ATL

IN THE IB DIPLOMA

A Literature Review of the Key Skills of Effective Learning

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Introduction

There is a clear need for a direct focus on the teaching of effective learning skills – studies show that up to 73% of university students report difficulties preparing for an exam and most 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 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 a 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, 52% 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 such as rereading and recopying to process those notes. 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 achieve their desired qualifications, all have one characteristic in common, metacognitive awareness. In other words they have learned how to critically analyse their own learning and evaluate the effectiveness of the strategies they are using. 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, 1996, 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 Skills Training

It has often been said that most of the jobs that today's children will take have not been invented yet and that most of children in school today will have at least 5 different careers in their lifetime and will need to be able to re-invent themselves for each career change. It is also predicted that 95% of jobs in the future will involve information processing 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, 2010) 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) Collaboration across networks
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.

The International Society for Technology in Education (ISTE) has highlighted the following skills as critical for success in the digital world:

1) Creativity and Innovation
2) Communication and Collaboration
3) Research and Information Fluency
4) Critical Thinking, Problem Solving and Decision Making
5) Digital Citizenship
6) Technology Operations and Concepts (Larson & Miller, 2011)

Similarly the industry funded Assessment and Teaching of 21st Century Skills (AT21CS) consortium advocates for ten skills grouped into four categories:

Ways of Thinking

1) Creativity and innovation
2) Critical thinking, problem solving, decision making
3) Learning to learn, metacognition

Ways of Working

4) Communication
5) Collaboration (teamwork)

Tools for Working

6) Information literacy (includes research into sources, evidence, biases, etc.)
7) ICT literacy

Living in the World

8) Citizenship – local and global

9) Life and career
10) Personal & social responsibility – including cultural awareness and competence

(Binkley, Erstad, Herman, Raizen, Ripley & Rumble, 2010)

A big influence at the present time in US education is Tony Wagner from Harvard through his book "The Global Achievement Gap" where he argues for a set of seven core competences to be developed in every student by the time they leave high school:

1) Critical thinking and problem solving (the ability to ask the right questions)
2) Collaboration across networks and leading by influence
3) Agility and adaptability
4) Initiative and entrepreneurialism
5) Accessing and analysing information
6) Effective written and oral communication
7) Curiosity and imagination

(Wagner 2010)

In Australia Lee Crockett and others are exerting similar influence towards skills based education in their country and beyond by advocating for the creation of the 'global digital citizen' through the development of what they call their 21st Century Fluencies:

1) Information Fluency
2) Media Fluency
3) Creativity Fluency
4) Collaboration Fluency
5) Solution Fluency

(Jukes, McCain & Crockett, 2010)

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; 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 learning skills or competencies include Belgium, Italy, Korea, Mexico the Slovak Republic, Spain, and Turkey (Ananiadou & Claro,2009).

All over the world education authorities and individual schools are grappling with the question of what skills school students need to be taught in order to increase their chances of success in both higher learning and the world of work and enterprise.

In the broadest sense all the components or categories of skills in all these models could be termed 'learning skills' because they are all the components of what it takes to be a brilliant learner in a modern digital age. We are right now the first generation of a new age. An age where all information will ultimately become freely available and we may well see the highest priority of education move from content to process, from what to learn to how to learn. For this age, the pre-eminent skills will be the skills of effective learning.

Learning Skills

The evidence for the effectiveness of the direct teaching of the skills of effective learning is quite robust but in the available 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).

Time management and goal setting techniques were rated as the best self-management skills by undergraduate students (Gerhardt, 2007) and the self-management of learning has been shown to improve academic productivity and achievement (Dean, Mallott & Fulton, 1983).

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 organisers, summarising (Armbruster, Anderson and Ostertag, 1987), rehearsal (Dwyer, 1986), the selection and use of effective task strategies (Schunk & Gunn, 1986), the construction of graphic organisers, summary writing (Weisberg & Balajthy, 1990) and writing strategies such as planning, organising, 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 standardised 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 affinity 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 also reflected in reduced anxiety (Nist, Mealey, Simpson, & Kroc, 1990) and increased task persistence (Relich, Debus & Walker, 1986).

One of the most recent analyses of the effects of learning skill training interventions is from Lyn 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).

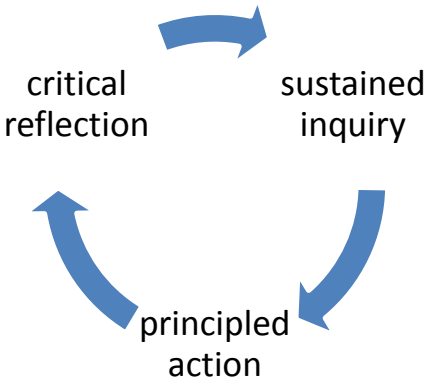
In support of McCombs' study, Hattie, Biggs & Purdie (1996) also distinguish clearly between metacognitive, cognitive and affective interventions. They describe *metacognitive* interventions as those that focus on the self-management of learning - planning, implementing and monitoring learning efforts – 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, and *affective* interventions are described as those that focus on such noncognitive aspects of learning such as motivation, self-concept, emotional management and resilience.

Metacognitive Skills

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.

> "There are two layers of problem solving: applying a strategy to a problem, and selecting and monitoring that strategy. Meta-cognition refers to higher-order thinking which involves active control over the cognitive processes engaged in learning" (Hattie, 2009)

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:



This cycle of reflection, when applied to the processes of learning within ATL, creates metacognitive awareness.

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 use their metacognitive skills to use, monitor, check and evaluate the success of the strategies they employ. (Paris & Winograd, 1990; Weinstein, 1987; Zimmerman & Martinez-Ponz, 1992)

Metacognitive training for students is the first necessary step in the process of improving all their ATL skills and is the common requirement for performance improvement in all ATL skills.

This is the aim of bringing an ATL focus into the DP as the learning skills training base through which, in combination with developing metacognitive awareness and inquiry learning in the classroom, all 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)

Training in self-regulation processes such as goal setting, self-monitoring and self-reflection has been shown to increase levels of both motivation and achievement (Schunk, 1996; Wood, Bandura & Bailey, 1990)

High achieving students have been found to use significantly more self-regulated learning strategies than low achieving students and their membership in either group has been predicted with 93% accuracy by looking at their use of self-regulated learning strategies (Zimmerman & Pons, 1986) which also has proved to be the best predictor of their achievement in standardised tests.

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)

Within the Diploma, through an increased focus on both the development of metacognitive awareness and the inculcation of the key ATL skills needed for effective learning students will gain all the skills needed to become self-regulated learners.

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 and have fulfilled all the aspirations of the Learner Profile.

ATL Skills

In considering the skills of effective learning it is first important to define what we mean by a skill.
The definition relied upon in the MYP Principles to Practices – The New Chapter (due for release in 2014), is that

"A skill is a set of strategies and techniques harmonised to achieve a single purpose which improves with practice"

As such a particular skill is quite different from an ability or a talent, it is truly international and can be developed by any person in any context.

At all three levels of the IB, ATL skills are grouped into 5 Categories:

- **Communication**
- **Social**
- **Self-Management**
- **Research**
- **Thinking**

At the MYP level these five categories are then expanded into ten clusters of skills as follows:

Skills Categories		**Skills Clusters**
Communication	-	Communication
Social	-	Collaboration
Self Management	-	Organisation
	-	Affective Skills
	-	Reflection
Research	-	Information Literacy
	-	Media Literacy
Thinking	-	Critical Thinking
	-	Creativity and Innovation
	-	Transfer

With definitions as follows:

Communication	The skills of effectively exchanging thoughts, messages and information through interaction
	The skills of reading, writing and using language to communicate information
Collaboration	The skills of working cooperatively with others
Organisation	The skills of effectively managing time and tasks
Affective skills	The skills of managing state of mind
Reflection	The metacognitive skills of re-considering what has been taught and learned by reflection on content, ATL skills and learning strategy use
Information literacy	The skills of finding, interpreting, judging and creating information
Media literacy	The skills of interacting with different media to compare and contrast different representations of information
Critical thinking	The skills of critique of text, media, ideas and issues
Creativity and Innovation	The skills of invention – developing original and novel ideas and products
Transfer	Utilising skills and knowledge in multiple contexts

All ten Skills Clusters are then sub-divided into examples of use in practice in the classroom. To date over 160 individual skills practices have been identified at the MYP level.

For the Diploma I propose keeping the same overall structure of ATL skills as in the MYP but searching for more appropriate examples of practices, techniques and strategies for 16-19 year olds within each of those skills clusters. Each ATL Skill Category will be dealt with individually.

Communication Skills.

One difficulty in trying to define key 'Communication Skills' for today's senior students is that for them life is communication. These students are part of the first ever digital generation, they have grown up within the flow of information that is the internet and they communicate in a thousand different ways every day. In 2006, the media scholar Henry Jenkins and co-authors Purushotma, Clinton, Weigel and Robison authored a white paper titled *Confronting the Challenges of Participatory Culture: Media Education for the 21st Century* (Jenkins et al, 2006). In this they describe 'participatory' culture as one with

> "relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing one's creations, and some type of informal mentorship whereby what is known by the most experienced is passed along to novices. A participatory culture is also one in which members believe their contributions matter, and feel some degree of social connection with one another (at the least they care what other people think about what they have created."

In essence a culture of communication and collaboration.

In the last 100 years or so (in the western world at least) the means, talents and skills needed to make a living have undergone enormous change from a dependence on manual skills to a dependence on communication skills.

