Understanding Gifted and Talented Learning

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An understanding of how gifted and talented learners learn needs to underpin the teaching that is implemented and form a basis for it. This paper develops a model of gifted and talented learning that draws from the research evidence available and develops implications for implementing effective pedagogy.

Pathway to be followed:

Giftedness and talent in the classroom	• teachers' stereotypes of gifted learning, giftedness and talent • possible ways in which students show high achievement in the classroom
A framework for describing knowledge and learning	Key learning actions used by self managing learners
What does gifted and talented knowledge look like ?	• characteristics of gifted knowledge. Renzulli's tripartite model: gifted knowledge comprises advanced conceptual knowledge, unusual links between ideas and high intrinsic motivation to learn and to reduce uncertainty. • gifted and/or talented knowledge ; Gagne's Differentiated Model of Giftedness and Talent. • being gifted and / or talented in different ways. Multiple domains of gifted knowledge; verbal, nonverbal or visuo-spatial, musical knowledge. Types of gifted learners. • neuropsychological models of gifted knowledge.
How gifted students learn	A systematic model of gifted learning that draws on: • essential characteristics of gifted learning : high ability, creativity and task engagement (Renzulli's tripartite model) • how learning maps gifted knowledge into talent; Gagne's model Differentiated Model of Giftedness and Talent. • how gifted learners manage and direct their learning; metacognition.

Teachers entry beliefs about giftedness. *Typical learning characteristics of students who are gifted and / or talented* ? Gifted students and how they learn are frequently misunderstood in regular classrooms. It is useful to begin with what teachers know about them. Their stereotypes influence how they recognise these students and how they teach them.

For each of the following characteristics, indicate whether you believe it to more characteristic of gifted learners, able, bright learners or of neither group.

	gifted learners	able bright learners	neither group
Not easily programmed by others during teaching	❒	❒	❒
Makes links between ideas in unexpected, divergent ways	❒	❒	❒
Learns the ideas being taught well	❒	❒	❒
Irritated by being structured or being directed to learn	❒	❒	❒
Remembers well what was taught	❒	❒	❒
Takes in new ideas as they are presented	❒	❒	❒
Usually good at spelling	❒	❒	❒
Easily programmed by others during teaching	❒	❒	❒
Is extremely curious to learn new ideas	❒	❒	❒
Prepared to learn new ideas	❒	❒	❒
Takes ideas apart, extends and question them	❒	❒	❒
Thinks intensely about ideas being taught	❒	❒	❒
Creates a new design or a way of thinking	❒	❒	❒
Invents, builds new ideas	❒	❒	❒
Receives new ideas from others well	❒	❒	❒
May not achieve academically at a high level	❒	❒	❒
Shows own opinions and feelings about idea	❒	❒	❒
Infers, predicts about ideas "But what if ...?"	❒	❒	❒
Understands the taught ideas well	❒	❒	❒
Learns the arithmetic tables well, learns by rote well	❒	❒	❒
Prefers convergent tasks that have an outcome defined by others	❒	❒	❒
Usually satisfied with high level of success	❒	❒	❒
Applies ideas taught well	❒		

	❒ ❒
Invents problems, assignments	❒ ❒ ❒
Invents own ways of solving problems	❒ ❒ ❒
Completes set problems, assignments	❒ ❒ ❒
Often highly self-critical of own learning	❒ ❒ ❒
Applies taught ways of solving problems	❒ ❒ ❒
Initiates tasks, prefers open-ended direction	❒ ❒ ❒
Completes set assignments well	❒ ❒ ❒
Enjoys being structured, directed to learn	❒ ❒ ❒
Prefers divergent problems	❒ ❒ ❒
Links taught ideas with new ideas well	❒ ❒ ❒
Achieves at a high level	❒ ❒ ❒
Is interested, prepared to learn new ideas	❒ ❒ ❒
Copies, imitates ideas well	❒ ❒ ❒

What classroom teachers need to know

How students who are G & T learn, learning characteristics and how these are displayed in the classroom.	How to teach G & T students, the range of pedagogic options available and when to use each. • differentiate and elaborate teaching regular topics. • allow the gifted learning processes to 'evolve',. • 'program' where necessary (for G & T students, helping students see the need to be 'programmed' • how to assess the knowledge of G & T students	
how to give feedback to G & T students that avoids peer comparisons, targets what they know and that challenges further learning through open-ended questions.	**What classroom teachers need to know**	Programming and curriculum options such as when to use acceleration versus horizontal broadening.
How to advise and counsel parents of G & T students.	How to counsel these students; how to help them understand and use their exceptionality to advantage.	How to foster the social-emotional development of G & T students, help them • understand peer interactions and influences

		• deal with concerns and worries about cultural issues • learn in groups • perceive consequences and implications.

What gifted knowledge and learning looks like : Some specific examples

Characteristic of gifted thinking	Outcome typical of regular students	Outcome typical of gifted students
show high level understanding, takes the ideas apart rather than low level interpretation or application		
Show novel connections between ideas quickly, infers		
Solve problems in unusual or novel ways		
Spontaneously ask complex questions about ideas		
Link ideas in lateral, broad ways that are unexpected		
Think in several directions rather than in a single direction, keep track of several ideas at once,		
Think in larger jump, skipping steps in the thinking		
Use imagination or fantasy, showed 'intellectual playfulness'.		
Show focused, intense interest in a particular topic		

How can we understand giftedness and talent

Renzulli : Giftedness is the product of three interacting clusters of traits;

- above average intellectual ability,
- high levels of creativity and
- high levels of task commitment.

