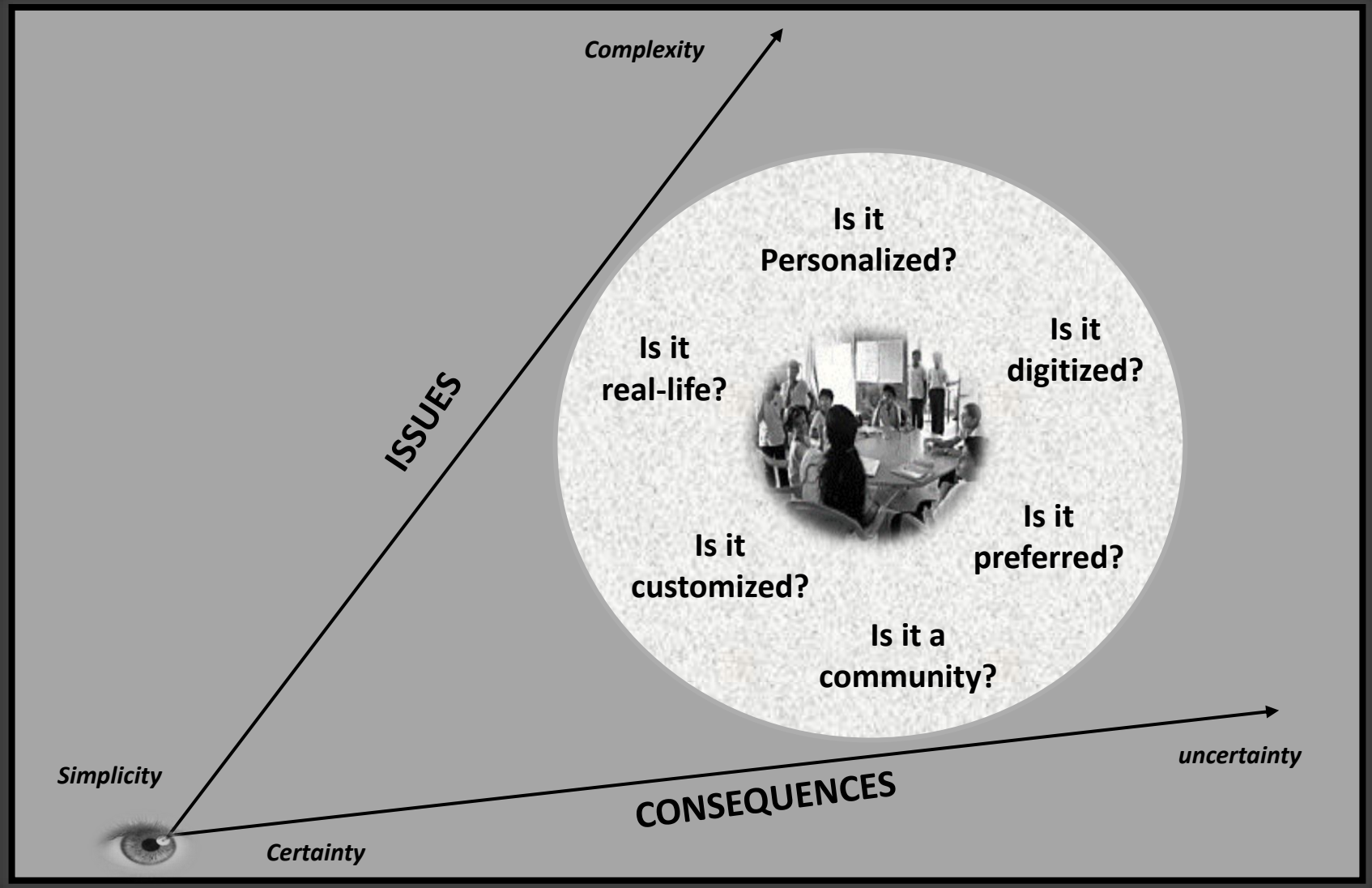
PRACTICAL CONSIDERATIONS
Facilitating learning



PRACTICAL CONSIDERATIONS GATEWAY

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Exploring five minds

Five Minds for the Future - Howard Gardner

A precise of his thinking

Howard Gardner has described five minds, encapsulating crucial skills, values, attitudes and knowledge. They are - the disciplined mind, the synthesizing mind, the respectful mind, the creating mind, the ethical mind. When conditions in the world are changing, educational change must happen, yet the current school system is preparing learners for the past, not the future.

The Disciplined Mind

A disciplined mind is proficient at ways of thinking within a specific discipline or knowledge perspective. Gardner makes a distinction between the subject matter (facts) and the discipline (the thinking behind a subject). For example, science as a discipline involves thought processes such as investigation, analysis, questioning and the generation and testing of hypotheses, and attitudes such as curiosity, as well as scientific facts.

Schools should provide learners with a taste of what it is to think like and feel like a scientist, a historian, an engineer, a lawyer, or whatever. By studying a limited number of key topics in depth, substantial chunks of deep learning are encountered rather than vast swathes of shallow, fact-filled learning. Knowledge gained through chunks of deep learning are meaningful, which breeds a desire for more knowledge. How to achieve a disciplined mind? Identify significant, consequential topics or concepts within a discipline and study them deeply.

The Synthesizing Mind

Individuals without synthesizing capabilities will be overwhelmed by information and unable to make judicious decisions about personal or professional matters. The synthesizing mind takes information from disparate sources, understands and evaluates that information (working out what's important and reliable and what's not), and puts the pieces together in a way that is meaningful to the synthesizer. Gardner suggests learners should generate several representations of a synthesis to deepen understanding.

Synthesis gets little attention in schools. Yet projects and theme-based curricula in schools are good ways to develop synthesizing minds. Explicit instructions, for example, on how to create rich narratives, powerful metaphors and non-linguistic representations are helpful and necessary. Learners should aim to generate several representations of a synthesis to deepen understanding.

The Creating Mind

A creating mind puts forward new ideas, poses unfamiliar questions, suggests fresh ways of thinking and generates unexpected answers. Creativity is essential as it allows us to keep one step ahead of computers and robots, and the like. Creativity is not something that can be turned into routines. Individuals without creative capacities are likely be replaced by computers.

Gardner explains that we should see creativity in a broad sense (not the Edward de Bono one-size-fits-all approach). Problem solving is a creative endeavour whereas creativity in a person is about temperament, not skill. A creative person is dissatisfied with current work, current standards, current questions, current answers, and strikes out in unfamiliar directions and enjoys – or at least accepts being different.

The implications for schools are clear: risk-taking and failure are natural parts of the creative process and perhaps those bored by school, and drop out, are the very ones who need an infusion of creativity in their learning. Gardner points out, young children are natural creators – the task of the teacher is to nurture this natural creativity (but, sadly, school squeezes it out of them).

The Respectful Mind

Individuals without respect will be not worthy of respect by others and will poison the workplace and the commons. A respectful mind notes, welcomes and responds sympathetically and constructively to differences between people and cultures. It seeks to understand different cultures and to work effectively with them. In our globalized, connected world, a respectful mind is essential.

The Ethical Mind

Individuals without ethics will yield a world devoid of decent workers and responsible citizens: none of us will want to live on that desolate planet. The ethical mind is more abstract than the respectful mind. It is more about meaning: our role as a learner, future worker and citizen. How we can serve a greater common good that goes beyond self-interest.