> "At the beginning of the century at least 80% of the American labor force were primarily employed in tasks that depended on manual skills. Only 20%—the white-collar segment—performed work that was based on communication abilities. At mid-century 63% of the nation's work force were employed in farming and blue-collar occupations; the number of workers holding white-collar jobs had almost doubled to 38%. At the end of the century 62% of our labor force make their livelihood using skills based on their communication abilities and many of the remaining 37%, although defined as farming and blue collar, are dependent on their communication abilities to function in the present communication society. Occupations that are voice dependent account for 34% of all workers. [2] In urban areas such as New York City at least 87.5% of the work force are dependent on communication skills. [3] Bureau of Labor [6] projections for the year 2005 indicate that US employment will increase by 17.7 million jobs, at least 92% (16.2 million) of which will be based on communication skills" (Reuben, 2000).

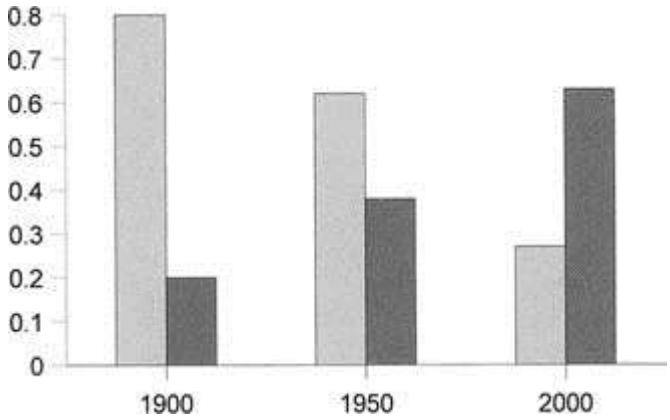


Figure Fig. 1.. Change in occupations in the United States from 1900 to 2000.
Light grey bars indicate manual labor jobs, dark grey bars indicate communication jobs (Reuben, 2000).

Tony Wagner, the recently appointed first Innovation Education Fellow at the Technology & Entrepreneurship Center at Harvard, in his book the Global Achievement Gap, describes Communication Skills as the Fifth 21st Century Survival Skill. He quotes his own work showing that 52.7% of employers surveyed say that "Written Communications, which includes writing memos, letters, complex reports clearly and effectively, is 'very important' for high school graduates' successful job performance" and that "80.0% of employer respondents report high school graduate entrants as 'deficient'" (Wagner, 2010)

Students in the final years of their school based education need to be very aware of the link between professional competence and communication competence (Russ, 2009). The requirement for strong communication skills is often implied in job descriptions (Krapels & Davis, 2003) and is expected in all university courses even those in which there is little written communications (Faris, Golen & Lynch, 1999). The AICPA (American Institute of Certified Public Accountants) for example, lists communication as a fundamental personal competency needed by all successful Accountancy students (Jones, 2011), the American Society of Clinical Oncology has a similar view (Back, Arnold, Tulsky, Baile, & Fryer-Edwards, 2003) as does the Society of Professional Engineers (Sageev & Romanowski, 2001).

Good communication skills have been significantly correlated with improved social self-efficacy (Erozkan, 2013), self-esteem and self-confidence (Riggio, Throckmorton & DePaola, 1990) and even with giving "a non-native English-speaking country a competitive edge and attracting lucrative foreign investment" (Wharton, 2002).

Within high schools good communication skills are needed not only for success in every subject discipline but also to help form and maintain good interpersonal relationships both with other students and with adults be they teachers, administrators or parents (Gallagher, 1991, Lass, Ruscello, Bradshaw, & Blakenship, 1991).

In an influential white paper produced by the University of Melbourne in association with Cisco, Intel and Microsoft as the foundation document for their ATC21S (Assessment and Teaching of 21st Century Skills) project, the authors declare that the most essential communication skills for adolescents in their mother tongue are:

- "Ability to communicate, in written or oral form, and understand, or make others understand, various messages in a variety of situations and for different purposes.

- Communication includes the ability to listen to and understand various spoken messages in a variety of communicative situations and to speak concisely and clearly.
- Ability to read and understand different texts, adopting strategies appropriate to various reading purposes (reading for information, for study or for pleasure) and to various text types.
- Ability to write different types of texts for various purposes. To monitor the writing process (from drafting to proofreading).
- Ability to formulate one's arguments, in speaking or writing, in a convincing manner and take full account of other viewpoints, whether expressed in written or oral form.
- Skills needed to use aids (such as notes, schemes, maps) to produce, present or understand complex texts in written or oral form (speeches, conversations, instructions, interviews, debates)."

(Binkley, Erstad, Herman, Raizen & Ripley 2011)

By the time students reach Grade 11 (Year 12) the assumption will be that they have gained all the basic communication skills and that they can manage the communications necessary for adequate performance at the DP level. They need to have sufficient vocabulary, syntax and grammar knowledge to be able to communicate and to be understood in written form and they need to be competent at three forms of inter-personal communication:

Verbal messages

- of the type and at the level of language that the listener will understand
- brief, succinct, organised
- free of jargon

Paraverbal messages:

- tone, pitch, pacing suitable for the aim of the communication

Nonverbal messages:

- body language consistent with verbal message
- eye contact appropriate to the message and the listener

They also need to be aware of the skills of effective listening and have the ability to relay the message back to the speaker in a way that confirms understanding and seeks further communication:

- paraphrasing
- checking perceived emotional content
- summarising
- questioning

General rules for effective communication are very simple but every culture has its own mores and shibboleths that can profoundly influence the clarity of both verbal and non-verbal communications. In Japanese culture for example there are nine non-verbal codes of communication that are seen as having an important influence on the meaning of any verbal communication:

- body language (kinesics)
- eye behaviour and facial expressions
- use of space (proxemics)
- touch (haptics)
- appearance
- space and time
- smell (olfactics)
- tone, pitch and pacing (vocalics)

- silence

It will be important for every teacher at the DP level to be very aware of the meaning and significance of both verbal and non-verbal messages within the culture of their students and their parents. Within subjects there will be communication strategies and skills that need to be defined by subject teachers and taught specifically within those disciplines. Many communication skills and strategies will be common across all subjects though and it is important for interdisciplinary groups to meet and consider their own specific subject needs for communication skills and the communication skills that can be taught generically.

For example a Business Studies departments needs might be:
Speaking, Persuasion and Active Listening:

a) Deliver self-prepared speeches
b) Organise ideas sequentially for a persuasive aim
c) Adapt the message for the audience
d) Use and cite appropriate references
e) Demonstrate supportive listening
f) Participate effectively in group discussion
g) Synthesise group ideas, summarise and give feedback

Writing, Reading and Comprehension:

a) Practice the processes and procedures for all forms of business writing
b) Build arguments, formulate claims and cite research to support those claims
c) Adapt writing to the needs of the reader
d) Make use of technologies used for information research
e) Use appropriate language, sentence and paragraph structure
f) Demonstrate proof reading and editing skills
g) Read challenging academic texts and create summaries of key points

Information Gathering and Analysis

a) Plan out and implement research strategies involving different media
b) Differentiate between quantitative and qualitative data
c) Organise, critically analyse, compare, contrast and interpret data
d) Express relationships between ideas in various ways
e) Produce visual displays of information
f) Draw conclusions based on validated argument
g) Cite references appropriately

(Young & Murphy, 2003)

In the MYP the Communication Skills Cluster is broken into two parts and further sub-divided into 27 skill practices that teachers can focus on in the classroom.

These examples of essential communication skills are not age specific, a student who develops proficiency in all the skills listed here would have all the communications skills needed for success in both the academic world and the world of commerce and enterprise.

This framework can act as a starting point for Diploma teachers to bring all students up to the same level, whether they have been through the MYP or not so that their communication skills are up to the standard needed to manage the Diploma.

COMMUNICATION	
Communication skills	**Exchanging thoughts, messages and information effectively through interaction**
How can students communicate through interaction	Give and receive meaningful feedback
	Use intercultural understanding to interpret communication
	Use a variety of speaking techniques to communicate with a variety of audiences
	Use appropriate forms of writing for different purposes and audiences
	Use a variety of media to communicate with a range of audiences
	Interpret and use effectively modes of non-verbal communication
	Negotiate ideas and knowledge with peers and teachers
	Participate in, and contribute to, digital social media networks
	Collaborate with peers and experts using a variety of digital environments and media
	Share ideas with multiple audiences using a variety of digital environments and media
How can students demonstrate communication through language?	**Reading, writing and using language to gather and communicate information**
	Read critically and for comprehension
	Read a variety of sources for information and for pleasure
	Make inferences and draw conclusions
	Use and interpret a range of discipline-specific terms and symbols
	Write for different purposes
	Understand and use mathematical notation
	Paraphrase accurately and concisely
	Preview and skim texts to build understanding
	Take effective notes in class
	Make effective summary notes for studying
	Use a variety of organisers for academic writing tasks
	Find information for disciplinary and interdisciplinary inquiries, using a variety of media
	Organise and depict information logically
	Structure information in summaries, essays and reports

One difficulty at the senior student level is being able to separate out communication skills from the general assessment requirements to process, understand, transfer and utilise essential knowledge. But through the use of modern technology including personal communication devices and social media platforms an amalgamation of many communication and social skills can be achieved which when highlighted by teachers can bring new understandings to students of the ATL skills in use.

Consider electronic communication. The first commercial text message was sent in December of 1992, by Dec 2012 there were 15,000,000 text messages being sent every minute. Today the number of text messages sent and received everyday exceeds the total human population of planet earth. Facebook,

which started as a social connection vehicle for university students reached an audience of 50 million users in just 2 years. By November 2012 Facebook had more than 1 billion monthly active users and mediated over 2.7 billion 'likes' each day. There are 200 million monthly active users on Twitter, 175 million tweets on average sent every day in 2012 and 163 billion tweets sent since Twitter started (Royal Pingdom).

