

CREATE METACOGNITIVE STRATEGIES TO UNLOCK POTENTIAL

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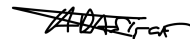
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Dedication

This research paper is dedicated to my Mom Late Mrs. R. Krishnaveni, my Dad Late Er. R Rajagopal, my Husband Mr. Frank Soans who always believed in me and stood by me every stage of my life.

Also dedicate the research to my Furry children Phosphorus, Mrigha, Simba, Calci for always being there for me, especially when I needed them the most! **Truly blessed to have you all in my life!**

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Truly privileged to have you as my Research Guide.

ABSTRACT

CREATE METACOGNITIVE STRATEGIES TO UNLOCK POTENTIAL

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Human race is very fascinating because of the beautiful mosaic that we are made of. No two human beings are alike – not just in our physical attributes but also due to the differences in the way we think, feel, and behave. We have constantly evolved as a species by pushing the capabilities of human brains beyond the realms of imagination. No algorithm or artificial intelligence, thankfully, as of now can accurately and completely map or predict all of human being's current feelings or future thinking.

For this reason, the study of human brain has been an intriguing topic for researchers over centuries. The fact that each one of us are so unique and that we differ greatly in thinking has been established based on decades of neuroscience research. The act of thinking about one's own mental processes is called Metacognition, in simpler terms referred as 'Thinking about Thinking'. Research into Metacognition is a critical one, as it opens a whole new world that we only can imagine exists.

The main goals of this study are two-fold: The study helps to create awareness and second and more important one is to create strategies using simple techniques so that Metacognition transcends to a higher order thinking about thinking or Epistemic Cognition.

This study accomplishes the above through creation of a ‘Metacognition Maturity Model’ that will help in creating awareness and metacognition strategies at individual level. This model enumerates the various maturity levels that exist in the long yet important journey of creating and improving Metacognition.

Understanding Metacognition and moving to an Epistemic Cognition state is a significant step for human race today in light of unprecedented changes being witnessed all around us on multiple fronts.

Creating Metacognition strategies gives us the power to thrive in an everchanging and complex world. Doing so, would not only result in metamorphic benefits for the individual at a personal and professional level but also take human race to a totally new level and may decide the sustenance of our race.

Key words: ‘Metacognition Maturity Model’, ‘Epistemic Cognition’, ‘Metacognition’, ‘Thinking about Thinking’, Neuroscience, Phenomenology, Cognitive Diversity, Diversity and Inclusion, Cognitive Psychology, Diversity of thinking, Thriving, VUCA world, Fifth industrial revolution

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CHAPTER I: INTRODUCTION

1.1 Introduction

Since times immemorial, researchers have always been fascinated by the human brain. Functions like thinking, feeling, learning, memories, emotions, temperature, vision, motor skills and many more such functions are controlled by the human brain, and this sets the human species so unique and so different from any other.

Right from ancient philosophies to Socrates, Aristotle, many great scientists, psychologists, and mystics world over have tried to understand the human mind and how it functions. In his famous treatise from 350 BC, Aristotle says “What thinks and what is being thought are identical” (Todd, 2014). More recently this whole concept of thinking about ‘thinking, feeling, behaving’ is called Metacognition. It is the act of thinking about own’s own mental processes (Bonds, Bonds and Peach, 2010).

Metacognition is a favorite research topic. This was first introduced in the 1970s by psychologists (Flavell, 1979) since then a lot of research has been done to understand various facets and the linkages to different psychological subdisciplines. For instance, in-depth studies are undertaken in the field of education to better understand the science of learning and assimilation of knowledge among students. There is a lot of literature pertaining to application of Metacognition among children and specifically in the context of education.

Business need for Metacognition: While discussing the need for Metacognition in today’s world, it is important to understand and appreciate the external trends that drive the ‘Future of Work’ and in turn assess if Metacognition as a concept will help in addressing the gaps that currently exist and what needs to be improved. This would help organizations effectively leverage the concept of Metacognition to strive towards the new world order and

thrive in the environment. In addition, it is also critical to understand the benefits that would accrue from leveraging the concept of Metacognition from an Inclusion point of view. Doing so, would ensure a wider impact not only at an individual's level and also at an organization level.

Future of work: Metacognition has prominence in today's world more than ever before. It has been a century since the word robot (n.) coined by Karol Capek entered the official dictionary, the most exciting phase of industrial revolution is the one we are currently experiencing (History of Robots, 2023, cited in Rajagopal and Provodnikova, 2023). Our species have always found opportunities to enhance capabilities and push the boundaries (Soans and Kostadinovic, 2023). Evolution of the race has involved utilizing our brain in more superior ways than in the past and there is a constant race to exert the supremacy of human brain and at the same time advance technology at a rapid pace as well. The first and foremost way to evolve our human brain is to understand the thinking about thinking or metacognition.

It can be said that application of metacognition has far-reaching impact not only among individuals, it also has a compounding effect when seen in a group context. This is extremely relevant in organizations where individuals cannot work in siloes and need to collaborate and work together. Workforce of future studies indicate that network of teams or team of teams will become the mode and therefore ability of humans to straddle across different units with ease rather than working in a silo or a specific function or a single unit level will become a thing of the past (Argarwal, Bersin and Lahiri, 2018).

Inclusion: Another buzz word in recent years is around the concept of Inclusion. While it may have started more as a compliance in the continuum, Diversity and Inclusion (D and I) has become a priority for success of businesses. Organizations have increasingly started to value this concept for its true worth rather than a tick in the box.