Employing different ‘mindsets’

Food for thought
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Thoughtfulness can be ‘shaped’ by engaging with-

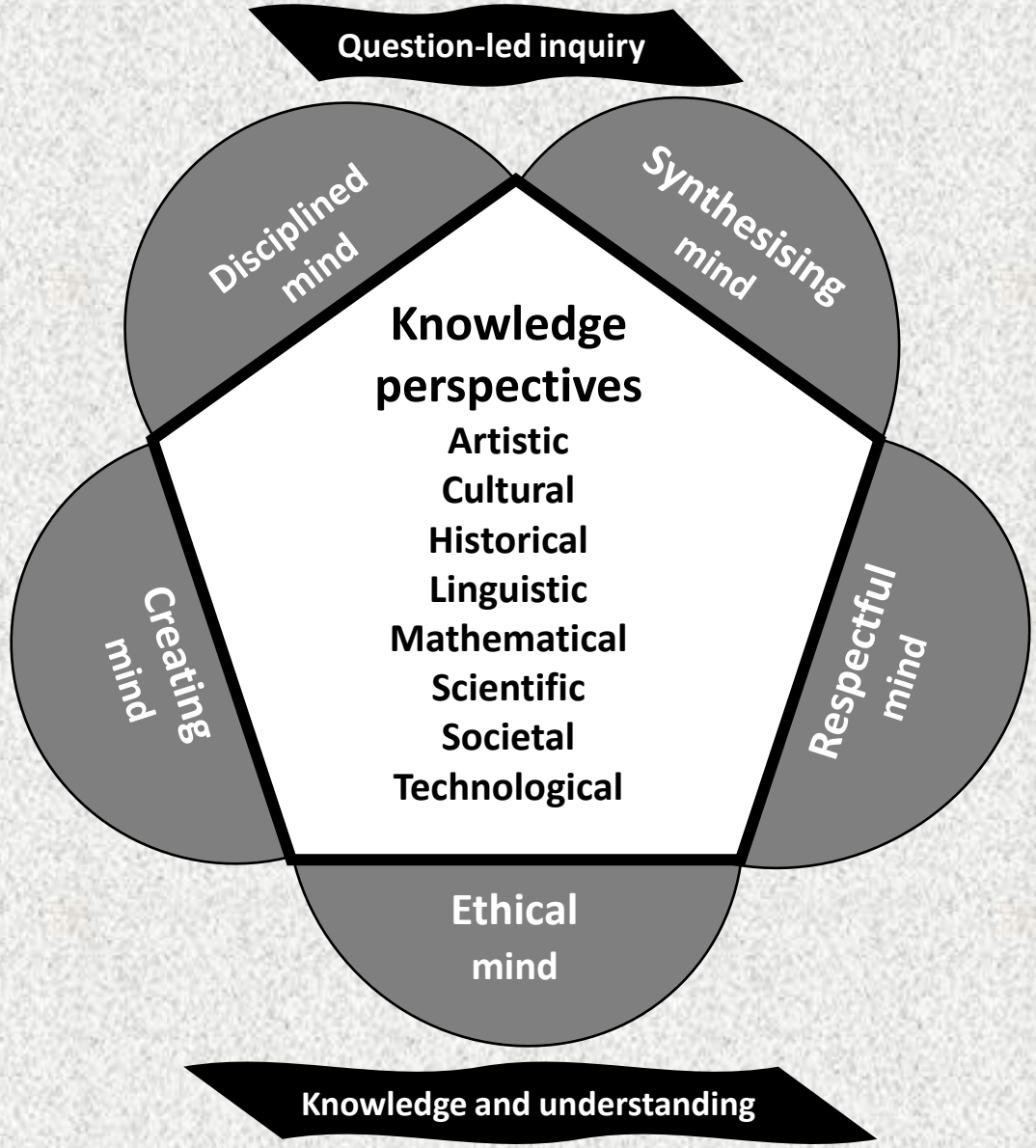
- Disciplines of knowledge and experience
- Synthesising ideas and information
- Respecting ideas and people
- Thinking and valuing ethically
- Creating something ‘new’ or different

Each of these five ‘mind sets’ can be applied through different perspectives from which understanding and experience has been developed. The perspectives may be explored individually or in combinations.

Teachers need to have expertise across these domains

Disciplines of mind are ways of thinking about and investigating experience. They are not subjects or subject matters.

Each knowledge perspective features characteristic intentions and processes, unique concepts and understandings.



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Building collaborative partnerships

Facilitating question-led inquiries

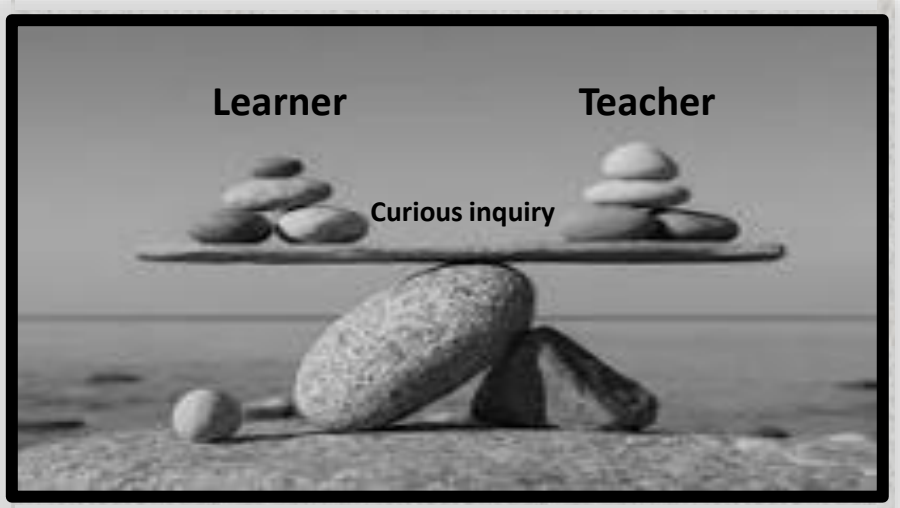
A shared enterprise

Participation in a shared enterprise is the privilege that emanates from teachers and learners working together. They inform and stimulate each other. Even though they come with different experiences and diverse expectations. It's a two-way street.

A dialogical process

Talk may be the primary medium, but emotional and non-verbal communication is just as important. Listening is key with talking and other forms of communication adjuncts to the sharing of ideas thoughts and feelings.

Nowadays, the digital world has broadened the possibilities and potential in ways that would have been unimaginable a decade ago.



A requirement

Collaborative question-led inquiries need to explore distilled knowledge and wisdom, and innovative or emerging possibilities. And do so across the gamut of knowledge and experience.

The quality of these inquiries reflects the knowledge, understandings, and know-how explored. Knowledge among teachers and skill in inquiry processes are critical ingredients in the mix.

A cultural experience

At the heart of facilitation is sharing minds through collaboration. It is a sensitive process where principles of equity, fairness, openness and honesty are important. An ambiance that needs to be worked on, cherished and protected against damaging or disrespectful behaviours.

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Learning cooperatively

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Question-led learning uncovers the unknown through knowing and understanding. In the process learners and teachers can facilitate each others learning

With the rider

No two people learn in the same way or at the same rate, or by means of identical experiences

Facilitation of learning requires 'orbiting' the needs and intentions of learners, and intervening in appropriate ways when the time is right

FACILITATION

Complex — **Uncertainty**

On request intervention
Focus on nuanced issues

Needs based intervention
Focus on developmental issues

Direct intervention
Focus on Technical issues

THINKING — **DIALOGUE**

Simple — **Certainty**

Teacher perspective

" Teaching is the art which expresses in a form accessible to learners an understanding of the nature of that which is to be learned".

Laurence Stenhouse

Learner perspective

"The ultimate aim of education is to enable individuals to become the architects of their own education and through that process to continually reinvent themselves".

Elliot Eisner

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Exploring real-life

Inquiry designs

Customised

Real-life challenges bring learning into the orbit of a learner's experience, as distinct from being something that appears 'foreign' or imposed. It becomes especially powerful when constructed around the expressed needs, experiences, circumstances and aspirations of learners.