Columbus Group : Asynchronous development in which advanced cognitive abilities and heightened intensity combine to create inner experiences and awareness that are qualitatively different from the norm.

Giftedness versus talented : distinguish between talent (outstanding performance in a specific area such as art, music, science) and giftedness (high level broad-based general ability).
Individuals may be gifted but not necessarily talented. Perleth & Heller (1994) and Differentiated Model of Giftedness and Talent (Gagne (1991) distinguish between these two concepts as follows;

Giftedness

distinctly above average competences or aptitudes in intellectual, creative, socio-emotional or sensori-motor ability. They are

- untrained and displayed spontaneously.
- attributed in part to genetic sources
- observed in many of the tasks a person does.

They can be suppressed by environmental influences and are seen in young children.

----------> motivation transforms giftedness into talent; through personal interests, personality traits and cultural influences

Talent

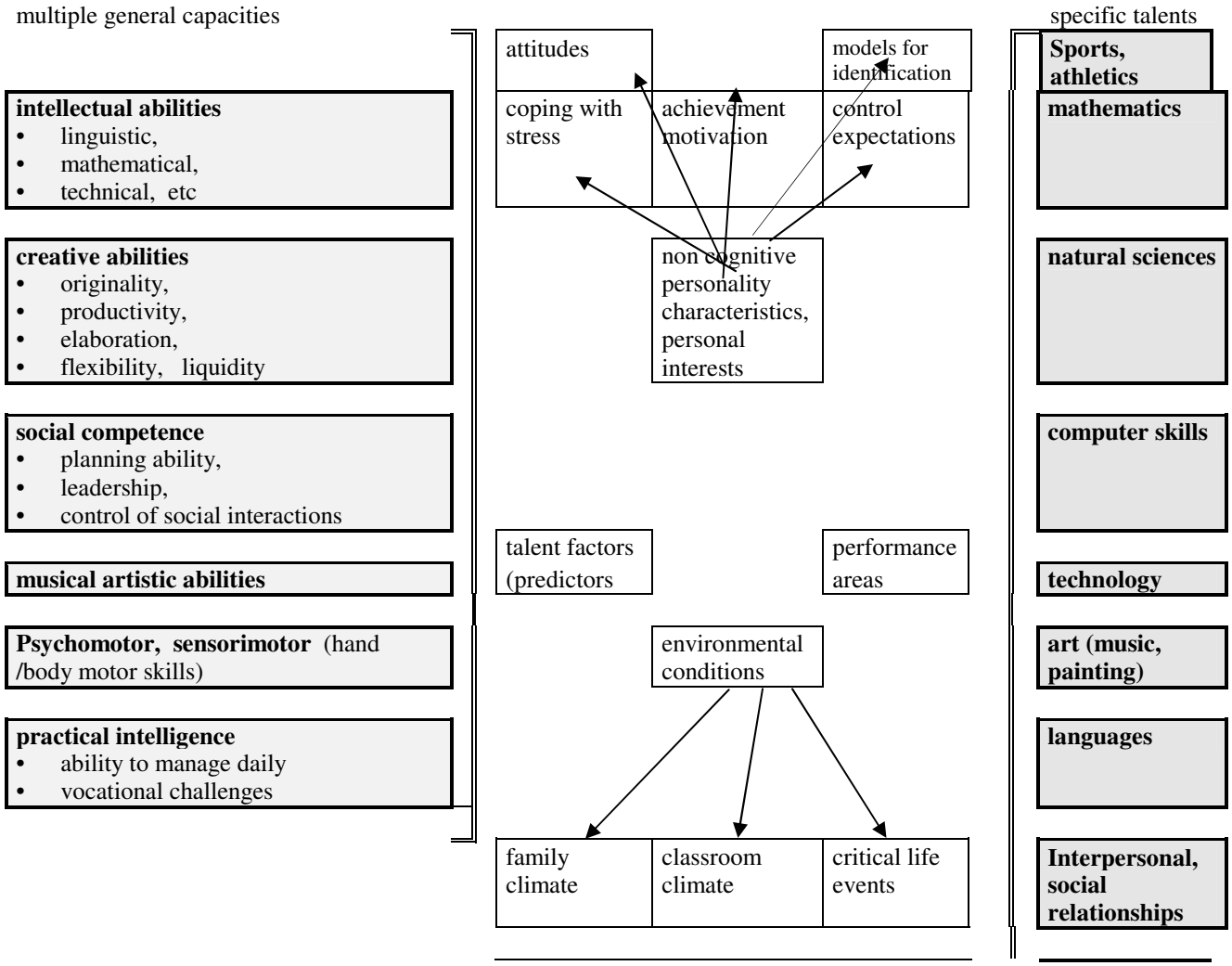
distinctly above-average competence in one or more fields of performance such as fine arts or performing arts. They are skills or abilities that

- are developed systematically
- emerge gradually as the aptitudes are transformed into skills in particular areas of activity.