These communication innovations are important because with text messaging and tweets we need to consider the shift in grammar, syntax and spelling that pervades these communications. With Facebook we need to consider the multimedia aspects of the communication especially the shift towards more visual information processing. Vimeo is a very successful social media video site with 14 million users at present, from which 200 petabytes of video was accessed in 2012. Ustream is a video streaming site with more than 60 million monthly viewers where anyone can stream their latest news in the hope of communicating to the world. All the major news networks keep a close eye on this and other platforms for up-to-date communication of news as it happens. Four billion hours of YouTube is watched on YouTube every month and 300 million new photos are added to each day to Facebook.

If the measure of good communication is consistency between the message sent and the message received then all these social media communication platforms contain very valid communication tools and it is up to teachers to incorporate as many of these information systems into their daily communications practice for students as they can.

One example of incorporating new communication technologies into student assessment was developed for PISA 2009. The Electronic Reading Assessment used a simulated reading exercise in a web based environment. This represented both a movement towards the use of more innovative assessment items and also a step towards changing assessment exercises into more authentic and up-to-date tasks.

Social Skills

Both Vygotsky and Piaget saw learning as a social phenomena. The Piagetian approach usually pairs children with developmental differences to create learning through comparing and contrasting skills and understanding. The Vygotskyen approach on the other hand utilises the interaction of a child with an older more knowledgeable figure to create the ZPD (Zone of Proximal Development) within which learning occurs. In both cases it is the collaboration and communication between the participants that creates effective learning (Dillenbourg, Baker, Blaye, & O'Malley, 1996).

The modern approaches of shared, situated and embedded cognition view learning as the result of a complex interaction of minds within specific cultural contexts and emphasise the social structures within which those interactions occur. These approaches necessitate consideration of all aspects of the environment in which learning occurs. In modern times this needs to include the pervasive influence of social media facilitated communication as an integral factor in of the cognitive activities associated with learning.

> "Under this view, knowledge is not something that is handed down from one partner to another. Rather, knowledge is coconstructed through interactions among collaborators. This approach emphasizes that the whole of group behavior is more than the sum of its

individual parts (Lai, 2011)

In the 1990s, in reaction to the use of software that increasingly isolated the individual user, the computer-supported collaborative learning (CSCL) approach was developed to study how people can learn using computers in collaborative groups. In CSCL learning takes place through interaction with both the material on-screen and with other people. Studies into the effectiveness of this method of learning are ongoing, facilitated to a greater degree today by new technologies such as Skype, Twitter video, ComBOTS, Gizmo Project, Google Talk and iChat etc. Results to date have been somewhat contradictory with higher level learning, increased participation and engagement being reported as well as more confusion, time wasting and conflict (Phielix, Prins & Kirschner, 2010).

Collaborative learning has been found to boost scores in mathematics for 7th grade students (Webb, 1993), improve academic performance for lower ability students (Saner et al, 1994), improve understanding of facts (Fall et al. 1997), increase student motivation and engagement (Cumming, 2010), and to produce higher satisfaction in learning (Klein, 1992). On the other hand Tudge (1992) found that among science students collaboration was more likely to decrease performance than increase it and Yun-Ke Chang et al. (2010) found that the use of wikis to improve academic performance enhanced the students' collaboration skills but not necessarily their learning.

Gender seems to have some influence on the effectiveness of collaboration in improving learning. Boys generally appear to gain more benefit from and find it easier to accept collaborative learning than girls in general do (Webb, 1991), and girls have even been found to suffer significant declines in performance after collaborating (Tudge, 1992). In collaborative groups with more boys than girls the boys were found to dominate making it harder for girls to have equal say. However in balanced gender groups there were no differences found in interaction patterns between boys and girls. Other influences are the ability level of the student and the level of development of the individual student's social skills, both of which correlate with improved collaboration and improved learning. (Webb, 1991).

In the on-line environment, one might expect that collaborative projects would create a safe environment for opinion and disagreement within members of a group but conversely Curtis & Lawson (2001) found that in on-line discussions students were less likely to disagree with or challenge one another than in face to face group work, and they also found that significantly more of the groups time together was given to planning in online groups, which was not always appreciated.

Collaborative learning approaches have been found to promote both critical thinking (Thayer-Bacon, 2000) and the development of metacognitive awareness (Schraw & Moshman, 1995; Schraw et al., 2006) and to positively influence students' motivation.

> "Collaboration provides opportunities for peer modeling, and models of successful student performance can be more motivating to students than teacher modeling. Working with others promotes academic engagement through the added responsibility of group performance, which causes individuals to persist at difficult tasks longer than they normally would (Turner, 1995).

In the MYP the Social Skills category is specifically linked with the Collaboration Skills cluster which is then further sub-divided into 14 skill practices that teachers can focus on in the classroom.

These examples of essential collaboration skills are not age specific and they are not exhaustive but a student who develops proficiency in all the skills listed here would have many of the collaboration skills needed for success in both the academic world and the world of commerce and enterprise.

This framework can act as a starting point for teachers to bring all students up to the same level, whether they have been through the MYP or not so that their communication skills are up to the standard needed to succeed well in the Diploma.

SOCIAL	
Collaboration skills	**Working effectively with others**
How can students collaborate?	Use social media networks appropriately to build and develop relationships
	Practice empathy
	Delegate and share responsibility for decision-making
	Help others to succeed
	Take responsibility for one's own actions
	Manage and resolve conflict and work collaboratively in teams
	Build consensus
	Make fair and equitable decisions
	Listen actively to other perspectives and ideas
	Negotiate effectively
	Encourage others to contribute
	Exercise leadership and take on a variety of roles within groups
	Give and receive meaningful feedback
	Advocate for your own rights and needs

Instruction in the skills of collaboration is often not specifically provided in the school setting as the practice of collaboration is in itself, often thought to contain within it the skills that need to be practiced and developed. But the specific teaching of these skills has been found to improve both the process and the effectiveness of learning in classroom situations where students are required to work in collaborative groups (Fall et al. 1997; Webb, 1995). Developing students' skills in communication, interpersonal and teamwork skills, conflict resolution, decision making, problem solving, and negotiation all help improve the effectiveness of collaboration as a learning tool.

As well as teaching the specific skills that students lack, teachers need to provide opportunities for them to practice collaboration skills, and teachers also need to think about the possibility of group assessments to create incentive for students to improve their collaboration skills. One such approach involving assessment of the collaboration process of all the individuals in a group as well as the group as a whole is the SPIDER Web Discussion™ method created by Alexis Wiggins:

> "The name is an acronym, describing the specific aspects of the discussion and its process:
> **S** ynergetic – a collaborative, group effort with a single group grade
> **P** rocess – a process that must be practiced and honed
> **I** ndependent – students work independently; teacher observes and gives feedback
> **D** eveloped – a developed, sustained discussion that aims to "get somewhere"
> **E** xploration – an exploration of ideas, texts, or questions through discussion *with a*

R ubric – a clear, specific rubric against which the students can self-assess

> Through specific processes like modeling, coding, group grading, and feedback sessions, SPIDER Web Discussion trains students to work together collaboratively in their problem-solving and to self-assess that process. The result is deep, high-level inquiry led and assessed by the students themselves, whether they are in second grade or high-school Geometry. In short, SPIDER Web Discussion aims to create authentic collaborators, communicators, and self-evaluators out of all students (Wiggins, 2011)

In this model, extensive training in equitable group discussion, Socratic questioning, collaborative processes, listening skills and peer engagement lead to increases for participants in all social skills as well as deeper engagement with the subject matter under investigation.

> Collaboration is the "mutual engagement of participants in a coordinated effort to solve a problem together." Collaborative interactions are characterized by shared goals, symmetry of structure, and a high degree of negotiation, interactivity, and interdependence. (Lai, 2011)

Collaboration skills are often reinterpreted as or subsumed into a group known loosely as 'social skills' which can be defined as "specific behaviours that an individual exhibits to perform competently on a social task" (Cook, Gresham, Kern, Barreras, Thornton & Crews, 2008, pg 132). Social skills often encompass such skills/behaviours as:

- Interpersonal behaviours – making friendships
- Peer-related skills – acceptance, collaboration, empathy
- Teacher-pleasing skills – following direction and instruction, compliance
- Self-related behaviours – understanding personal motivation, dealing with stresses
- Assertiveness skills – being unafraid to express own opinions and ideas without aggression
- Communication skills – reading accurately and responding well to verbal and non-verbal cues

(Elksnin & Elksnin 1998)

Social skill deficiency in childhood has been found to be the single best predictor of significant problems in adulthood (Strain & Odom, 1986) and it is more frequently found in teenagers with learning and behaviour problems than in the general student population (Elksnin & Elksnin, 1998). Social anxiety has been found in 19%-33% of university undergraduate students (Beidel, Turner, Stanley & Dancu, 1989) and 91% of a group of 99 social phobics reported deleterious effects on their academic performance as a result, usually through lack of class participation, fear of assignments requiring oral presentations and group work (Turner, Beidel, Borden, Stanley & Jacob, 1991). Seventy five percent of students with learning disabilities have been found to deficient in social skills (Kavale & Forness, 1996).

To function effectively in the high school environment students need to be adept at both peer-related and teacher-related social communication and behaviour. Both represent zones of proximal development for academic success and social success skills. To aid this process particularly for students with some form of pre-existing behavioural difficulty, specific training in social skills can sometimes be of great benefit.

In relationship to teachers, the larger the difference between teachers' expectations and students' behaviour the greater the difficulty students will have in achieving academic success (Cook et al. 2008). Being able to represent yourself assertively, ask questions, resolve conflict and solve communications

problems may not be behaviours that necessarily produce the most harmony or compliance in a classroom but teachers need to realise that these are all important social and communication skills which students need to practice in order to develop proficiency.