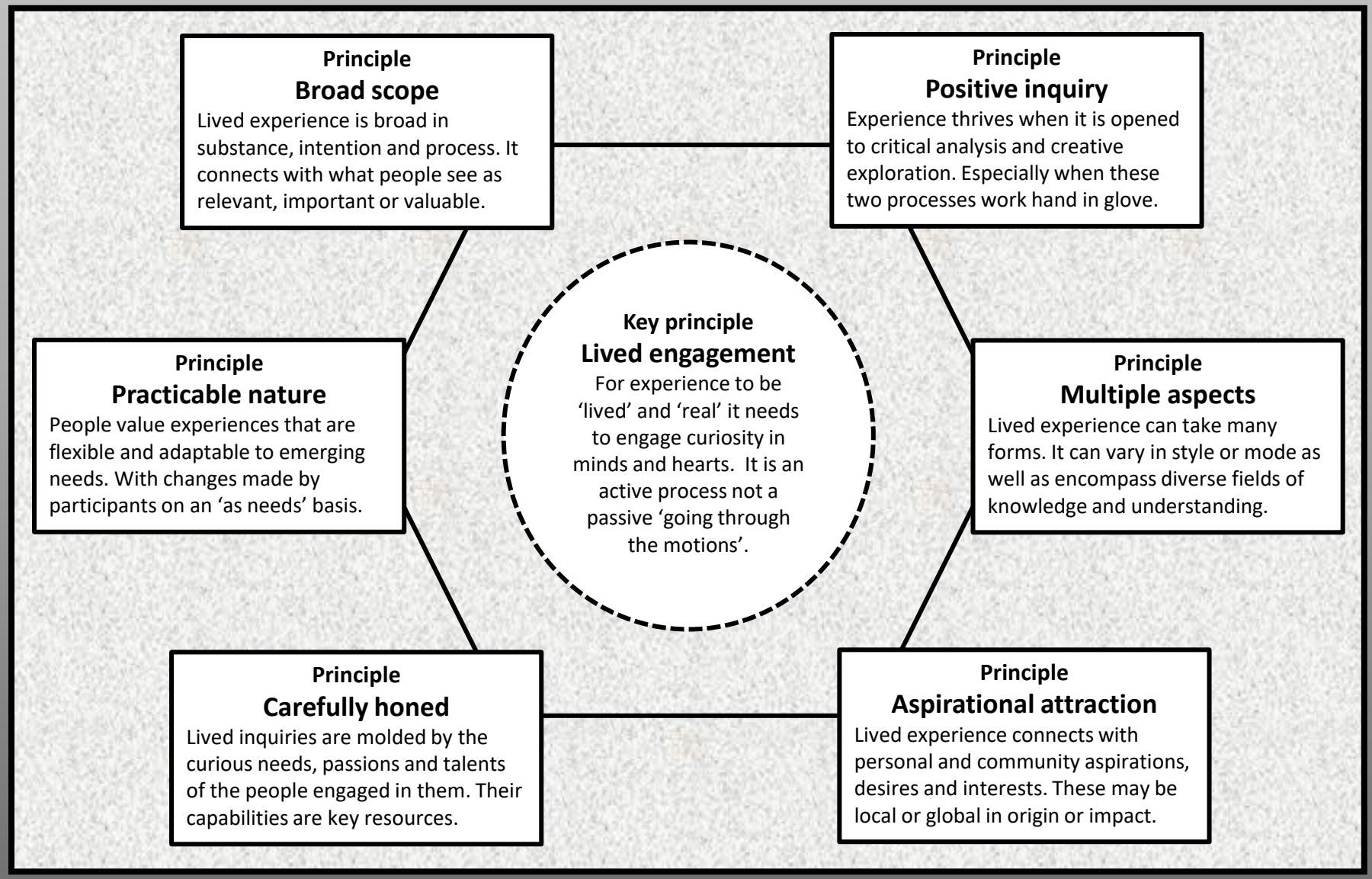
Personalised

Personalised learning requires differentiation of inquiries to meet the differing needs, interests and aspirations of learners. It often involves development of 'modular' or 'unitized' programs which have short term goals and diverse content from which learners can chose. Yet an entire 'modular' series forms a coherent and interconnected whole.

Question-led

Question-led learning, almost de facto, customizes learning programs and personalizes inquiries. Especially if the questions come from learners or result from negotiation between learners and teachers. Collaborative decision-making around GGQs and CQs is particularly valuable for gaining clarity and attuning learning to the needs, interests and aspirations of those involved. As a consequence, motivation to learn and pursue challenges is enhanced.

Principles for a continuing dialogue with 'real-life' experience.



Personalizing and customizing learning

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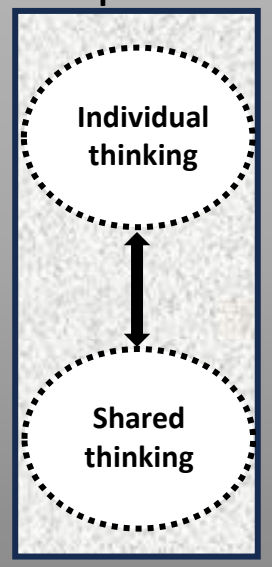
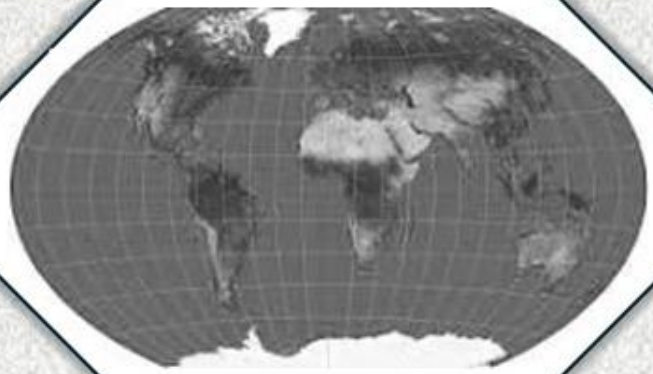
Keep in mind



Focused
- Personal issues and needs
- Local contexts and situations
- Global challenges and tasks

Relevant
Challenging



Purposeful
Personalized

Collaborative
- Individualized choice
- Cooperative teamwork
- Peer and multi-age work

Customized
- Prior learning and interests
- Personal and group understandings
- Talents and aspirations
- Learning needs

Motivation to learn and go on learning throughout life!

Meaningful
- Personal issues and needs
- Local contexts and situations
- Global challenges and tasks

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Encouraging deep learning

Multifaceted mysteries

“The most beautiful experience we can have is the mysterious

Albert Einstein

Knowledge issues

Is knowledge about coverage of subject matters embedded in different key learning areas (subjects)? Or, is it about building deep understanding that can be creatively applied?

In an increasingly diverse and complex world LESS IS MORE. Superficial understanding is inadequate, and a smorgasbord of glimpsed experience is not enough. Furthermore, the explosion in knowledge has made ‘complete’ coverage a forlorn hope.

Deep conceptual knowledge transcends immediate experience from which it is derived. It can be extrapolated to different situations and contexts. And importantly, it can be related to other understandings and creatively applied to new or emerging challenges

Growing understanding

Deep learning stems from curious question-led inquiry. It is built by making sense of experience which is then applied to create knowledge that has meaning and value for individual people and/or collective groups of people.

There are two bookends - generic generative questions and disciplines of mind through which these questions can be explored. The connections made may be concepts confined to specific fields of inquiry or ‘big ideas’ transferable across different fields of inquiry.

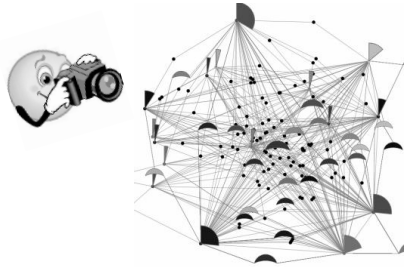
Either way the knowledge and understanding that accrues creates a platform from which inventive ideas and practices can grow.

Note: the meaning attached here to ’deep learning’ is quite different from when it is used in reference to AI.

Continual growth

The development of deep learning is never static. It is continually expanding in response to new experiences and new challenges. And to changed perceptions of extant experience and shifting connections between different aspects of that experience.

Indeed, continual cognitive networking and social interaction generate dialogues that fuel and characterise deep learning. The process represents ways and means curiosity can be engaged and enacted.