The theorists generally agree on the areas of 'giftedness and talent

multiple general capacities or aptitudes of high ability (or independent abilities) (P & H)	specific talents (P & H)
• intellectual gifts, comprising quantitative, verbal, spatial (Cohn) , linguistic, mathematical, technical (P & H)	• academic , technical (G) • maths, natural sciences, computer skills, technology, languages (P & H)
• creative abilities (originality, productivity, elaboration, flexibility) (P & H)	
• artistic gifts, ability in fine arts, performing arts • creative (Gagne) • musical and artistic abilities (P & H)	• artistic (G) • art (music, painting) (P & H)
• social gifts, leadership, empathic / altruistic ability (C) • socioaffective (G) • social competence (planning ability, leadership, control of social interactions) (P & H)	• interpersonal (G) • social relationships (P & H)
• sensorimotor (Gagne) • psychomotor (hand+ body motor skills) (P & H)	• athletic (Gagne) • sports (P & H)
• practical intelligence (ability to manage daily and vocational challenges) (P & H)	

DMGT type models



What do these models mean for selection and identification of students ?

What does the distinction between giftedness and talent mean for understanding giftedness and for classroom practice ?

To what extent does your school differentiate between giftedness and talent ?

Understanding how gifted and talented students learn

We are interested in how gifted children learn. Questions we need to examine include

- how does the knowledge of gifted students differ from that of other students ?
- how do gifted students differ in how they think ? Evidence that they think faster, in greater depth, in larger steps at once ? Are they able to change that they know more easily ?
- do gifted students manage their learning and thinking more efficiently ?
- do gifted students have greater confidence in their ability to learn and think ?

To answer these questions we need to develop a framework for understanding knowledge and how it changes. Following is a description of a 'bof'. Work through it and use it to decide what a bof is and what you did to make this decision.

Peter knew enough about bofs to be aware of the danger he was in. He thought about his predicament . Bofs, he knew, were short-sighted, but had a very good sense of smell. They also had very sensitive hearing.

In the distance he could hear the roar of the river. Would that cover the noises that he was sure to make as he tried to escape ? Slowly and silently he turned and backed away from the clearing.

The bof couldn't see Peter, but knew that he was escaping; its sense of smell told it this. It padded along on its huge paws, claws sharp and extended. It moved its head from side to side, its nose pointing up and swinging like a radar scanner searching for its target.

Peter made his way to the waterfall. He stopped on the bank of the river, keeping as still as he could.. Then he saw the bof again. It was standing on a rise that ran along the bank. It was hungry. It was also angry because it had been deprived of its dinner. It padded up and down on the green grass carpet making a soft grunting noise as it moved, It furiously sucked in air through its dilated nostrils as it searched for Peter's scent. Its huge arms thrashed around as it groped for its quarry. Suddenly its pointed ears pointed in Peter's direction.

What, do you think, is a bof ? _____

What did you do to reach this decision ? How did you form your impression ?

Peter has escaped from the bof. Imagine a creative way in which he does this.

What are the key actions that self-directing learners might use to learn about bofs ? We can identify a number of key actions that learners use to change what they know. These actions provide us with a framework for understanding learning generally and gifted and talented learning in particular.

Learning interactions for transforming what one knows at any time.

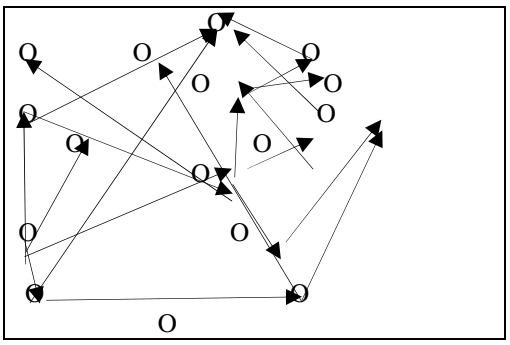
To learn about bofs, there are several actions learners use: learners

- frame up a challenge or reason for learning something; they are motivated and have an interest in learning.
- have an idea of knowing where they will end up; they can 'see' what they will know or be able to do, having learnt.
- make links with and use what they know about the topic, how to learn it and their beliefs about learning the topic.
- see a possible pathway to their goal for learning.
- learn new ideas in specific limited, supported, 'scaffolded' ways.
- deepen what they have learnt, generalize from the specific learning experiences and abstract from them.
- invest positive emotion in the new knowledge, develop positive attitudes to learning the new ideas; this motivates them to learn more about the topic in the future.
- store what they have learnt in memory and practise remembering it.
- identify how they learnt and what they did that helped them to learn.
- see themselves making progress.
- automatise what they have learnt so it can be more easily used.
- transfer and generalise the new knowledge, think flexibly and originally about it, create new ideas and elaborate what they know.
- organise what they have learnt for assessment purposes.

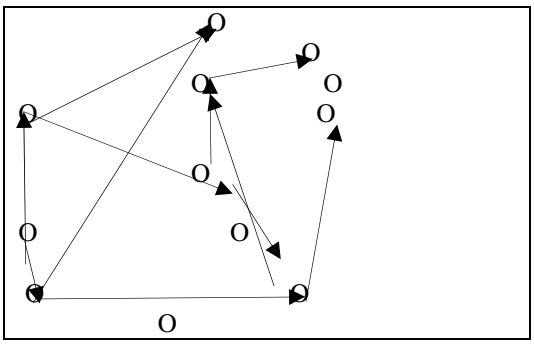
This set of learning actions can be used to describe what self managing learners 'do' when they learn. Together it provides a framework for understanding ad analyzing the learning patterns of gifted and talented students.