With regards to peer relationships, many negative outcomes including victimisation, violent behaviour, low academic achievement and dropping out of school have all been linked to low social skills and a failure to achieve sufficient status within a peer group (Lopez & DuBois, 2005).

Socially skilled students tend to be more successful at school. They are better able to negotiate a trouble free path through relationships with both teachers and peers, they form more stable relationships and they are able to self-manage feedback and learn from interactions (Simonsen, Myers, Everett, Sugai, Spencer & LaBreck, 2012).

The results from trials of social skills training are generally positive although somewhat mixed. The benefits of school-wide social skills training for both at-risk and general students have been found to be an increase in safety and academic performance and a decrease in problem behaviours (Bradshaw, Mitchell & Leaf, 2010) and Simonsen et al. found that what they called 'packaged social skills instruction' *Second Step, Project ACHIVE, Incredible Years* and teacher or school developed social skills instruction (SST) all led to positive student outcomes. In an analysis of 5 meta-studies Cook et al. (2008) concluded that SST interventions produced improvements in two thirds of high school students with (or at risk of) emotional /behavioural disorders. One online programme of social skills, cognitive –behaviour therapy and relaxation techniques produced a significant decrease in social fears and an increase of social skills (Lehenbauer, Kothgassner, Kryspin-Exner & Stetina, 2013). However in a meta-analysis of 49 studies into SCT (Social Competence Training) results showed that the programme was only 'moderately effective (Beelman, Pfingsten & Losel, 1994).

Most recently in the Netherlands social skills training camps have been trialled targeting children from 7-13 years with problem behaviours. The children first attend a 6 day *Sterkamp* (Star Camp) and then get the opportunity 6 months later to attend a follow-up camp called *Maankamp* (Moon Camp). The camps' programmes include group based social skills training in combination with physical education and adult mentoring. Drawing on previous research into effective SST organisers also included the parents of the children in the programme, made sure they had diversity of composition of all groups and delivered the programme in an outdoor, natural setting. Assessment of the children attending both directly after the camps and 12 months later showed 'large positive changes' for most outcome measures (van Vugt, Dekovic, Prinzie, Stams & Asscher, 2013).

In today's world social collaborative skills are practiced and developed both online and off but it is online where relationships are most numerous, complex and broadly based. With the development of Web 2.0 functionality, internet users are no longer passive recipients of information but active data creators.

> "Digital media creativity among young people is a social process that inevitably entails social negotiation between peers, explorations of the relationship between the self and others and performances of social identities like gender, ethnicity and class" (Mostmans, Vleugels & Bannier, 2012)

Web 2.0 is the term that describes the second generation of the World Wide Web that enables people to collaborate and share information online. Web 2.0 refers to the transition of web pages from static HTML

production to more dynamic formats that allow viewers to utilise applications on the page, give immediate feedback and generate content of their own. A Web 2.0 site will usually allow users to interact and collaborate with each other in a 'social media' enhanced dialogue through open communication and the development of web-based virtual communities of users.

In the USA studies show that that 57% of online teens (around 12 million people) create content for the internet. They create blogs and web pages for school, friends or organisations, they share original artwork, stories, photos, or videos online or they sample and remix other online content into new original creations.

- "33% of online teens share their own creations online, such as artwork, photos, stories, or videos.
- 32% say that they have created or worked on webpages or blogs for others, including those for groups they belong to, friends or school assignments.
- 22% report keeping their own personal webpage.
- 19% have created their own online journal or blog and 38% read them.
- Teens are much more likely than adults to blog and they are also more likely to read blogs."

(Lenhardt & Madden, 2005)

The social influence of all this time online cannot be underestimated. For teenagers the internet means connection with others, it means social interactions whether by email, Facebook, Twitter, chat, blogs, games etc. Most western teenagers today are immersed in one or more web-based social networks from the moment they get out of bed until the moment they go to sleep, 7 days a week, 52 weeks of year. This is today's participatory social culture where creativity, communication and collaboration blended with media skills are the currency of value. In the white paper mentioned earlier Jenkins et al. called this grouping of skills "media literacies".

> ""A set of cultural competencies and social skills that young people need in the new media landscape. Participatory culture shifts the focus of literacy from one of individual expression to community involvement. The new literacies almost all involve social skills developed through collaboration and networking"
> (Jenkins, Purushotma, Clinton, Weigel, & Robison, 2006 p 4).

The media literacies chosen by Jenkins et al. (2006) are:
Play — the capacity to experiment with one's surroundings as a form of problem-solving
Performance — the ability to adopt alternative identities for the purpose of improvisation and discovery
Simulation — the ability to interpret and construct dynamic models of real-world processes
Appropriation — the ability to meaningfully sample and remix media content
Multitasking — the ability to scan one's environment and shift focus as needed to salient details.
Distributed Cognition — the ability to interact meaningfully with tools that expand mental capacities
Collective Intelligence — the ability to pool knowledge and compare notes with others toward a common goal
Judgment — the ability to evaluate the reliability and credibility of different information sources
Transmedia Navigation — the ability to follow the flow of stories and information across multiple modalities
Networking — the ability to search for, synthesise, and disseminate information

Negotiation — the ability to travel across diverse communities, discerning and respecting multiple perspectives, and grasping and following alternative norms.

These are the 21st Century literacies (Wagner) and fluencies (Crockett et al.) that have been mentioned previously. These media literacies encompass aspects of all five ATL skills categories and represent real life approaches to information processing in the classroom through which skills in every category can be highlighted.

Designing subject specific tasks around the development of any of these media literacies will exercise students in most aspects of ATL - Communication, Social, Research, Self-Management and Thinking skills.

Self-Management Skills

The self- management category of ATL skills at the MYP level includes three clusters

Organisation – managing time and tasks effectively

Affective Skills – managing state of mind, which is further broken down into 5 sub-sets of skills:

- Mindfulness
- Perseverance
- Emotional Management
- Self Motivation
- Resilience

Reflection – re-considering what has been learnt and how it has been learnt, choosing, using and evaluating ATL skills

I propose that for the Diploma level we simplify this grouping as follows:

Self- Management:

Organisation – managing time and tasks effectively

Affective Skills – managing state of mind:

- Mindfulness
- Self Motivation
- Resilience

Reflection – developing metacognitive skils

The rationale for these changes is contained in the following text.

SELF MANAGEMENT	
Reflection	**Metacognition - reconsidering what has been learnt and how it has been learnt; choosing, using and evaluating ATL skills**
How can students be metacognitive?	Identify strengths and weaknesses of personal learning strategies (self-assessment)
	Demonstrate flexibility in the selection and use of learning strategies
	Try new approaches to learning and evaluate their effectiveness
	Consider content (What did I understand today? What don't I yet understand? What questions do I have now?)

	Consider ATL skills development (How proficient do I feel in the significant skills practiced in this unit)
	Consider learning strategies (What learning strategies have I been engaged with? How effective was each one for me? Which factors seem to be most important to me in helping me learn well?)
	Identify strengths and weaknesses of personal learning strategies (self-assessment)
	Demonstrate flexibility in the selection and use of learning strategies
	Try new approaches to learning and evaluate their effectiveness

Metacognition

Within the Reflection Cluster are found all aspects of metacognitive skill development

In order for any learning strategy training to be effective it is first necessary to develop the metacognitive skills of noticing present strategy use, analysing, comparing, experimenting, gathering feedback, making changes and implementing new strategies. These 'executive' functions need to be in place first before any specific learning strategy training takes place in order for any strategy training to be put into use by the student in their own studies. Without the meta-level skills being applied, direct learning strategy training has little impact and quickly disappears once the instructional context is changed (Kuhn, 2000)

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).

Children in pre-school and primary education often demonstrate metacogntive abilities in selecting and applying learning strategies (Siegler, 1994) but Mok, Fan & Pang (2007) in studying students in Hong Kong found that this ability declined after the transition to secondary school. Some of their suggested explanations for this decline included the increasing self-consciousness of teenagers, the demands at school to cover content overriding the awareness of process and more use of surface learning approaches in the secondary classroom than deeper level approaches often found in primary and pre-school education. This result was in contrast to a recent study from England in which metacognitive ability improved significantly with age during adolescence and then plateaued, but did not decline, into adulthood and 'middle age'(Weil, Fleming, Dumontheil, Kilford, Weil, Rees, Dolan & Blakemore, 2013).

One of the metacognitive interventions successful in enhancing achievement is direct instruction in self-management skills like planning, information organisation, goal setting, scheduling and time management (Wang, 1983). Karoly and Greiner (1976) found that students who received training in self-monitoring, self reward, and planning strategies significantly outperformed other groups on nearly all measures of academic achievement.

Robert Sternberg and Howard Gardner have together produced a model of student performance improvement based on the metacognitive process that they call PIFS, *Practical Intelligence For Schools.* This model looks at the seven intelligences of Gardner's Multiple Intelligences theory:

- Linguistic
- Logical- Mathematical
- Spatial
- Musical
- Interpersonal
- Intrapersonal
- Body-Kinesthetic (Gardner, 1993)

from the point of view of Sternberg's Triarchic theory which proposes three key aspects to every intelligence:

- Analytical
- Creative
- Practical (Sternberg, 1996)

This PIFS model then develops five metacognitive themes or questions related to learning which teachers can help students use in order to enhance the ways of thinking they will need most for success at school. These themes are:

- *Knowing Why* – understanding the purpose of all classroom learning and tasks
- *Knowing Self* – identifying strengths and weaknesses in present learning strategies and skills
- *Knowing Differences* – recognising that different school subjects require different types of thinking and learning
- *Knowing Process* – understanding the steps needed in learning and the range of possible learning strategies available
- *Revisiting* – using review of content and process effectively

This model recognises five different areas that make up the full metacognitive process necessary for academic performance improvement. The PIFS programme

> "Successfully enhanced both practical and academic skills in each of the target skill areas (reading, writing, homework, and test taking) in children from diverse socioeconomic backgrounds attending diverse types of schools"
> (Williams, Blythe, White, Li, Gardner & Sternberg, 2002)

Metacognition training through ATL in the Diploma programme will set the foundation for the learning of all the other ATL skills. At the Diploma level metacognition can be seen as the umbrella skill which makes all learning process improvement possible. Whether Diploma students come from the MYP or from other programmes, they all need to first be focused on their meta-cognitive ability. This is often a good way for a teacher to start a new year by investigating the metacognitive skills proficiency of their students and then using exercises within their subject areas to raise the students awareness of the importance of metacognition for effective learning and give them practical mechanisms to use to do so (see Teacher Support Materials – Metacognition, 2013).