Learning deeply

Deep learning is a requirement in a complex and rapidly changing world

Food for thought
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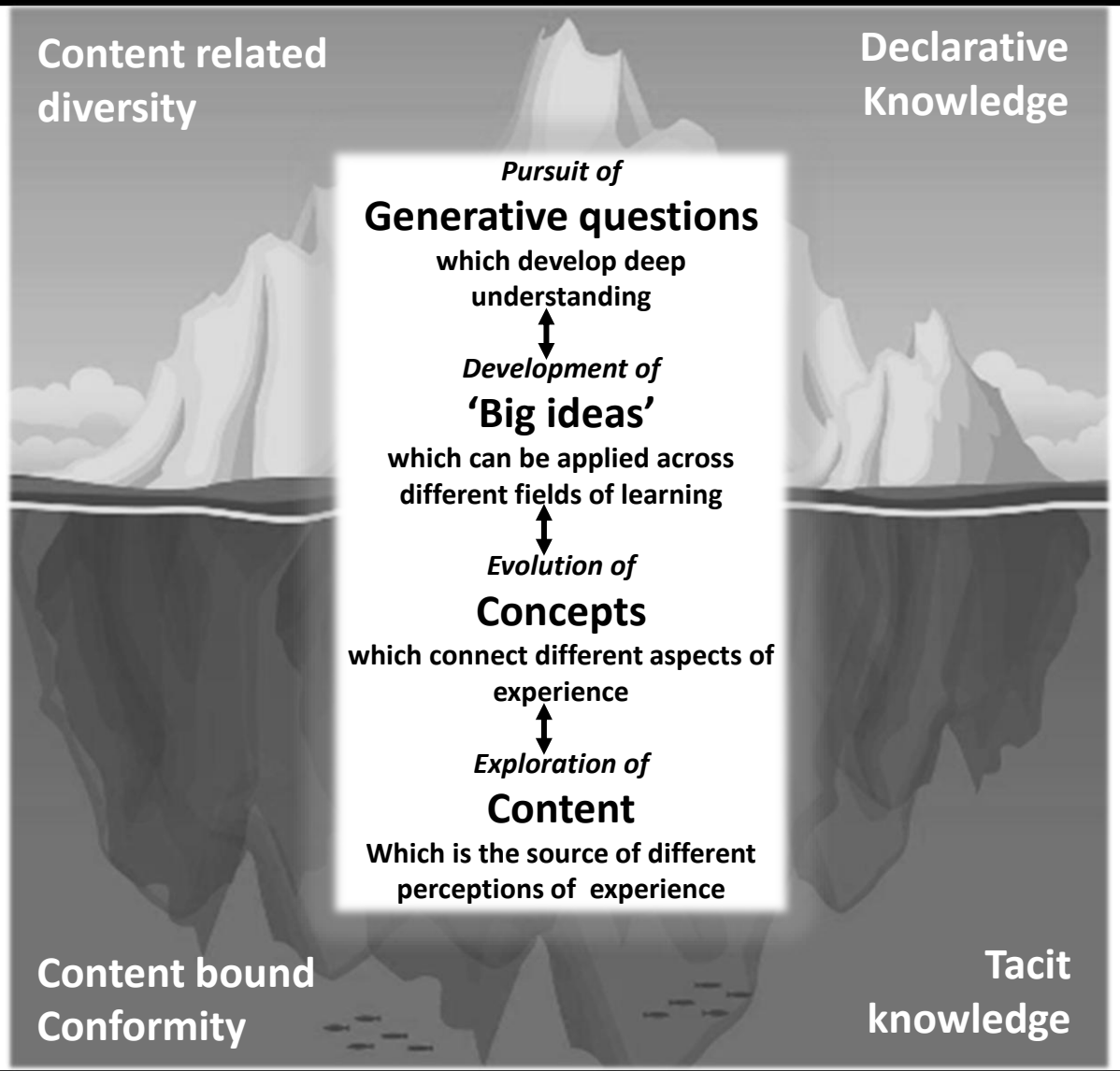
Questions are gateways to the expression of curiosity and building deep understanding

Less is more provokes deep learning

Superficial learning
More is less



Less is more
Deep learning

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Being aware

Stay human and avoid becoming another machine sitting in front of a box.

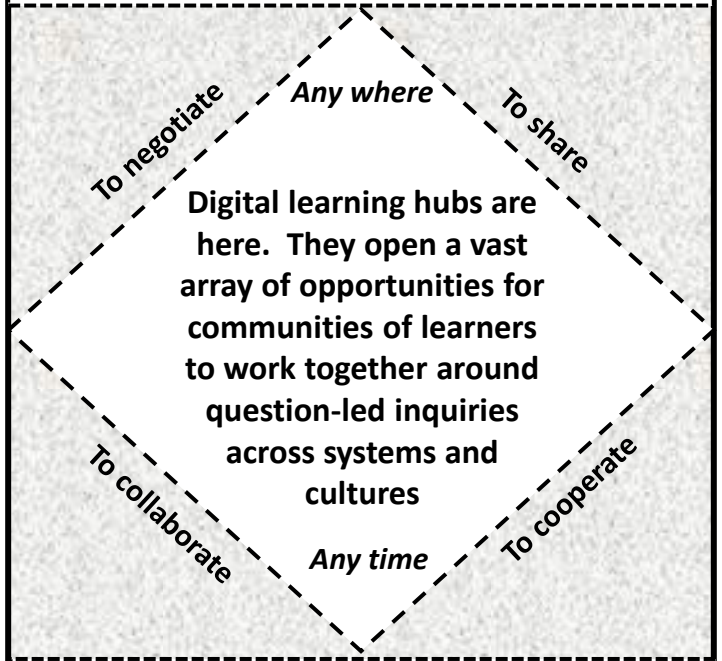
Diverse outlooks

There are many perceptions about the relationship between education and technology. For instance-

- "Technology is just a tool. In terms of getting the kids working together and motivating them, the teacher is most important." – Bill Gates
- "If we teach today as we taught yesterday, we rob our children of tomorrow." – John Dewey
- "Do not confine your children to your own learning, for they were born in another time." – Chinese Proverb
- "I have never let my schooling interfere with my education." – Mark Twain
- "We need technology in every classroom and in every student and teacher's hand, because it is the pen and paper of our time, and it is the lens through which we experience much of our world." – David Warlick
- "The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn." – Alvin Toffler
- "The great aim of education is not knowledge, but action." – Herbert Spencer
- "Tech gives the quietest student a voice." – Jerry Blumengarten
- "Technology will never replace great teachers, but in the hands of great teachers, it's transformational." – George Couros
- "Education is the most powerful weapon that we can use to change the world." – Nelson Mandela

To keep up with the future of technology, we must be willing to change our old mindsets and move towards innovation.

What is desirable and ethical in teaching and learning are key questions now and in the future?



How should education take on board emerging technologies in the world of tomorrow?

Challenging predictions

Predicting technological advancements over the next 10-15 years is challenging. Based on current trends and ongoing research, here are some areas that are likely to be the focus of much innovation.