What happens to gifted knowledge during learning : A microscopic view

One aspect of gifted and talented learning is how gifted students' knowledge changes during learning, We can draw pictures of how individuals use their knowledge when they are solving a problem or learning new ideas. We can show each idea by O. Each idea is linked in a network. Incoming information lights up some ideas. When this happens, other ideas that are linked are also lit up. For a particular topic, we have drawn the meaning networks for two students A and B.



student A



student B

Student A has a richer, more elaborate network of meaning units. A has both more meaning units and a greater number of links. Imagine both students being exposed to the same information for this topic. Student A has more units of meaning for making sense of it. As well, this student can

(1) end up with a broader understanding because the ideas are linked with other ideas.

(2) chunk the information more efficiently, 'put together' more of the information into individual 'bites' or chunks.

(3) come to an understanding more quickly.

(4) operate more in a 'big picture' way

(5) make wider links with existing knowledge, draw in a broader range of ideas.

This is one way of modelling or picturing the knowledge of gifted learners. These learners have richer and more differentiated networks of meanings in the areas in which they are gifted. This allow them to search for stimuli that help to complete their structure and show generalized assimilation, applying a scheme to all stimuli available.

Brain organisation of GLIM Research by suggests that the brain organisation of GLIM differs from that of average math ability students. Gamm, a calculating prodigy vs non-gifted peers compared brain activity while doing mental arithmetical calculations.

Gamm used areas of the brain linked with episodic memory to calculate	matched peers did not use it
Gifted calculators use the unlimited storage capacity of long-term memory to retain task relevant information, such as the sequence of steps and intermediate results used in complex calculation	rely on the limited span of working memory

Brain organisation of GLIM differs from average math ability students: GLIM are more likely to use right hemisphere processing and show better communication between the hemispheres. The increased bilateral cortical use provides additional processing resources.

A framework for understanding gifted and talented learning.

We can use the set of learning actions to describe what self managing learners 'do' when they learn. The framework can be used to collate what is known about the learning characteristics of gifted and talented students. The left hand column shows the key learning actions and the right hand column shows how gifted students learn.

To learn a new idea most students	How gifted students learn

need a challenge or reason to learn : they
• differ in their self- motivation to learn: vs motivated by others. Motivation to learn ranges from extrinsic to intrinsic.
• differ in their motives for learning; their purpose can be to
  • reproduce or memorise information
  • 'take ideas apart' (deep motives).
  • learn ideas to satisfy external criteria, get good marks (achieving motive).
	Gifted students
	• learn well by having their knowledge challenged, by being able to frame up questions that they pursue.
	• are more likely to show intrinsic motivation to learn. They resist extrinsic motivational orientations.
	• are more likely to show deep motives for learning, to want to 'take ideas apart', question and extend them by linking with what they know. They often resist learning for superficial or achieving motives.

need to know where they will end up, be assisted to 'see' the goals	Gifted students • learn well by forming an impression of where they will end up, they are more able to see their goals spontaneously, set their own goals

make links with and use what they know re topic
• they link the information with what they know about a topic in different ways : by
  • talking to themselves about it, learn in linguistic ways.
  • thinking scientifically about the information.
  • forming images or mental pictures about the information
  • thinking of the key actions and use this to learn.
• differ in how fast and efficiently they handle information
• what they know about how to learn, how to think, their thinking or learning strategies
• use what they feel about themselves as learners of the ideas (self efficacy)
• identify what they don't know about the topic
• recode what they know to match the teaching
	Gifted students
	• have wide general knowledge and an extreme knowledge in areas of interest, know things that other pupils seem unaware of.
	• can have superior existing knowledge of a topic that is better differentiated and elaborated in a range of forms:
	  • verbal, abstract, 'semantic' form (verbally gifted), advanced vocabulary
	  • imagery, experiential form (visual spatial gifted).
	  • procedural form
	  • scientific-mathematical form (math/ scientifically gifted)
	  • musical form
	• show early fluency and are expressive particularly in areas of interest and communicate ideas fluently
	• process information faster and efficiently, can hold more ideas in short term memory.
	• need to see that they are allowed to manage and direct aspects of the learning, that they are valued for what they know and how well they can manage the learning.
	• often set unrealistically high standards and goals for themselves, are self-critical, may judge themselves harshly and believe they will be less successful in learning particular topics (particularly those that don't interest them.
	• are 'perfectionists', may worry about expectations that they should be 'perfect' and yet know that they aren't. If their giftedness or creativity is perceived to be threatened, they withdraw; they frequently lack the analytic strategies necessary for dealing with the threat more constructively.
	• are curious, question topics they will learn enjoy discovering new idea and need the opportunity to explore new ideas.

	• need to have the opportunity to recode what they know to match the teaching • have high sense of moral values • often have low self-esteem that restricts their academic learning.. Their self-talk is frequently more pessimistic than optimistic and they need to learn more optimistic scripts as options. • may be more anxious, often put stress on themselves and feel stress from others due to unrealistic expectations. • show a passion for learning 'self-driven' and motivated to 'want to know'. They learn spontaneously without direct teaching, have high levels of intrinsic motivation (feel frustration in learning situations in which they have less control over what, how and why they are learning.
need to see a pathway to the goal	Gifted students • prefer to set their own pathway that they can follow to the goal .

learn new ideas in specific contexts They
• use a range of learning strategies:
  • actions, imagery, familiar language;
  • recode imagery, action knowledge
  • answering questions
  • decide how a new idea is like what they know
  • change their minds, make and correct mistakes,
  • talk about the ideas in different ways ?
  • make a picture of the ideas, imagine them
 	
• hold knowledge in short term memory or the thinking space.
 	