In a (meta) study of 800 meta-studies of factors effecting student achievement Hattie (2009) found 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.

Through the introduction of the idea of self-regulated learning in the classroom teachers can often highlight the importance of both the skills of good learning and the need for metacognitive awareness to improve and develop those skills.

Organisation

The most obvious skill that students require in order to be successful not only in the Diploma but at all levels of education and learning, is the skill of organisation.

IB Diploma students are particularly susceptible to stress as they try to read all the material they need to, review their learning as they go, finish assignments on time, study for tests and other assessments and work on their long term projects like their Extended Essay as well as balance a busy social life and often a part-time job as well. It is easy for a students to feel overwhelmed by the workload and feel that there is never enough time to get anything done well which results in stress (Sax, 1997). Academic stress often comes from a perception that there is too much material to cover and not enough time to develop it well (Carveth, Gesse & Moss, 1996). Other stressors can be financial, time or health related or self imposed (Goodman 1993). Poor time management behaviours such as procrastination and last-minute cramming are often at the heart of self-imposed stressors which often lead to sub-standard academic performance (Longman & Atkinson, 1988). The two main strategies used by students to lower stress levels are time management and leisure activities (Mattlin, Wethington & Kessler, 1990) and of the two, time management has been found to have the greatest ameliorative effect on stress (Misra & McKean, 2000)

Students are very aware of their own deficiencies in this area but often do not have effective strategies to overcome them. In one study 67% of students entering university reported that their greatest lack was their ability to manage their time effectively (Weissberg, Berentsen, Cote, Cravey & Heath, 1982). At the secondary school level students themselves readily identify their top time wasters as Facebook, texting, phone-chat, television and daydreaming.

Time management is often a well understood but poorly practiced strategy in high school students (Brown, 1991)and has often been researched in the context of being a feature of self-managed or self-directed learning (McCombs, 1986). Time management has rarely been studied as a single influencing factor. The few singular studies there are show that effective time management practices allieviate stress (Lay & Schouwenburg, 1993), increase academic performance (Campbell & Svenson, 1992) and contribute largely to ‘strategic study’, a strategy often suggested as a study skills method (Kirschenbaum & Perri, 1982).

In the MYP the Organisation Skills Cluster is sub-divided into 8 skill practices that teachers can focus on in the classroom.

These examples of essential organisation skills are not age specific and they are not exhaustive but a student who develops proficiency in all the skills listed here would have many of the organisation skills needed for success in both the academic world and the world of commerce and enterprise.

This framework can act as a starting point for teachers to bring all students up to the same level, whether they have been through the MYP or not so that their communication skills are up to the standard needed to manage the Diploma.

SELF MANAGEMENT	
Organisation skills	**Managing time and tasks effectively**
How can students demonstrate organisation skills?	Plan short and long term assignments; meet deadlines
	Create plans to prepare for summative assessments (examinations and performances)
	Keep and use a weekly planner for assignments
	Set goals that are both challenging and realistic
	Plan strategies and take action to achieve personal and academic goals
	Bring necessary equipment and supplies to class
	Keep an organised and logical system of information files/notebooks
	Use appropriate strategies for organising complex information

Time management is often expected of students but not specifically taught. In the table above, simple time management strategies are outlined and in the 'stand-alone' paper of this present work will be developed further.

If all Diploma teachers co-ordinate their deadlines for students so that any individual student's assessments are well spread throughout the school year, if teachers help their students learn how to break down assignments into achievable steps and timeline each step, plan out review and study for tests and exams and build study timetables then a great deal of poor time management will be alleviated.

Time management is not something we can assume that students will be good at, like all ATL skills it is a specific skill which must be taught.

Although good time management is always insisted upon by the best teachers, and students get shown over and over again how to do it, students are often very poor time managers. One reason for this has been proposed as *perceived control of time* (Macan, Shahani, Dipboye & Phillips, 1990) also called a *time attitudes factor* (Britton & Tesser, 1991) wherein a student that feels they are in charge of their own time, and can happily say "No" to people is able to reject unprofitable *Time Consuming* (Cemaloglu & Filiz, 2010) activities in favour of time management activities. These students report greater work satisfaction, less overload, more efficient thinking, greater enjoyment of their studies and more perseverance.

But this performance improvement is only partly attributable to time management strategies themselves, a greater effect may be due to the shift in attitude, something that can be influenced by affective skill development.

Affective skills

In addition to the meta-cognitive and organisational 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.

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 deliberately use delayed gratification and positive self-talk to generate self-motivation, they exhibit good impulse control and in order to improve learning performance often use attention focusing tactics to screen out distractions and increase 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 do not, 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 upon completion (Baard, Deci, & Ryan, 2004; Sheldon & Kasser, 1998).

While every teacher would probably agree with the research findings above the question still remains – are these affective attributes of students that predispose students 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, 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.

The Affective Skills component of the Self Management Skills cluster at the MYP level is divided into 5 skills sub-sets. This division into these particular sub-sets is based upon the teachability of affective skills and so is somewhat conceptually arbitrary but very practical as is needed at the MYP level. At the Diploma level it can be assumed that students have mastered all the basic skills and the particular affective skills needed to handle the challenges of higher learning can be grouped into three key skills sub-sets: Mindfulness, Self-motivation and Resilience. These groupings are themselves still very conceptual and it is recognised that, depending on how it is taught, each subset could contain elements of all the other affective sub-sets. Such is the nature of Affective Skills.

SELF MANAGEMENT	
Affective skills	**Managing state of mind**
How can students manage their own state of mind?	Mindfulness
	Self-motivation
	Resilience

Resilience

Resilience appears to be the affective concept that is most inclusive of almost all the other desirable affective elements of the successful Diploma student. The resilient learner is mindful, persevering, emotionally stable and self motivated. Through focusing on developing resilience with respect to learning teachers may find that many other important affective skills are practiced and developed as well.

The concept of resilience comes from Garmezy (1974) who worked with the children of parents diagnosed with schizophrenia and a high risk for psychopathy. Within this group he found a few children who resisted the effects of their parents' mental illness well and managed to develop their own adaptive and healthy patterns of behaviour. Later in the eighties the concepts of invulnerability (Anthony, 1974), and invincibility (Werner & Smith, 1982), suggesting as they did a fixed attribute evidenced only in some children, gave way to the idea of resilience being a characteristic more fluid in nature and able to be developed and fostered in all children. Rutter (1987) and Benard (1993) showed that an individual's resilience varied over time and research results began to reflect the idea of resilience as positive adaptation despite adversity, which was never permanent and more of a developmental progression with new vulnerabilities and strengths emerging with changing life circumstances (Luthar, 1991).

Benard (1993) found that the four most common internal attributes of resilient children were:

1. social competence - responsiveness, empathy, caring, communication skills, a sense of humour
2. problem solving skills – planning, organising, seeking out resources, thinking critically, creatively and reflectively
3. autonomy – sense of identity and the ability to act independently and exert control over their own circumstances, task mastery, internal LOC, self efficacy, the development of resistance (to negative messages) and detachment (from dysfunction)
4. a sense of purpose – having goals, aspirations, achievement motivation, persistence, hopefulness, optimism.

McMillan & Reed (1994), in studies of *at-risk* middle and high school students, simplified this list down to a combination of high intrinsic motivation and an internal locus of control (LOC), which seemed to

characterise the successful, resilient, at-risk students. These students had a strong sense of self efficacy and saw themselves as being successful because they had chosen to be so and had put in the necessary effort. They had clear, realistic goals, were optimistic about their future and took personal responsibility for both their successes and their failures. These students believed that their success was primarily due to their own actions: “Resilient students do not believe that the school, neighbourhood, or family is critical in either their successes or their failures” (p. 138). “Even though they welcome and appreciate the efforts of the significant adults in their lives, they do not see these people as being responsible for their success or failure. They credit themselves” (p. 139).

Csikszentmihalyi, Rathunde and Whalen (1993) claimed that the optimal conditions for learning are not created by goals that are too easy or too difficult but by goals that are challenging but achievable. Alfi, Assor and Katz (2004) point out that “Optimal challenge, by definition, entails the possibility of temporary failure and frustration. In fact the possibility of such temporary failure makes such tasks optimally challenging and therefore interesting and intrinsically motivating” (p. 31). But this would seem to be true only for the particular student who is confident of being able to cope with temporary failure. Another student in anticipation of even temporary failure may well slip into helpless or self-handicapping behaviour. This type of academic underachiever has been shown by Nurmi, Onatsu and Haavisto (1995), “typically to anticipate failure in a task and therefore to concentrate on creating behavioural excuses for it instead of formulating task-oriented plans” (p. 189).

One of the clearest differences between the resilient learner and the more ‘helpless’ learner is seen in their response to failure. The resilient individuals attribute failure to a lack of effort and take effective remedial action but the helpless individuals attribute failure to a lack of ability about which, they believe, there is nothing they can do (Dweck, 1999).