- Artificial Intelligence (AI) Advancements
- 5G and Beyond
- Renewable Energy Innovations
- Quantum Computing
- Biotechnology and Healthcare
- Autonomous Vehicles
- Advanced Robotics.
- Space Exploration
- Sustainability and Climate Tech
- Neurotechnology
- Smart Cities
- Augmented Reality (AR) and Virtual Reality (VR)
- Advanced Materials
- Cybersecurity Innovations
- Blockchain Applications

Creating digital environments

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Ethical issues and AI developments

Flow of Software development

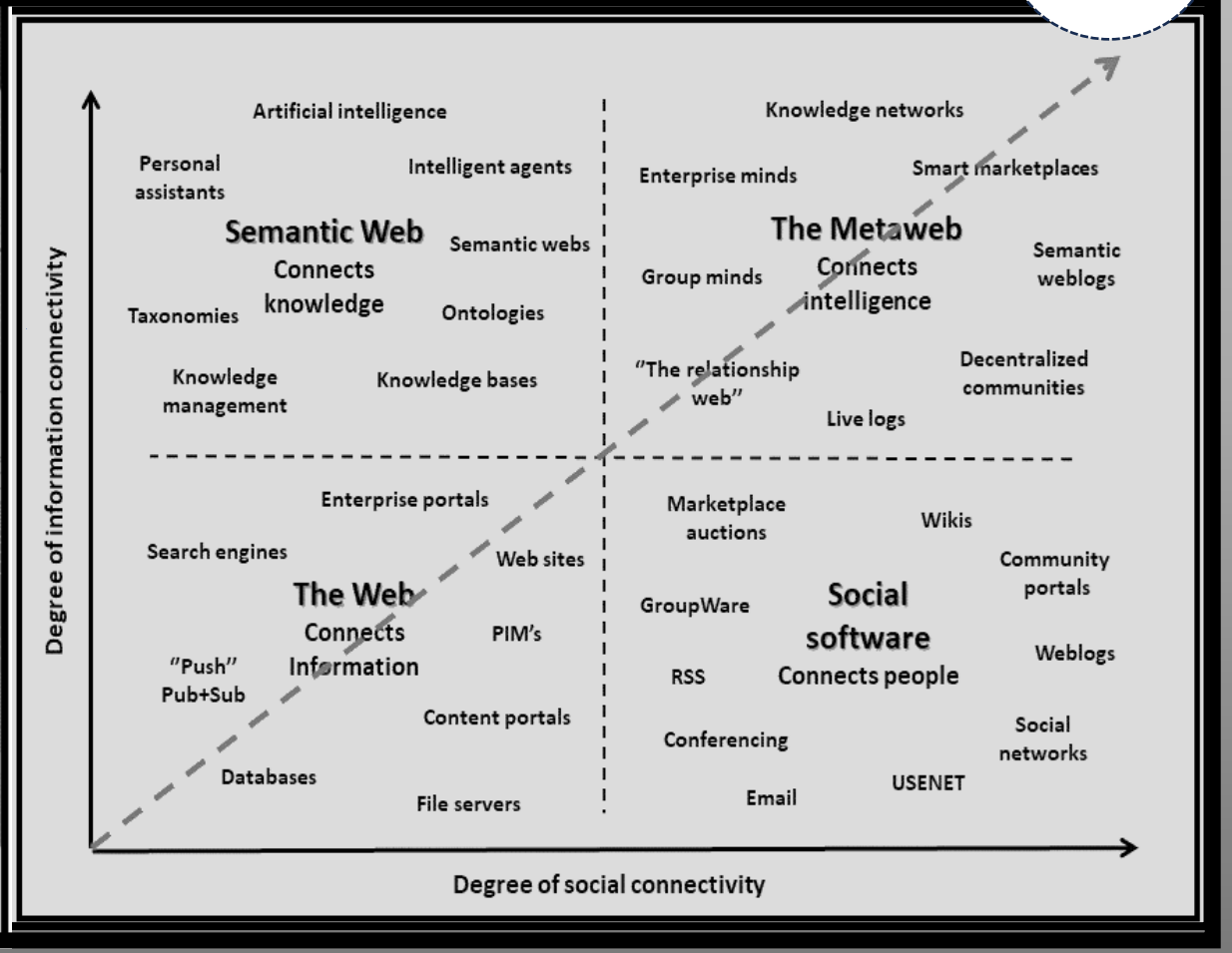
Learning through networking any where and at any time in an interconnected world

Pattern of evolution in digital environments

Progression	Search	Social	Smart
Main vehicles	Internet access	Customised connection	Artificial intelligence Big data
Key features	Information Contacts Extant ideas	Networks Shared Multimedia	Intelligent Remote Control

Delayed time 1950s | **Real time** Today | **Virtual** Future

ICT and AI systems – today and tomorrow



ICT Dialogue capability – today and tomorrow

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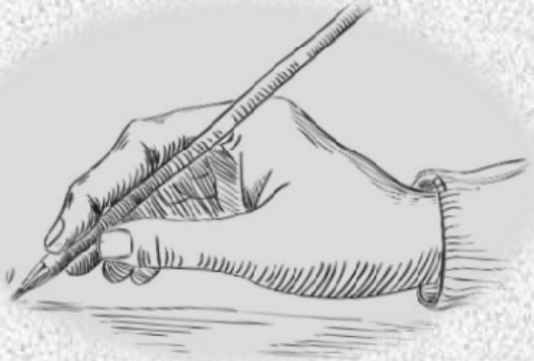
Using digital technologies

Digital technologies have many applications in question-led learning.

Multiple resources with multiple possibilities for application in question-led inquiries



Selection of computer-based tools that facilitate and enhance learning requires wise choices

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Build digital hubs

Digital hubs are becoming part of information and knowledge-based societies.

Local Intranets are analogous to digital libraries which can become dynamic learning hubs

Customised resource
A school Intranet is analogous to a digital library or hub tailor-made for needs of learners and learning communities. It provides a secure source of multimedia resources available 'on tap' to teachers and learners. It can be accessed at any time and anywhere inside school, and if electronic security systems permit in learner's homes outside school.

Dynamic content
School Intranets are user driven and can be upgraded on an 'as needs' basis. If, for example, a collaborative planning meeting of teachers or a community of learners requests an 'on-line' bank of specific resources, they can be made available in a matter of hours. Acceptable contributions and work from learners can also be continually uploaded on an 'as needs' basis and ongoing question-led projects networked.

Effective use
School intranets help to minimize overloading available bandwidth by discouraging wasteful ramblings on the world-wide-web. Yet that does not necessarily preclude access to the huge variety of Internet sites on the web. Should it be considered desirable entrée can be limited to 'acceptable sites'.

Regular monitoring
Being hosted on the school's server aids monitoring inappropriate use that is outside the agreements set out in a school's 'Computer Passport' or similar. The 'passport' can be given 'added authority' if it is formally signed by learners and their parents or guardians and countersigned by the school principal.

Digital capability has become a key requirement in the modern world

Creating digital libraries

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Provide access to text-based, multimedia and digital resources

School-based Intranet - Indicative example of possibilities

TODAY	INFORMATION	RESOURCES	ON-LINE
Weather Map	Department of Education	E-Centre Department's 'one stop shop'	Hot Sites
Satellite Image	Classes	Resources for Teaching and Learning	Useful Internet Sites
Daily News	Student Share	Useful sources	Web Quests
Attendance	Staff Share	Extended Learning	ABC On-Line
Newsletter Publisher Document	School Information	Photos	Education Network of Australia (EdNA)
Mercury	School Internet	Rivers	Reuters Newsagency
My H-Drive	Student Information	Kids Stuff	Student Forums
Help Desk	School Library	Web Tools	Student Mail
Searching tips	Encarta		
Copyright			

System and school-based
Digital libraries in the 'cloud'

Provide digitized materials
- Reading program resources
- Stories and novels
- Information and data resources
- Graphical representations
- Learning programs

Make available resources
- Films and documentaries
- TV - live and stored series
- Blogs, podcasts and wikis
- Sports & recreation activities

Network learner's work
- Investigation studies/products
- Personal and group stories
- Chat forums on key issues
- Collaborative projects and tasks