• use the information in different ways;
 	
  • some segment it into parts, work on each part; analytic sequential thinking.
  • some make rapid guess about main idea and check their guess; global wholistic thinking.
 	
• manage and direct their learning ('metacognition') differently: some
 	
  • plan, monitor their progress and review how they have learnt themselves
  • look for direction from others
	Gifted students
	
	• have a well-developed memory, particularly for the areas of interest, know how to use their knowledge better.
	
	• see connections between ideas quickly, learn new information and solve problems rapidly.
	
	• keep track of several ideas at once.
	
	• link ideas in lateral, creative ways. learn in idiosyncratic ways and often surprise us with the direction their thinking seems to have taken, give unexpected responses to questions ,
	
	• often not easily programmed externally, learn better when they can see the meaning base for the ideas rather than when the ideas are taught by rote, may have difficulty learning by rote, learning spelling, handwriting, recall of arithmetic.
	
	• ask questions spontaneously, ask complex questions and seek the opportunity to answer them for themselves
	
	• explore possible options, trial ideas, interpret ideas as problems,
	
	• use analogy, make comparisons well, look at ideas in different ways; for example, intuitively, in imagery or action ways.
	
	• maintain comparatively high levels of concentration and persistence on thinking tasks that interest them.
	
	• link and categorise ideas at a high level
	
	• look for and see cause-effect relationships or consequences rapidly, try to discover the how's and why's of their world. May see' consequences that peers don't, tend to worry, appear to be less self-confident, less sure of self..
	
	• often do not need much practise to learn new ideas, require fewer repetitions of an idea to learn it.

	• often do not get the appropriate corrective feedback • use short term memory better, link ideas at a higher level, organize them better during thinking. Short term memory ability matches area of giftedness; math gifted learners have better number memory, artistically gifted have better visual. • use global wholistic thinking more than analytic sequential thinking, think in larger jump, skip steps in their thinking, ignore details in some areas. • show superior metacognitive knowledge, more able to monitor comprehension, learn independently, prefer to direct their own learning, may have difficulty in situations in which their learning is directed • use imagination, fantasy and humour at a high level, show 'intellectual playfulness'. may show carelessness in handwriting and similar routine tasks • pursue an idea or argument tenaciously, express opinions uninhibited, argue in a clear, logical and reasonable manner. • can concentrate for prolonged periods and show high levels of perseverance, not easily distracted from tasks of interest.
Deepen, abstract what they have learnt, link more broadly with what is known • link episodic, abstract and procedural aspects of idea • review, consolidate what was learnt • decontextualize, summarize, organize, main/subordinate ideas. • elaborate and extend ideas through questioning • look at ideas from different perspectives	Gifted students • use more complex cognitive / thinking strategies than peers and more spontaneously. They often create strategies rather than use taught ways of thinking. They may have difficulty saying what they did to think their way through a task. • show better far transfer of strategies to situations quite different from those in which the strategy was first used or learnt, eg problem solving strategy, • show superior problem-solving strategies, are more flexible in shifting from one strategy to another for complex problems and transfer understanding from one problem to related problems more effectively • spontaneously link episodic, abstract and procedural aspects of idea and move between them more easily.
link positive emotion with new knowledge if conditions are met: • interest level, • ideas seen to have value, be useful • they learnt the ideas successfully	Gifted students invest positive emotion in the new knowledge if they managed and directed the learning. They are less likely to value knowledge they are forced to learn

store what they have learnt in memory, practise remembering it	Gifted students • store easily what they have learnt in meaning or semantic memory, particularly when topic interests them • have more difficulty storing information that has been repeated in rote memory.

identify how they learnt, what they did that helped them to learn	Gifted students
	• often learn rapidly in idiosyncratic ways, rather than being programmed how to think and have difficulty saying the thinking they used. It is useful for them to reflect on how they learnt.
	• may have difficulty saying how they thought through or solved problems, because
	  • they are thinking faster than they can vocalize or
	  • they don't believe they need to tell others how they think.

see themselves making progress	Gifted students • usually set their own indicators for seeing themselves making progress, particularly for topics that interest them. • may frequently judge themselves harshly in terms of whether they have made the desired progress.
automatise what they have learnt so it can be more easily used	Gifted students often automatise what they have learnt in meaning ways rather than through being taught rules. They often do not automatise ideas by rote.
transfer and generalise the new knowledge	Gifted students show far transfer and generalise the new knowledge far beyond the context in which it was taught
organise what they have learnt for assessment purposes	Gifted students often have difficulty showing what they know in assessment contexts because they prefer to show what they know about a topic rather than fit their knowledge within the assessment task parameters.

Serial - analytic versus synthetic-global strategies

Learners think about ideas in two main ways: they use either
- analytic strategies that analyse ideas into parts step by step way and sequence them or
- wholistic strategies that integrate ideas with other ideas, treat each ideas as a whole.

A comparison of the two types of strategies is shown in the following table. Learning in conventional classrooms requires a balance of both types. Many gifted students show a preference for using wholistic strategies over analytic strategies.