In a very similar vein, Martin and Marsh (2003) described a mastery pattern of behaviour in students he called the *Success Oriented* and a helpless pattern of behaviour in students he called the *Failure Avoiders* and the *Failure Acceptors.* The three groups were distinguished from each other most significantly by their different reactions to failure. The Success Oriented exhibited no fear of failure and used failure as feedback, altering their behaviour where necessary. The Failure Acceptors expected failure, were resigned to it and were subsequently helpless. The Failure Avoider category broke down further into three self explanatory groups, the Overstriver, the Defensive Pessimist and the Self Handicapper.

In response to failure situations is seen the clearest distinctions between the resilient and ‘helpless behaviours and between academic high and under achievers. Most theorists in the field agree on this distinction:

	Responses in Situations of Failure	
	Resilient	***"Helpless"***
Resilience/vulnerability (Benard, 1993)	high self-efficacy; learns from mistakes; strength focused	low self-efficacy; overwhelmed by failure; deficit focused
Locus of Control (Rotter, 1966)	*internal* – takes responsibility for failures	*external* – takes no responsibility for failure
Learned Helplessness (Seligman, 1975)	*optimistic explanatory style* – failure is externalised where appropriate but modified by behavioural internality	*pessimistic explanatory style* – failure is internal; stable and global and reinforced by characterological internality
Attribution Theory (Weiner, 1973)	lack of effort; maintaining effective striving in adverse conditions; challenge seeking; learning goals	lack of ability; performance deterioration in adverse conditions; challenge avoiding; performance goals
Mindset Theory (Dweck, 2007)	*Growth* - adaptive, effective remedial action; positive affect in aversive circumstances; incremental intelligence	*Fixed* – self defeating; negative affect in aversive circumstances; helplessness
Behaviour Patterns (1) (Seifert, 2004)	*Mastery* – takes responsibility, learns from mistakes; success and failure are internal, stable, controllable	*Failure avoidance* – takes no responsibility for failure; success and failure are internal, stable, uncontrollable *Learned Helplessness* – everything is failure; takes full responsibility for all failure; failure is internal, stable, uncontrollable *Work Avoidant* – takes no responsibility for failure
Behaviour Patterns (2) (Martin and Marsh 2003)	*Success Oriented* – no fear of failure	*1)Failure Avoidant* – fear of failure: *Overstriver* – achieves to avoid failure; *Defensive Pessimist* – sets low standards *Self Handicapper* – failure is choice or uncontrollable 2) Failure Acceptor – expects failure, is helpless
Academic Performance	High achievers	Low or underachievers

The literature reviewed reveals a consistent dichotomy between what might be called *healthy* and *unhealthy* reactions or responses to failure situations.
The *healthy* response to failure is for the individual to:

1. find the facts,
2. take responsibility for his/her own actions,
3. make changes to his/her process or strategy
4. have another go.

This type of reaction has been termed *failing well* (King, 2009).

Extremely high goal orientation, self discipline and determination to have a better life than their parents are key characteristics of academically successful, resilient students (Merdinger, Hines, Osterling & Wyatt 2005) as well as the presence of positive adult role models with high expectations, often teachers, who intervene on their behalf and act as "gatekeepers for the future" (p. 875).

Individual students like these described will be found in every school but schools that are most effective at promoting the resilience of their students are those that provide opportunities for children to make mistakes and learn from them, to develop problem solving skills, autonomy, a purposeful, constructive and optimistic outlook on the future, and effective communication and relationship skills (Benard, 1993). To do this schools need to run programmes that promote the development of an internal LOC in students, as well as self efficacy, optimism, a sense of personal responsibility and the ability to fail well (McMillan and Reed, 1994; King, 2009).

Self-Motivation

As Alfie Kohn points out in "Punish by Rewards" no one can ever motivate anyone else, the only true motivation is self-motivation (Brandt, 1995). All we can ever hope to do as teachers is to arrange the variables that we have some influence over to help self-motivation to arise and then to facilitate its development.

Motivation for learning is closely related to the skills of 'learning to learn' and perceived self-efficacy for learning (Warr & Downing, 2000; Parsons, Hinson & Brown, 2001). Self efficacy when related to learning tasks is a combination of a learner's judgements about their ability to handle the task level of difficulty and their confidence in their cognitive skills (Pintrich, 1999). Self-efficacy is an important factor in both academic achievement (Bong, 2001, Ning & Downing, 2010) and academic motivation (Bong & Clark, 1999).

Two orientations of motivation are widely accepted, that of intrinsic or internal and extrinsic or external motivation. Intrinsically motivated learners engage with learning for the interest they have in the subject or the challenge of overcoming an obstacle or the pleasure they get from finding out new things, whereas extrinsically motivated learners tend to learn in response to a perceived reward in terms of approval or a particular grade, score or mark.

> "People with high levels of self-efficacy are more likely to persevere in the face of difficulties, more likely to demonstrate intrinsic motivation when engaged and performing a task, and less likely to feel disappointed in the face of failure. They are less likely to feel stressed and more frequently perceive a difficult situation as challenging as opposed to difficult" (Prat-Sala & Redford, 2010, p285).

Classroom environments that actively help develop students' autonomy and self direction will increase intrinsic motivation and help improve students efficacy as learners (Deci, 1975) whereas classroom environments and processes which offer tangible rewards for performance outcomes undermine intrinsic motivation (Deci, Koestner & Ryan, 1999).

Teaching styles which are authoritarian and controlling produce students with low self-efficacy who tend to lose initiative and learn less effectively than students whose teachers are more authoritative and supportive of autonomy and self-regulation (Flink, Boggiano & Barrett, 1990, Lamborn, Mounts, Steinberg, & Dornbusch, 1991).

The strongest self-motivation for learning occurs when three factors are present – autonomy, mastery and purpose (Howard, 2010). These factors tie in well with the *School Intelligence* ideas of Sternberg et al. mentioned earlier.

Autonomy means giving students power over their own learning and responsibility for asking the right questions, finding the right answers and then creating their own understandings and applications. Teaching to the test does not produce autonomy within the student. Only by practicing independent (autonomous, self-directed, self-managed, self-regulated, lifelong) learning in the classroom will the student be able to get better at it.

Mastery means achieving high competence in a set of skills, in this case the skills of good learning. By teaching the ATL cognitive, affective and metacognitive skills mentioned here teachers will be giving students challenges to master that are skill based and can be self-assessed. Improving their ATL skills will then impact on the efficiency and effectiveness of all their other learning creating more self confidence and self-motivation around learning school subjects. This approach requires teachers to maintain a dual focus in the classroom on both content (what the students are learning) and process (how they are learning) and to see improving the processes of learning (the ATL Skills) as being a important outcome in every lesson.

Purpose means answering the question 'Why?'. Why am I learning this? One way to develop purpose is through relevance, making the learning relevant to today's world by connecting the topic to be taught to a real world situation, problem or event. Another option is to look at purpose through the lens of developing intrinsic operators:

- to feel satisfied, proud of yourself
- to challenge yourself and see what you are capable of
- to get a measure of your progress to date
- to gain useful knowledge and skills
- to develop and increase your intelligence
- to practice concentration, determination and the exercise of effort

These motivational operators then tie in well with the development of ATL Skills in particular the affective skills.

Mindfulness

At the MYP level the three Affective Skill areas of Mindfulness, Perserverance and Emotional Management are dealt with separately through which important issues for students and schools like bullying, anger management and academic skills like concentration and perseverance can be addressed.

At the DP level it is assumed that most of those issues have been addressed and underlying skills have been learned or a student would not have attained the Diploma level. At this level a focus on Mindfulness as a overarching concept is developmentally appropriate and can include aspects of the emotional management skills most useful at this level like managing test anxieties and dealing with stress as well as strategies to develop mental quiet and help overcome distractions.

Jon Kabat-Zinn is credited with making the idea of mindfulness explicit, his definition being of "paying attention in a particular way: on purpose, in the present moment, and nonjudgementally" (Kabat-Zinn, 1994, p. 4). Mindfulness techniques have long been a part of Eastern religious practices but in the last twenty years mindfulness itself has become part of mainstream awareness and is defined most often as " inherently a state of consciousness" that involves consciously attending to one's moment to moment experience (Shapiro, Carlson, Astin & Freedman, 2006).

> "Mindful awareness involves reflection on the thoughts, feelings, and emotions of the mind that emerge moment by moment; it helps people recognise when they are distracted fatigued or biased; and may help to recalibrate the alerting, orienting, or executive functions" (Reid, 2013)

The practice of mental relaxation is at the core of most mindfulness training but rather than the focused attention on mantra or objects required of practices like Transcendental Meditation, in developing mindfulness the mind is relaxed and held open and all that is required is awareness and acceptance of the moment to moment flow of thoughts, feelings, memories and experiences of the present mind. Mindfulness is not something that needs to be practiced sitting cross-legged in silence, awareness of mind can happen at any time and many mindfulness practices have developed that are very active like mindful walking, driving and jogging (Thompson & Gauntlett-Gilbert, 2008).

In psychotherapy the practice of mindfulness has been used very effectively to treat people with "mild to moderate" psychological distress (Baer, 2003). In the USA especially, many mindfulness based therapies have arisen like Mindfulness-Based Stress Reduction (MBSR), Dialectical Behavior Therapy (DBT), Acceptance and Commitment Therapy (ACT) and Mindfulness-Based Cognitive Therapy (MBCT) and programmes to develop mindfulness from two days to eight weeks long are running in many schools (Montgomery, Kim, Springer & Learman, 2013).