Develop secure education Intranets for teachers and learners

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Avoiding misconceptions

Beware of confusing rhetoric

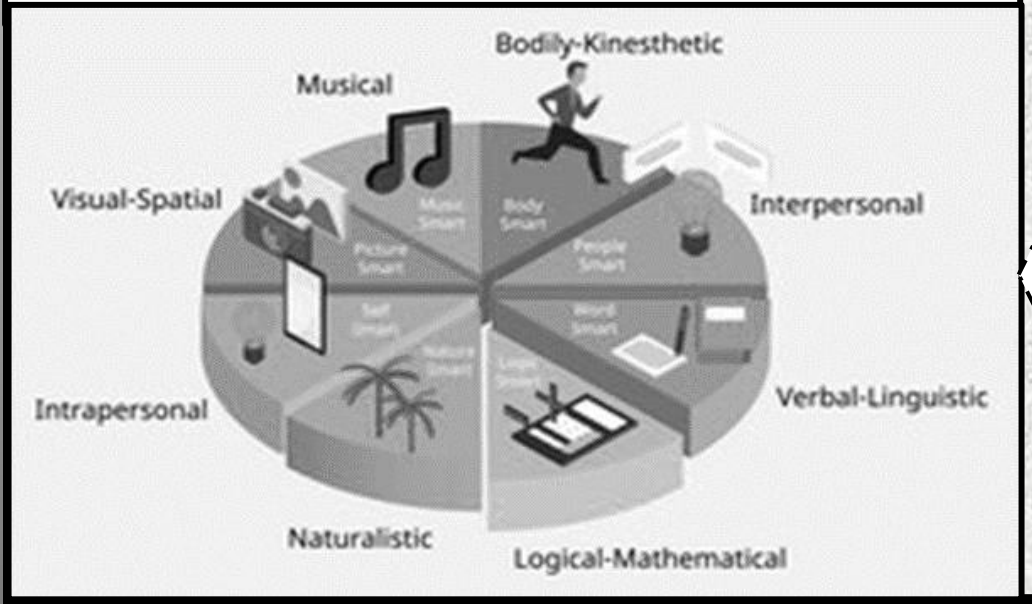
Multiple intelligence

These quotes from Howard Gardner give context to the theory of multiple intelligence.

"It's not how smart you are that matters, what really counts is how you are smart"

"Anything that is worth teaching can be presented in many different ways. These multiple ways can make use of our multiple intelligences"

"The goal of education is to help people use their minds better"

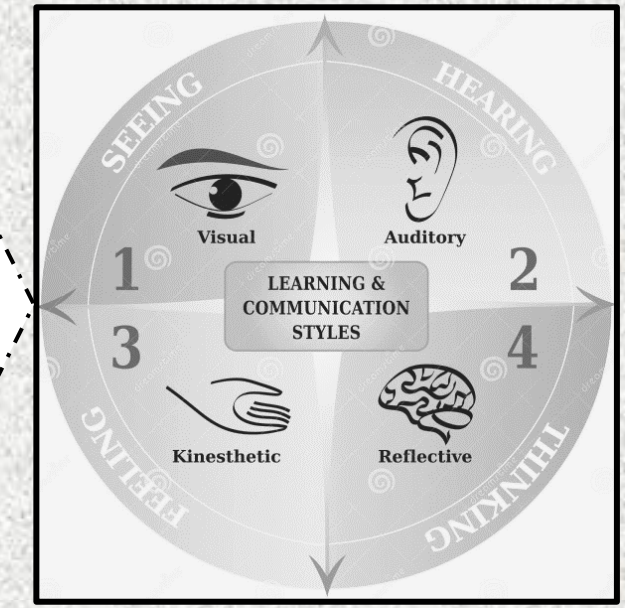


Common misconceptions

Multiple intelligence is often spoken of as being the same as learning style, learning disposition, and learning modality. In fact, they are different.

- **Multiple intelligence** represents different intellectual abilities and functioning
- **Learning styles** are ways in which an individual approaches a range of tasks.
- **Learning dispositions** denote personal preferences for learning
- **Learning modalities** comprise means for learning using the senses for learning.

"We are always faced with the limits of language and language's inability to represent the unspeakable".
Daniel Borzutzky



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Learning preferences

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Accommodate and build on diversity.

Different learning Processes	Different fields of Intelligence	Reflected in	Different learning Preferences	
Collaboration	Naturalist		Word smart learners	Like to – Read. Write. Tell stories. Explore meaning.
Discussion	Musical		Logic smart learners	Like to – Experiment. Figure things out. Work with numbers. Query.
Storytelling	Logical-mathematical		Picture smart learners	Like to – View pictures/slides. Watch movies. Play with machines..
Reflection	Existential		Music smart learners	Like to – Sing/hum/listen. Play instruments. Respond to music..
Inquiry	Interpersonal		Body smart learners	Like to – Move around. Touch and talk. Use body language.
Instruction	Bodily-kinaesthetic		People smart learners	Like to – Have lots of friends. Talk to people. Join groups.
Demonstration	Linguistic		Self smart learners	Like to – Work alone. Pursue own interests. Independent
Presentation	Intra-personal		Eco smart learners	Like to – Observe things. Recognise things. Analyse things.
Visualization	Emotional			
Experimentation	Visual			
Nonverbal				

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Supporting learning communities

Rationale

Learning communities enable values, ideas and capabilities to be expressed, developed and shared in ways that enhance question-led inquiries.

A set of design principles and action features to guide the construction learning communities and facilitate work within them is outlined in the table.

The two sets underpin the theory and practice of collaborative and cooperative learning. They have universal application across the gamut of intelligent inquiry within and between diverse cultures.

Design principles *Enacting values*	Action features *Building capability*
Connectedness Develop a sense of community through friendship, care, compassion, cooperation, acceptance, belonging and sharing.	**Being imaginative** Think analytically and creatively to devise alternative possibilities, multiple solutions, and inventive options.
Resilience Recognise strengths and potential, developing self-management, self-confidence and self-respect, and nurturing optimism together with perseverance and well-being.	**Being enterprising** Act as self-starters who work cooperatively with others and collaboratively in teams to devise and implement ideas.
Achievement Attain personal success across a range of human endeavour, pursuing individual excellence, and displaying pride and satisfaction in personal achievement.	**Being respectful** Act in reliable and responsible ways with a strong sense of justice based on what is considered right and wrong.
Creativity Value original ideas, demonstrating enterprise and innovation, and engaging with and responding to the aesthetic qualities of the natural and constructed world.	**Being ethical** Develop moral autonomy to debate different points of view and come to understand the values and moral dilemmas implicit in specific situations and communities.
Integrity Act honestly, ethically, and consistently as well as developing trust through personal actions.	**Being knowledgeable** Make sense of experience by formulating connections that network thoughts in ways that balance simplicity and complexity yet open-up more of the unknown.
Responsibility Accept both individual and collective responsibility and contribute to sustainable community development.	**Being democratic** Participate as a responsible citizen to generate informed, nuanced and socially responsible decisions and actions that are grounded in the equity of human rights.
Equity Develop tolerance and a commitment to social justice, acknowledging diversity, respecting difference, and encouraging distinctiveness.	**Being empowered** Act resourcefully and intelligently in dealing with challenges, problems, and uncertainties as well as being responsive to changing needs and environmental requirements.

Establishing learning communities

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Provoke collaborative and cooperative learning

Negotiate principles of performance
- Promote personal excellences
- Build respect for differences
- Inspire care for others
- Promote sharing with others

Build empathetic sensitivities
- Recognise feelings and emotions
- Seek other people's insights
- Celebrate own and others efforts
- Create space and voice for all

Establish expectations & consequences
- Clarify rules and work requirements
- Follow up issues thoroughly
- Negotiate consequences to fit
- Ensure consistency in application

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Creating interactive environments

Food for thought
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Feel safe, take risks, ask questions, make mistakes, learn to trust and share feelings

A good education can change anyone. A good teacher can change everything!