Serial - analytic strategies	Synthetic-global strategies
• Work on bits of information step by step • Learn step by step, delay giving answer. • Focus on detail and specific facts. • Think in direction provided. • More likely to learn the conventional ways of thinking	• Look for overall patterns, scan • Leap in and answer quickly, guess impulsively • Focus on overall idea, miss or ignore detail • Think by moving in several directions at once. • Develop their own ways of thinking. May think very quickly and not reflect on how they thought.
• Take things apart, work on the parts • Easily programmed by external information by analysing and taking on board small changes at a time • Follow other people's directions well	• Think in wholes • Not easily programmed by external information, attempt to align what they think with parts of information • Prefer to direct, manage their thinking, flexible, not phased by unanswered questions.
• Think by linking the parts in conventional ways. • Analyse, sequence ideas in taught ways • Find it easy to learn the 'rules of play' of situations when these are explicit • Prefer less flexible convergent learning • Learn other's explanations, procedures	• Think by imposing their personal links, drawing in ideas that may seem irrelevant, 'off the track', lateral. • Arrange, sequence ideas less predictably. • Don't take on the 'rules of play' when these are explicit, use their own rules of play • Prefer flexible, open-ended learning contexts • Prefer to work out own explanations, sometimes using other peoples' explanations.
• Show what they know in conventional, acceptable, taught ways	• Show what they know in less conventional ways; have difficulty using conventional ways of display

Metacognition and giftedness

Metacognition describes how students become responsible learners regulating their own learning and performance. Self-regulation is the highest level of metacognitive activity (Borkowski, 1996) and includes

- monitoring or self-checking,
- planning or goal-setting, and
- attending and rehearsing.

Gifted learners use self-regulatory strategies such as defining, focusing, persisting, guiding, coping, correcting, reinforcing and solving. The Good Strategy User Model is useful for examining metacognition in gifted students (Carr, Alexander & Schwanenflugel, 1996). Three components can be examined:

component	gifted and average students
knowing how to use a particular strategy	gifted elementary students • use more complex strategies • use strategies more spontaneously and independently • don't differ from non-gifted students in near transfer of strategies to use in similar situations • show far transfer of strategies to use in situations quite different (for example problem solving, elaboration)
knowing when, where and why different strategies should be used	Gifted children have better knowledge about why particular strategies work
knowing how to evaluate, check and change strategy use	Gifted children are no better than average children in • judging the effectiveness of a strategy, • adopting alternative ways of solving problems. They use problem-solving strategies more flexibly and are more efficient in shifting from one strategy to another for the complex problems.

Gifted students use the same strategies and rules during problem solving as average learners; they don't show qualitative strategic differences (e.g., Gaultney, Bjorklund, & Goldstein, 1996; Jackson & Butterfield, 1986). However, they use the more advanced rules, use strategies more efficiently and learn new strategies more easily (Geary & Brown, 1991). They show superior problem-solving strategies and flexibly shift from one strategy to another for the complex problems, and transfer understanding from one problem to related problems more effectively (Kanevsky, 1992)

To collect metacognitive data to decide if students are gifted Metacognition in a talent domain may become important after the early learning years, when children have learned the basics of their field and become immersed in strategy and self analysis.

Think aloud	students think aloud while doing a simple task (Ericsson & Simon, 1993). Record and analyze what they say, with other data such as writing, drawing, videos, behavioral observations that reveal the cognitive processes (Hong & O'Neil, 1992).
Portfolios :	Reports from 4 people over period on a student's ability in 4 areas (Shaklee, 1993): • acquisition and retention of knowledge • application and comprehension of knowledge • creation of knowledge and • perusal of knowledge Metacognition is one indicator of the application and comprehension of knowledge.
Problem-solving tasks	Analyse and score contextual problem solving tasks for fluency and flexibility
Dynamic assessment procedures	In particular domains (Bolig & Day, 1993) to measure the rate of learning transfer and rate of learning, particularly for far transfer

Developmental trends in gifted learning. As well as looking at how gifted students go about learning at any time, it is useful to look at how gifted students develop intellectually. This allows us to look at issues such as early identification.

Two main theories of cognitive development are provided by Piaget and Vygotsky. It is useful to examine what each of these proposes for gifted learning.

Piaget

Piaget proposed	Gifted children differ qualitatively in how they develop thinking. The order of stages is consistent but organize their knowledge differently; they
• we make sense of the world by using what we know • we symbolise the world in various ways; actions--> images -->real world concepts ---->abstract concepts • thinking consists of mental operations; physical actions are internalised. • our knowledge consists of sets of related ideas (schemes) . • our ways of knowing change qualitatively through a sequence of stages	• move through stages faster (Hix, 1990; Lempers, et al., 1987) of up to 2 years (Carter, 1985). Moderate and highly gifted students do not differ in speed (Bekey & Michael, 1987) and can do at least one formal operations task by age 9 or 10. • show domain specificity in formal operations (Berninger and Yates, 1993). • once they can conserve, move through sequence rapidly, do so simultaneously in several contexts (Roberts, 1981).