Mindfulness training has been found to produce improvements in both psychological and physiological well being, with reductions being found in depression (Segal, Williams & Teasdale, 2002), anxiety (Hayes, Strosahl & Wilson, 1999) helplessness (Grossman, Niemann, Schmidt, and Walach, 2004), chronic pain (Kabat-Zinn, 1990), substance abuse (Bowen, Chawla, Collins, Witkiewitz, Hsu, Grow & Marlatt, 2009), binge eating (Kristeller & Wolever, 2011) and physical impairment (Thompson & Gauntlett-Gilbert, 2008). Research also shows that mindfulness improves the functioning of the brain (Brown, Ryan and Cresswell, 2007) with improvements being reported in reading comprehension and working memory capacity (Mrazek, Franklin, Phillips, Baird & Schooler, 2013), attention span (Brefczynski-Lewis, Lutz, Schaefer, Levinson & Davidson, 2007), digital memory span (Chambers, Lo,& Allen, 2008) and visual/spatial processing efficiency (Kozhevnikov, Louchakova, Josipovic & Motes, 2009).

There are many mindfulness practices that can be used in schools (Seagal, Williams & Teasdale, 2002) but some of the most common are:

- Eating a raisin – applying all one's attention to the slow dissolving of a raisin in the mouth

- Mindfulness of breath – sitting quietly, eyes closed focused on beathing
- Body scan – sitting quietly, eyes closed, directing attention slowly in a flow from one part of the body to another
- Walking mindfulness – walking while paying close attention to all sensory input

(Thompson & Gauntlett-Gilbert, 2008)

Mindfulness can be used at any time in any subject to focus students on their own perspectives on idea, their own biases and prejudices, the influence of their own or an adopted culture, the ethical and moral implications of any concept. Also mindfulness techniques can enable imagination to make links between ideas, to spur creativity and generate novel and original thoughts.

As well improving cognitive skills it has been suggested that one way higher institutions of learning could achieve cross-cultural education, contemplative learning and true internationalism would be to include mindfulness training in undergraduate programmes (Mahani, 2012).

One of the most interesting applications of mindfulness training is Niemiec, Rashid & Spinella's (2012) proposal for the development of *Strong Mindfulness* – integrating mindfulness and character strengths. Using Peterson and Seligman 's (2004) universal classification of 6 virtues and 24 character strengths:

- Wisdom and Knowledge
    - Creativity
    - Curiosity
    - Judgement
    - Love of Learning
    - Perspective
- Courage
    - Bravery
    - Perseverance
    - Honesty
    - Zest
- Humanity
    - Love
    - Kindness
    - Social Intelligence
- Justice
    - Teamwork
    - Fairness
    - Leadership
- Temperance
    - Forgiveness
    - Humility
    - Prudence
    - Self-regulation
- Transcendence
    - Appreciation of beauty and excellence
    - Gratitude
    - Hope
    - Humor

- Spirituality

...and using mindfulness techniques to bring those character strengths to life.

In looking at all the Affective skills discussed here and at the Learner Profile itself there seems to be a great deal of cross-over between the ultimate outcomes of an IB education and the character strengths mentioned above.

Possibly mindfulness training could be used as the vehicle to achieve all those objectives?

The ATT document will look at ways in which mindfulness practices could be taught at the Diploma level.

Research Skills

> "Inquiry-based learning describes a range of learner-centred pedagogies increasingly employed in higher education where students learn through engaging in open-ended research and inquiry. It is acknowledged that this type of pedagogical approach requires advanced information literacy capabilities in students, and that there is a need to support the development of information literacy in inquiry-based learning curricula" (McKinney, 2013)

At the MYP level the Research Skills Cluster is divided into 2 skills sub-sets: Information Literacy and Media Literacy which are then sub-divided into 18 skill practices that teachers can focus on in the classroom.

RESEARCH	
Information literacy	**Finding, interpreting, judging and creating information**
How can students demonstrate information literacy?	Collect, record and verify data
	Access information to be informed and inform others
	Make connections between various sources of information
	Understand the benefits and limitations of personal sensory learning preferences when accessing, processing and recalling information
	Use memory techniques to develop long term memory
	Present information in a variety of formats and platforms
	Collect and analyse data to identify solutions and/or make informed decisions
	Process data and report results
	Evaluate and select information sources and digital tools based on their appropriateness to specific tasks
	Understand and use technology systems
	Use critical literacy skills to analyse and interpret media communications
	Understand and implement intellectual property
	Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions
	Identify primary and secondary sources

Media literacy	Interacting with media to use and create ideas and information
How can students demonstrate media literacy?	Locate, organise, analyse, evaluate, synthesise and ethically use information from a variety of sources and media [including digital social media and online networks]
	Demonstrate awareness of media interpretations of events and ideas [including digital social media]
	Make informed choices about personal viewing experiences
	Understand the impact of media representations and modes of presentation
	Seek a range of perspectives from multiple and varied sources
	Communicate information and ideas effectively to multiple audiences using a variety of media and formats
	Compare, contrast and draw connections among (multi)media resources

The above framework can be used to bring any inexperienced students up to speed with their information processing skills but at the DP level it will be important for students to be integrating and practicing all these skills and more in their own academic researching. Teaching at this level needs to provide many opportunities for students to practice sophisticated research skills both in a well scaffolded classroom environment and also in an independent, self directed manner.

Good quality research skills have always been at the heart of all academic endeavour but the mechanisms of search and the media of information have changed enormously especially in the last 30 years. In 1981 Marland broke research skills down into 9 sequential stages all of which are just as valid today as they were in 1981 but the presence of the electronic library and the internet makes some of those skills broader in application than they once were (Barry 1997; Jenkins et al. 2006). Where once researching meant finding the information you wanted researching today is much more about comparing, contrasting and validating available information and winnowing down the volume of data into a manageable quantity.

Marland's stages (1981)	Addenda for 21st C skills
1. Formulate and analyse needs	Generating key words, concepts, formulating highly focused search questions, search strings
2. Identify and appraise likely sources	Knowledge of a wide range of information platforms, databases and search engines, access to libraries – hard copy and digital access, establishing RSS feeds
3. Locate individual resources	Effective search skills, search within search, advanced search protocols, Boolean search operators; Dewey classification system
4. Examine, select and reject sources	Investigate primary and secondary sources, verification, comparison, cross checking
5. Interrogate sources	String searching, hypertext management, skimming, scanning, speed reading, assessing reliability
6. Record and store information	Downloading, storing, printing, translating between data presentation media, cataloguing, indexing

7. Interpret, analyse synthesise and evaluate information collected	Distinguishing fact from opinion, interpreting visual information, processing maps, charts, video; key word searching, summarising, comparing references, collecting citations, building bibliography; marshalling evidence, constructing arguments
8. Present and communicate resulting work	Understanding file transfer protocols, data reinterpretation, media management, presentation formats, building persuasive visual presentations
9. Evaluate what has been achieved	Seeking feedback through formal and informal/ social media systems

The term *digital divide* originally referred to the difference between the *haves* of the digital age who were those with access to computer equipment, and the *have nots* being those with limited or no access. This distinction is now narrowing much more and the divide is reformulating around differential possession of digital skills (Van Dijk, 2005, Norris, 2001) sometimes called the *cognitive divide* (Scott & O'Sullivan, 2002). The internet is fast becoming the most important information source and communication facility in contemporary society and internet skills can now be considered as vital personal assets.

> "When these (internet) skills are unequally divided among the population, the consequences of this skills inequality may even exacerbate existing social inequalities" (Deursen & Van Dijk, 2010, p. 894)

Internet skills have been found to contribute to academic success in the school environment (Kuhlemeier & Hemker, 2007) and although teenagers are often seen to be the most prolific internet users they are not all equally proficient in the internet skills they need for effective research and learning (Lauman, 2000). Teenagers often have less well developed search skills than adults (Ofcom, 2006), and only rudimentary techniques and strategies for simple searching, hypertext and hypermedia navigation (Facer & Furlong, 2001, Pew, 2007).

Steyaert (2002) created a model of internet skills containing three aspects:

- Instrumental skills – the functional operation of available technology
- Structural skills – the manipulation of the structures within which information is found
- Strategic skills – active searching, scanning, selecting for relevance

Van Dijk (2005) elaborated on this model and created a distinction between the skills of operating the internet as a medium (Operational and Formal) and the skills related to interaction with the content or subject matter provided (Information and Strategic). Further studies showed that the proficiency in the general (Dutch in this example) population of *Operational* and *Formal* skills appeared to be related to structural problems of access whereas proficiency in *Information* and *Strategic* skills was found to be directly related to both education level and intellectual capacity. In one study of populations of 18 years and over they found that the medium-related skills (Operational and Formal) decreased with increasing age but content related skills (Information and Strategic) were found to increase. But whereas teenagers had more familiarity with the operation of all internet components their *Information* and *Strategic* skills were found to be very low (Deursen & Van Dijk, 2011). In a related study of senior school students Deursen and Van Diepen (2013) found that while the levels of medium-related skills were adequate in the

students their content-related skills were very poor. Age and gender were not found to be significant influences and the best predictor of proficiency in content-related skills was the student's level of educational achievement.

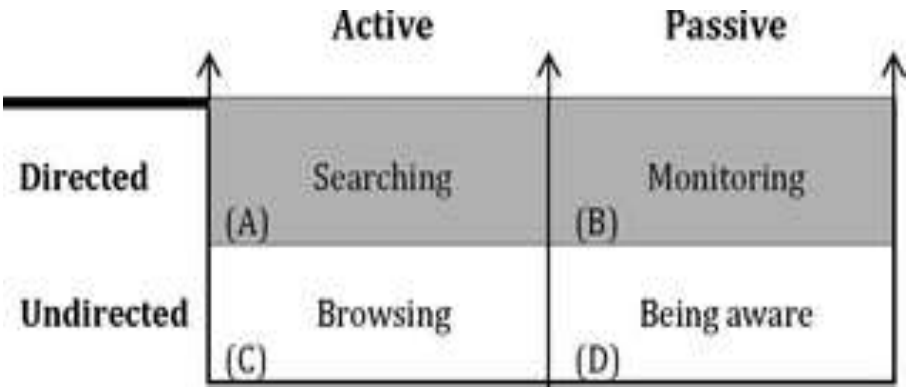
Most students think of researching as putting key words into a search box which leads them to undervalue the importance of other methods (Nichols & Mellinger, 2007).