Negotiate principles for good relations, cooperation and collaboration

Participant rights	Personal responsibilities	Teamwork culture	Resilience qualities
Respect the right to-	**Recognise the need to-**	**Accept responsibility to-**	**Support people to be-**
▪ Have different views ▪ Remain quiet ▪ Look for alternatives ▪ Agree or disagree ▪ Stop contributing	▪ Listen ▪ Respect ▪ Participate ▪ Appreciate ▪ Reflect	▪ Negotiate ▪ Share ▪ Value ▪ Commit ▪ Own	▪ Autonomous ▪ Socially competent ▪ Purposeful ▪ Creative ▪ Caring

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Benefitting from flexible spaces

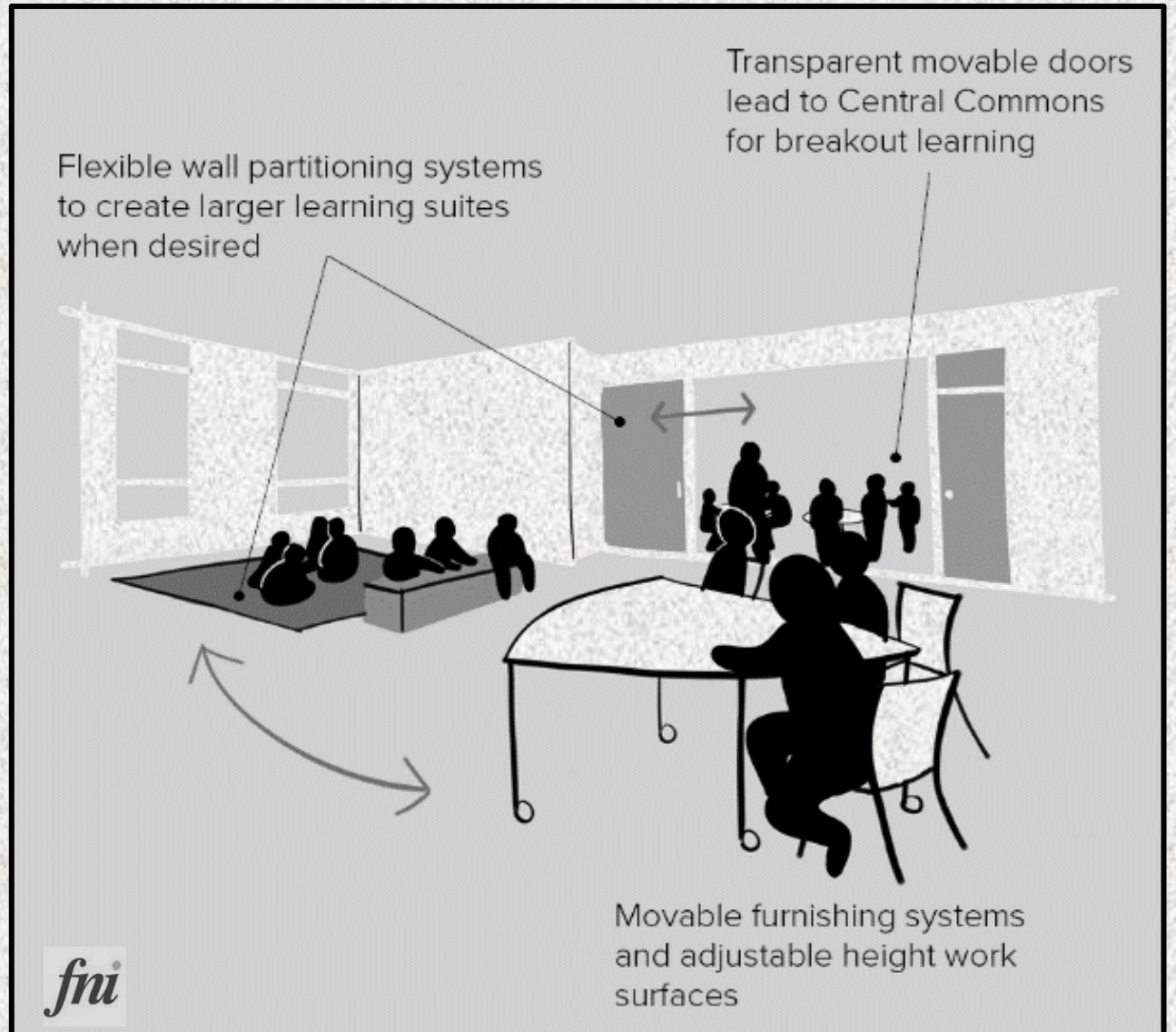
Agile learning spaces

Flexible multidisciplinary spaces are predicated on collaborative learning through which contributions to learning can be drawn from many quarters. Thereby enabling creative ideas and practices to gain expression and be shared through question-led inquiries across the gamut of the Sciences, the Humanities, and the Arts. The opportunities for individual learners and groups of learners include.

- Drawing on the complete range of multiple intelligences
- Working in different modes, styles and modalities
- Participating in personalised and customised of programs

Modern designs have opened-up the potential of flexible learning spaces far beyond anything envisaged during the 'Open Plan' movement of the 1970s. Nowadays learning spaces are custom designed for specific purposes such as – commons, breakout areas, secluded areas, learning studios and outdoor areas.

Teaching and learning issues need to be front and centre of conversations about the design of spaces. With the attractive glitz of novel spaces played down.



A state of mind

It is relatively easy to create flexible opportunities for learning in custom designed spaces.

But even in traditional spaces corridors, nooks, corner spaces, purpose designed furniture, and outdoor areas can be set up in ways that are motivated by the sentiments in the diagram.

An ongoing sense of agility helps to create dynamic and vibrant learning communities.

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Exploiting agile spaces

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Agile learning spaces are responsive, adaptable & flexible

Move away from school as a place - make it an experience

Create diverse spaces for learning

- Individual study spaces
- Breakout and workshop spaces
- Direct teaching areas
- Collaborative commons spaces
- Specialist areas
- Digital hubs
- Performance and presentation areas
- Outdoor spaces

Provide multiple ways to learn

By different Means	In different Ways
Independent study	Specialist learning
Technology-based learning	Teacher based learning
Small group activity	Project based learning
Student presentation	Large group instruction
Play-based learning	Collaborative workshops
Question-led inquiry	Special needs/interests learning

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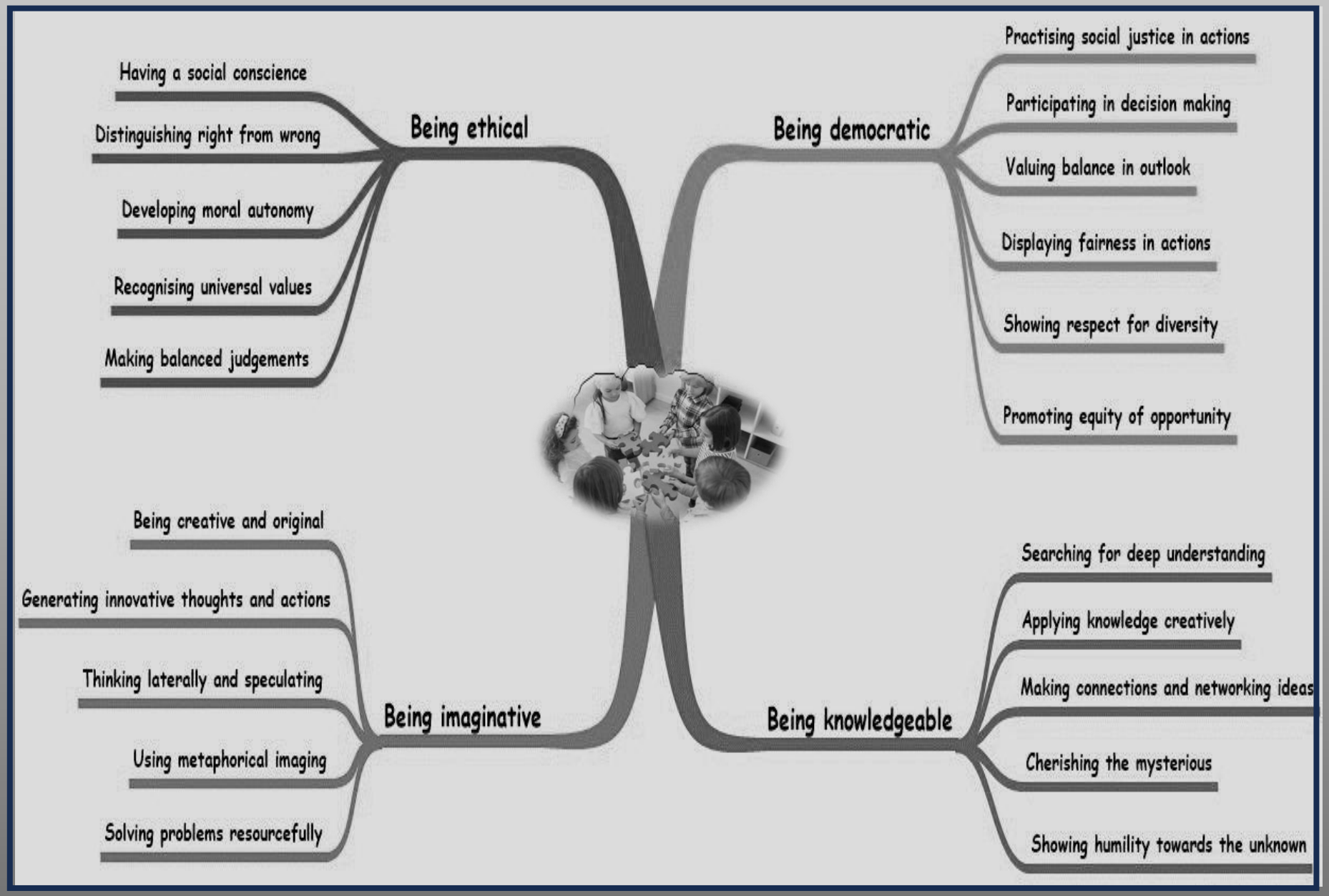
Developing Citizenship