• sensory-motor stage; action understanding. • pre-operational stage; perceptual understanding; 2 sub-stages (1) perceptual understanding and (2) intuitive understanding • concrete operation stage; real-world logical understanding. • formal operational stage; abstract understanding. • our knowledge changes in situation of cognitive conflict; two adaptation processes; • link new ideas with what we know; • change what we know.	• having learnt a concept, apply it more widely and use wide active inference (Heller, 1979) • have richer and more differentiated networks of meanings (Heller, 1979). This allow them to search for stimuli that help to complete their structure and show generalized assimilation, applying a scheme to all stimuli available. • operate as big picture thinkers, pattern seekers and form general principles that apply to all domains, following feedback from few encounters • don't generalize as much within a domain on the most difficult problems; have general principle but don't consistently apply it.

Vygotsky

Vygotsky proposed • we make sense of the world through our social interaction with others, particularly in how we jointly solve social problems • we symbolise the world using socially determined and valued • tools; actions for solving problems • signs; gestures, icons, symbols • Zone of proximal development' ; difference in how a person can solve problems without and with social support. • Self talk as a mediator for managing learning Provide opportunities for negotiating meaning in learning.	Implications of Vygotsky for giftedness Do gifted students • have past social interactions, social problem-solving that differ from others ? Do their parents begin to mediate learning earlier, manage parent-child interactions differently ? Parents of pre-school gifted children model and foster metacognitive strategies more than parents of normal ability children, particularly during problem solving (Moss, 1990). Gifted preschoolers more likely to predict consequences, reality test and monitor their thinking • internalise different social tools and signs ? • internalise tools and signs more easily ? • differ in their cultural experiences ? • have more highly developed iconic and linguistic coding systems ? • operate more easily in the ZPD (easier to scaffold, self-scaffolding) ? How might gifted students manipulate the ZPD ? • Can have their existing knowledge be scaffolded by higher level thinkers ? • Do they need to be scaffolded in ways that allow them to pursue their own interests in learning ? • Some gifted students show a smaller ZPD when peers or teachers provide the scaffold; they prefer to manage their own rather than learn in mixed ability groups. • learn self talk more easily ?

Identifying gifted children

Behavioural observation checklist

Student name _____ **Date** _____

Age _____ **Sex** _____ **Grade** _____ **School** _____

Rate the child on each of the following characteristics using the 5-point scale. As much as possible, base your judgment on things your child actually did or said. Tick the appropriate box for each one.

	Rarely	Not often	Some times	Often	Usually
Approach to learning and thinking How often your child					
• achieved developmental milestones faster, earlier than normal	❑	❑	❑	❑	❑
• sees connections between ideas quickly, learns new information and solve problems rapidly	❑	❑	❑	❑	❑
• asks complex questions about everyday situations, tries to discover the how's and why's of the world.	❑	❑	❑	❑	❑
• sees cause and effect relationships rapidly	❑	❑	❑	❑	❑
• links ideas in lateral, creative ways, surprises you with the direction their thinking, give unexpected responses to questions	❑	❑	❑	❑	❑
• thinks in larger jumps, skips steps in her / his thinking	❑	❑	❑	❑	❑
• uses imagination, fantasy and humour at a high level.	❑	❑	❑	❑	❑
• has a well-developed memory, particularly in areas of interest	❑	❑	❑	❑	❑
• makes decisions quickly	❑	❑	❑	❑	❑
• has difficulty learning rote learning to spelling, arithmetic	❑	❑	❑	❑	❑
• shows carelessness in handwriting and similar routine tasks.	❑	❑	❑	❑	❑
• discusses an idea or point of view tenaciously,					
• expresses opinions in a clear, logical way	❑	❑	❑	❑	❑
• has a wide general knowledge and an extreme knowledge in areas of interest	❑	❑	❑	❑	❑
• shows advanced vocabulary, particularly in areas of interest and communicate ideas fluently	❑	❑	❑	❑	❑
Motivation to learn How often your child					
• shows high sense of moral values	❑	❑	❑	❑	❑
• is 'self-driven' and motivated to 'want to know'.	❑	❑	❑	❑	❑
• learns independently and spontaneously, prefer to direct her / his own learning.	❑	❑	❑	❑	❑
• becomes frustrated when the learning is directed by others, when she/ he less control over the learning and why she/he is learning.	❑	❑	❑	❑	❑
• shows a passion for learning in areas that are of interest and can become very absorbed.	❑	❑	❑	❑	❑
• displays a high level of curiosity, constantly questions and enjoys discovering new ideas.	❑	❑	❑	❑	❑
• questions learning in more directed, closed teaching, becomes behaviour or a discipline problem in repetitive tasks, when curiosity is not challenged or when the learning pace is too slow	❑	❑	❑	❑	❑
• concentrates for prolonged periods, shows a high level of perseverance, not easily distracted from tasks of interest.	❑	❑	❑	❑	❑
• becomes bored and frustrated with repetitive, routine tasks	❑	❑	❑	❑	❑
• daydreams	❑	❑	❑	❑	❑
Interpersonal interactions How often your child					
• doesn't see her / himself getting the necessary positive affirmation from peers and teachers.	❑	❑	❑	❑	❑
• doesn't value her/his exceptional abilities.	❑	❑	❑	❑	❑
• doesn't know how to show what she/he knows. ❑	❑	❑	❑	❑	
• has difficulty feeling part of a peer group	❑	❑	❑	❑	❑