> "In the Internet world, the ease of finding *something* obscures the difficulty of finding the *right thing*" (Gustavson & Nall, 2011, pg. 291)

Students tend to start by getting infatuated with information, the more of it the better without discrimination and then end up feeling simply overloaded and often give up.

Deursen and Van Diepen (2013) in their study of Dutch senior high school students given an internet research assignment found most students using only very general search terms, no students at all using Boolean operators to refine their searches and most paying no attention at all to the source of their information. Any information would do, finding the answer was the prime objective and the idea of interrogating the validity of the data did not occur.

To manage the data flow necessary to research well it is necessary for students to make sure they become proficient in all four modes of information seeking (Bates, 2002). These come from the consideration of whether the searcher is *Active* or *Passive* in their search strategy and whether the search is *Directed* or *Undirected*. The intersection between these four process parameters give rise to four different research modes or methods which Bates claims are all important for students to master in order to be able to gain a comprehensive 360® view of any subject.



(from Darling & Foster, 2012, pg. 434)

Searching is both directed and active, attempting to answer questions and develop understanding around specific topics or questions.
Monitoring is directed but passive and involves scanning information collected around topics of interest but with no particular question in mind just keeping abreast of developments and 'news' and being alert for anything which may be pertinent to a current inquiry.
Browsing is active but undirected, there is no specific topic in mind and the researcher is simply grazing over anything which catches their attention and allowing themselves to follow strings which may or may not lead to valuable information
Being Aware is both passive and undirected and means simply being aware of all the unsolicited information that surrounds us and allowing our attention to scan it for relevance while not paying direct attention to it.

Searching:

Searching is the skill most often associated with research in all forms and Google is the most popular search engine in the western world but most students have very poor searching skills. Within Google and in most other search engines there are a set of Boolean operators which students need to gain proficiency with to help them narrow down their searches. Most search engines will recognise AND and OR to differentiate important terms and speech marks or brackets to isolate specific search terms or quotes. Domain Limited Searching is another useful tool where by adding specific words to the search terms a search can be limited to specific sources of information. Tacking on terms to your search inquiry like site:gov will limit a search within Google to only governmental websites, site:U will limit searching to university websites and adding a minus sign before the word *site* will instruct google where not to look in its search eg. adding on –site:gov would instruct google to look at every site except those with a .gov tag in their URL. Students also need to get familiar with academic search engines like Google Scholar which has its own search protocols. There are online tutorials that come with every search engine which will quickly and simply explain top students how to use all these search defining terms but students also need lots of practice both within class and at home to get familiar with using search limiters and search refiners.

Monitoring:

Monitoring involves first employing an RSS Reader (*Rich Site Summary* or *Really Simple Syndication*) to collect together all the internet content (feeds) produced regularly that are of interest and then scanning through all the collected feeds on a regular basis looking for topics of value. The most popular RSS Readers today are Feedly, Newsblur, Netnewswire, Bloglines and Newsgator and new ones are generated daily. Most are able to be set to choose feeds very selectively and most have apps to enable the user to access the same feeds from their phone. They can be used to gather all forms of digital data from written blogs and articles to pictures, YouTube clips, podcasts and live broadcast. Learning to use RSS feeds is a critical skill for students to keep up to date with developments globally and in their chosen subjects and needs to be the first step that teachers help set up for any project work, for the Extended Essay, for TOK, CAS, Environmental Systems and Society and for any subject where research is a component part.

Monitoring is not the set up part though, monitoring means regularly skimming through all the feeds collected by the RSS Reader, finding the relevant information and downloading or summarising or filing the important data. If performed on a regular basis, especially in response to questions or lines of inquiry from teachers, monitoring can be a vital tool which keeps the student current and enables them to make relevant connections between their subjects and the world around them. Feeling overwhelmed by information is a common concern of students but by learning good refining skills and specific search skills students can learn to narrow down the scope of their searching and cope with the volume they then produce. Research is more information selection and management than it is searching and finding.

Browsing:

> "*Browsing* is the complimentary opposite of *monitoring*. Here we have no special information need or interest, but actively expose ourselves to possibly novel information. It can be said that *monitoring* and *directed searching* are ways we find information that we know we need to know, and *browsing* and *being aware* are ways we find information that we do not know we need to know" (Bates, 2002, pg. 5)

This is the skill that most students already have, in abundance. The modern teenager in a western 'wired' environment probably spends more time engaged with this activity per day than almost anything else. Most people know it as surfing and it is characterised by a general direction of interest but a willingness to be distracted in almost any direction at all. The tools in use are mostly 'favouriting' websites, using place holders or 'likes' to keep connected to particular themes or strings.

The problem with browsing is that it often takes place when searching or monitoring need to be taking place and as such can be a major distraction.

Being Aware:
This is not so much a skill as an awareness of all the messages and information in all media forms that surrounds us all day and every day. As such it is more a practice of mind than a skill – *see Mindfulness in the Affective Skills section.*

Training in internet research skills will be vital for every student who is engaged in any form of inquiry learning or who uses the internet for the completion of any schoolwork. Teachers need to recognise this fact and build sufficient opportunity either within their subjects or as separate skills focused modules to bring all students up to speed with their internet skills. These skills along with communication and collaboration skills are the foundation skills of lifelong learning in the 21st Century.

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.

The 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 the learning strategies they have used or been exposed to and reflect on the relative effectiveness of each strategy for them.

The biggest problem with most assessments of learning effectiveness or learning skills is that what they are usually measuring is either characteristics of the person that tend to 'go-with' effective learning (like time management) or the effect of the use of a particular skill on subject matter by virtue of the degree of understanding achieved of that subject matter and the ability to present that understanding back to the teacher in some form. A learning skill has no content of its own, in measuring a learning skill all you are ever doing is measuring the application of a skill to certain content within certain context.

Whatever the means employed it is very useful for students, on a regular basis, to gain some measure of their own proficiency in the specific ATL skills being focused on by the teacher or the department or the school.

One method of assessing skills that has been shown to improve both self-confidence and self-motivation is self-assessment (Dweck, 1999). Using this technique students are relied upon to accurately judge their own competence or proficiency improvements in specified skills against generalised skills proficiency measures.

Using this method teachers will:

1) Decide which particular and specific skills are going to be focused on in your classroom/subject/department/school
2) Make the skills to be focused on explicit by clear description of each skill and by using examples of high and low skills proficiency
3) Allow the students to self assess their perceived competence in the skills in question
4) Analyse the results obtained looking in particular for any general skills deficiencies across the class
5) Develop mini-lessons or tutorials or find on-line exercises for students to complete to bring all students up to the same level
6) Build into subject lessons exercises which enable students to practice and improve the skills in focus

7) Ask the students to continue to self assess their proficiency up to mastery level

The self-assessment chart on the following page has been adapted from Dreyfus & Dreyfus (2000) and Berliner (2004) from skills assessments applied to the development of professional expertise among teachers and contains four levels of expertise or proficiency in any skill identifiable through behaviours as ranging from:

- the Novice – Observation – watching others performing the skill
- the Learner – Emulation – copying others practice of the skill
- the Practitioner – Demonstration – being able to demonstrate the skill on demand
- the Expert – Self-Regulation – being able to perform the skill without conscious attention

The highest level of skill proficiency is seen within this model as self-regulation. This skills progression is in line with both Abraham Maslow's levels of learning (1987) and John Stevenson's development of capability (1992). Once a person can use a skill unconsciously without deliberate awareness then they are at the completely un-scaffolded level of the self regulated learner and is deemed sufficiently proficient to be able to teach that skill to others. Stephenson saw the development of the capabilities of the lifelong learner as being the movement from being able to use a learning skill with known content in known context (competence) to being able to use that skill with unknown content in unknown context (capability). This ties in very well with the overriding aim of all IB teaching and learning as the development of the self-managed, self-directed, self-regulated, lifelong learner.

	ATL Skills Proficiency			
	Level 1 **The Novice** **Observation**	**Level 2** **The Learner** **Emulation**	**Level 3** **The Practitioner** **Demonstration**	**Level 4** **The Expert** **Self-Regulation**
Dreyfus & Dreyfus (2000) Berliner (2004)	Observes others performing tasks and using the skill Gains an understanding of how the skill operates and what the distinguishing characteristics of the skill are Gathers procedural information about the performance of the skill, asks questions to clarify procedure Errors are frequent High levels of scaffolding from teacher needed - explanations, training, structural support	Copies others performance of the skill Works through the skill in a step by step fashion, seeks clarification for correctness of performance Consolidation of learning is occurring through experience Is very conscious of performing the skill and correcting errors with deliberation Medium level of scaffolding needed - correcting poor performance, answering questions	Can demonstrate the skill on demand Flexibility of skill use in different contexts is developing Automaticity is developing Errors are corrected quickly Minimal teacher scaffolding required – setting directions, goals, assessable outcomes	Can perform the skill without thinking through the process first Can teach others the skill Automaticity is established High levels of performance occur Any errors are corrected automatically No teacher scaffolding needed
Stephenson (1992)	Is not performing the skill	Performs skill only with known content in known context	Can perform skill either with different content or in different context	Can use skill with unfamiliar content in unfamiliar context
Maslow (1987)	Unconscious Incompetence	Conscious Incompetence	Conscious Competence	Unconscious Competence

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