievement of learning objectives.

Any student can then be monitored in their movement from:

Observation → Emulation → Self-control → Self-regulation

Outcome

The aim of the new ATL will be to help every student gain the skills they need to become a self-regulated lifelong learner and achieve all the characteristics of the Learner Profile.

The way to achieve the requirements of the new ATL will be through learning skills based, reflective inquiry learning aimed at developing self reflective learners through process focused teaching. The key to which is giving our students the learning skills they need and the opportunity to practise all these learning skills in a safe and supported environment. In other words, *by not doing the learning for them!!*

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