• believes her /his interest are very different from those of same-age peers.		❑	❑	❑	❑	❑
• is sensitive to rejection by others and try to conform so as not to appear different.		❑	❑	❑	❑	❑
• shows heightened perceptions and sensitivities.		❑	❑	❑	❑	❑
• wants to dominate or organise peers and groups, direct group learning activities		❑	❑	❑	❑	❑
• has difficulty understanding and valuing the learning of others, is irritated by class peers who do not understand the ideas at the same depth.	❑	❑	❑	❑	❑	
• appears to lack confidence in her/his interaction with peers, has difficulty trusting peers		❑	❑	❑	❑	❑
• feels for others and events in the world, worries about children who they see being unfairly treated		❑	❑	❑	❑	❑
• takes on the problems of others and world problems as personally affecting her/him, worries about these.		❑	❑	❑	❑	❑

Self-esteem How often your child

• has low self-esteem that restricts her / his preparedness to learn academically.	❑	❑	❑	❑	❑
• shows self-talk that is more pessimistic than optimistic.	❑	❑	❑	❑	❑
• set high (often unrealistically high) standards for her/him self and judges her / himself harshly, is self-critical.	❑	❑	❑	❑	❑
• puts stress on her / himself and feels stress from others due to unrealistic expectations.	❑	❑	❑	❑	❑
• is a 'perfectionists', worries that she / he should be 'perfect' but know that she / he isn't.	❑	❑	❑	❑	❑
• is less prepared to 'take risks' in learning					
• has a sense of failure and may not enjoy school.	❑	❑	❑	❑	❑
• is interested in consequences, the future, see and worry about consequences that peers don't see.	❑	❑	❑	❑	❑
• appears to be less self-confident, less sure of self.	❑	❑	❑	❑	❑
• has difficulty resolving inner conflicts, unsure of her / himself.	❑	❑	❑	❑	❑
• shows uneven rates of development	❑	❑	❑	❑	❑
• presents as emotionally or physically immature.	❑	❑	❑	❑	❑

Interpreting your child's profile : You need to have your impression of your child's learning and developed interpreted by an educator or educational psychologist who has expertise in the area of gifted learning. This will often be done following an interview with you. You may be invited to suggest examples or evidence of how your child performed on some of the characteristics.

Key concepts and vocabulary

abstract	verbal, abstract, 'semantic' form (verbally gifted)
achieving motive	learn ideas to satisfy external criteria, get good marks
affective aspects	emotional aspects
analytic sequential thinking	some segment it into parts, work on each part
aptitude potential	capacity to learn
asynchronous development	'asynchrony' in development uneven rates of development in different areas, some areas develop faster than others
assimilation	absorbing information within existing knowledge
attitudes	how disposed positively or negatively a person is to a topic
cognitive abilities	ways of thinking
Creative thinking	applying knowledge and earlier experiences in novel ways, includes fluency, flexibility, visualization, imagination, expressiveness, originality, lateral thinking and openness.
deep motive to learn	'take ideas apart'
domains of giftedness	areas of knowledge in which a person is gifted
episodic knowledge or memory experiential	What you know or remember using earlier experiences, particular real-life contexts, ideas stored in imagery, mental pictures, ideas linked because they occurred in the same place at the same time .
Extrinsic motivation	when learners learn for purposes external to the learner, for example, motivated by the desire for high marks, social acceptance, to out-achieve others.
genetic sources	Sources or causes that are inherited
global wholistic thinking.	some make rapid guess about main idea and check their guess
imagery	experiential form (visual spatial gifted). forming images or mental pictures about the information
intellectual ability	ability to learn and to solve problems
intrinsic motivation	When learners are 'self-driven' and motivated to 'want to know'
knowledge	the range of ways in which we can know; through experiences, images, more abstract ways, know 'how to' do things, what we believe, feel, how to learn and think.
learning strategies	what they know about how to learn
learning styles	characteristic ways in which people learn
metacognition	how individuals manage, regulate and direct their thinking, learning and performance; they plan, monitor their progress and review how they have learnt themselves
personality traits	non cognitive personality characteristics
potential	capacity to think or learn
procedural knowledge	knowing 'how to' to something
psychomotor	sensorimotor psychomotor (hand+ body motor skills)
quantitative	Properties of quantities

recode what they know	Change what is known from one form to another
scheme	a way of thinking, a thinking strategy
self efficacy	use what they feel about themselves as learners of the ideas
self- motivation to learn	intrinsic motivation
self-regulation	the highest level of metacognitive activity and includes monitoring or self-checking, planning or goal-setting
semantic knowledge or memory	ideas that are abstract, not linked to a particular situation, a more general form of ideas, verbal knowledge, ideas that apply across a range of contexts
sensorimotor	hand+ body motor co-ordinated with sensory information
short term memory	hold knowledge briefly while it is used for thinking or learning
socio-emotional, socio-affective	Emotions in the context of a person's interaction with others, cultural influences on emotions
superficial motives	reproduce or memorise information
talents	Superior knowledge and skill developed through specific cultural intervention, teaching, instruction
thinking space	where knowledge is held during thinking or learning, short term memory
thinking strategies	what they know about how to think

Apply the set of characteristics of gifted and talented learners learning to specific topics in regular classrooms

Select a topic in Maths / Literacy (for example, infer from a narrative text) / Science / Art / Music / H &PE / SOSE. Identify how you would modify teaching for G & T learners using the learning characteristics

Superior learning processes	
Learning outcomes	
Motivation to learn and learning style	
Interpersonal interactions	
Self-perceptions and affective aspects	
Uneven rates of development	

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