Citizenship for the foreseeable future even though no one really knows what life will be like ten years from now!



A global culture
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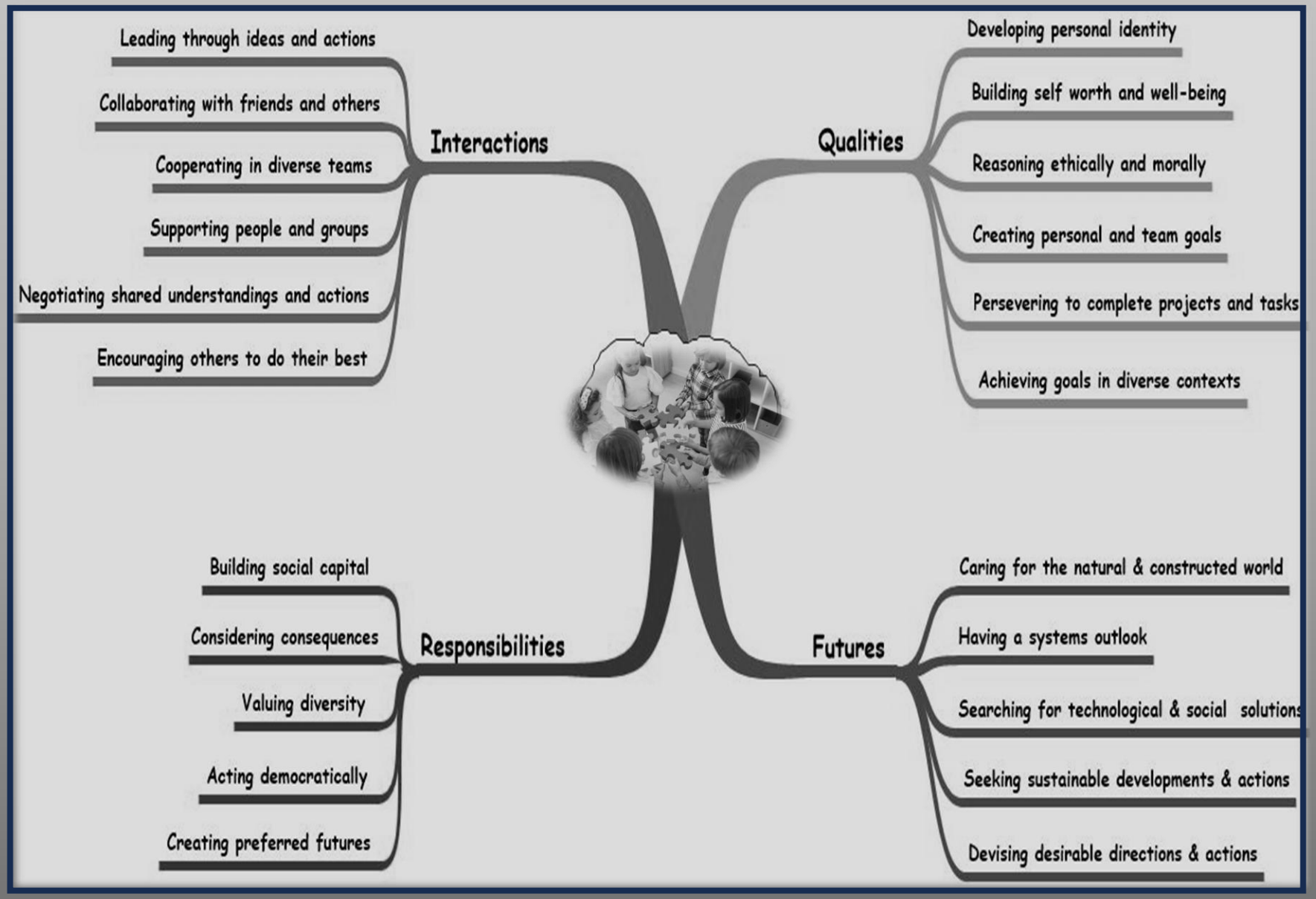
Developing Resourcefulness

Resourcefulness for the foreseeable future even though no one really knows what life will be like ten years from now!



Raising resilient kids
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Building a curriculum around questions – maybe a possibility?

Melvin Freestone
www.melvinfreestone.org

GGQs Indicative examples	CQs Indicative examples	PQs Indicative examples
Focus on - BEING LITERATE – early learners' example		
Causation *Why is it like it is?* In what ways can simple multimodal texts and pictures be constructed?	▪ What are the ideas behind the story? ▪ How could the text and pictures be sequenced? ▪ Are there any graphic 'tools' that could be used to give direction to reader?	▪ Are there different ways to organise the text and pictures? ▪ What would improve the sentence structure?
Focus on – BEING NUMERATE – transitional learners' example		
Function *How does it work?* In what ways does a 'number line' show a relationship between positive and negative numbers?	▪ Why is zero placed in the middle of a 'number line'? ▪ Are there different ways zero can be understood? ▪ How could 100s. 10s and 1s be represented on a 'number line'?	▪ How might a 'number line' be used to help manage pocket money and family budgets? ▪ How might 'number lines' work for keeping positive and negative scores in games?
Focus on – BEING HEALTHY – transitional learners' example		
Care *How might people care for each other?* In what ways might ideas, feelings and attitudes affect how people behave and act?	▪ How might likes, dislikes and preferences affect a person's actions? ▪ Could a person's behaviour be predicted without making a judgement? ▪ Could cultural differences be reflected in how people think and act?	▪ What might be influencing the choices of friends or people who are not liked? ▪ Could taking responsibility for one's own actions help?
Focus on -– BEING EXPRESSIVE – proficient learners' example		
Innovation *What might innovation add?* In what ways might informed choices be made about designs, materials, and techniques in an artwork?	▪ Could experimenting with different structures, images and overlays help? ▪ Could exploring and comparing what artists had done in the past inform the work? ▪ What is it that needs to be or could be better expressed in the images being created?	▪ How might the specific skills required be developed and practised? ▪ Is there any specific art vocabulary to help in telling others about the ideas and processes used?
Focus on - BEING KNOWLEDGEABLE - accomplished learners' example		
Thinking *How is the thinking evolving?* In what ways are force, pressure and motion interconnected in how systems operate?	▪ In what ways do different objects and materials react when they collide? ▪ Could the state of a material affect the way it reacts to force and pressure? ▪ In what ways does moving objects up or down use force and pressure?	▪ How is pressure involved in moving specific objects to achieve a specified outcome? ▪ Why is pressure and force important in the design and construction of structures?

We need creativity to break free from the temporary structures that have been set up by a particular sequence of experience.

Edward De Bono

In true dialogue, both sides are willing to change.

Thich Nhat Hanh

The power of ummmm...
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