Juliet Bourke and Dillon (2018) in their Deloitte research report mention that organizations with inclusive culture are:

- 2x as likely to meet or exceed financial targets
- 3x as likely to be high performing
- 6x as likely to be innovative and agile
- 8x more likely to achieve better business outcomes

While most organizations focus on Diversity alone, it is important to amplify the efforts to improve Inclusion as both Diversity and Inclusion are important aspects to consider for real needle movement. Some organizations also include Equity and Belonging in their approach which makes it holistic.

While embarking on Diversity and Inclusion journey, most individuals and organizations focus heavily on visible aspects of Diversity like gender, generation, race, ethnicity etc. However, there are many other invisible aspects of Diversity which needs to be focused as well. Elements like work experience, socio economic background, neurodiversity, LGBTQ+ affiliation, thinking, learning and personality styles, introversion, extroversion and many other invisible aspects of diversity are often ignored.

It is imperative for individuals, organizations and even economies to build a holistic Diversity and Inclusion strategy keeping multiple dimensions in mind. While some of these invisible dimensions are easy for individuals to self-realize and identify themselves, there are many others which are quite profound and would need a lot of introspection for individuals to realize and self-identify, requiring significant introspection. A classic example would be elements like thinking, behaving and personality styles. Individuals, units and whole organizations should expand their efforts to further the understanding of thinking and behaving style. Ignoring this critical dimension would lead to a superficial strategy and one that would not realize the full power of Diversity and Inclusion beyond visible elements.

The basic understanding of thinking and behaving styles is also called ‘Cognitive Diversity’, and this needs a lot of focus and attention among individuals which would benefit organizations

One of the interesting studies done in this space is by Deloitte, their research reveals that high performing teams are cognitively diverse (Juliet Bourke and Dillon, 2018). Cognitive diversity is the diversity in the mental frameworks that people use for every action. Juliet Bourke and Dillon, (2018), state that teams that have diversity in thinking are 20% more innovative and 30% lower on potential risk parameters.

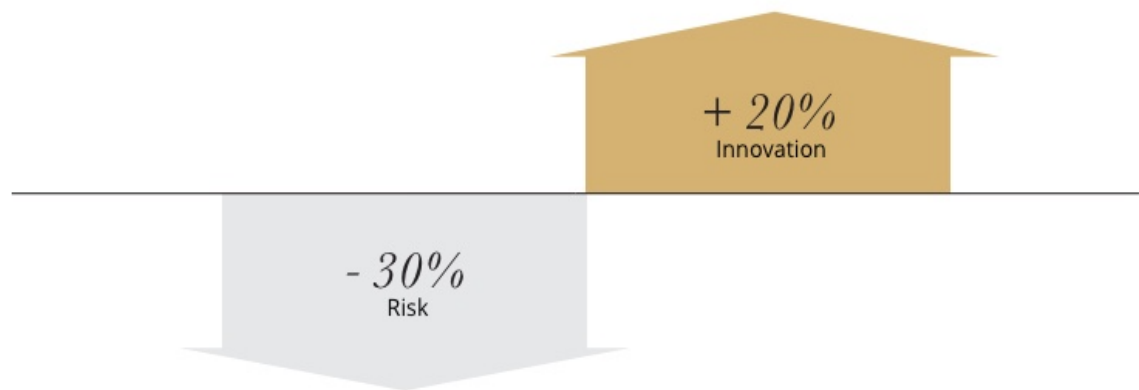


Figure 1.1
The value of diversity of thinking (Juliet Bourke and Dillon, 2018)

Juliet Bourke and Dillon (2018) in their report talk about the importance of Cognitive Diversity in the following manner:

- Creates a stronger and more convincing story about importance of Diversity and Inclusion so everyone feels relevant
- Accurately represents the intersectionality element which helps the focus on broader parameters and not focused on an individual dimensions of diversity in individuals

Diversity of thought or Cognitive Diversity or an individual’s thinking style directly maps to the supreme concept of Metacognition. Therefore, the way to understand diversity of

thought is through creating awareness of the concept of Metacognition and the drivers of Metacognition in individuals. From the above, following aspects are evident:

- Metacognition as a concept has been in existence for about half a century, however the research is predominantly among children and young adults, mostly around concept of learning
- There is a business need to invest in Metacognition: In today's Volatile, Uncertain, Complex, Ambiguous (VUCA) world with unprecedented challenges, awareness about one's thinking style would set them apart
- Metacognition is very relevant as a concept as it has an impact on Diversity and Inclusion in organizations and this represents Diversity of thought or Cognitive Diversity

Taking all aspects into consideration, it appears that Metacognition has huge, wide-ranging potential that can be tapped in myriad ways and this study proposes to unearth the same and simplify the concept.

1.2 Research Problem

Though Metacognition as a concept has been in existence for many decades, most of the research is at the root of educational child psychology. Another area where Metacognition is widely studied and perhaps applied is around specific situations like impact of Metacognition on ageing or getting to know how to solve specific conditions like autism spectral disorders or learning disabilities like dyslexia in children.

Concepts like Metacognition, Epistemic cognition are not very prevalent in management research and the corporate environment today. These terms are not widely referenced in Management level interventions in organizations. It is a huge opportunity area; this is particularly interesting since Metacognition has a huge impact on addressing the gaps that future of work would bring to the fore and a critical component in the holistic D and I

strategy. The intention should be not to merely reference the terminology but to understand, appreciate the concept and build strategies to hone it. There has to be rigorous focus and tenacious strategy around the same. Some moments of truth pertaining to Metacognition are as follows:

- Though terms like Metacognition were introduced almost half a century ago, it is not very prevalent as a concept in organizations.
- There is little study available on impact of Metacognition in adult learning stage in organizations as most of research focuses on child stage and around child learning styles
- This could be one of the reasons why Metacognition is not very well understood and appreciated across different life stages.
- Impact on specific aspects like influencing, decision making, critical thinking have not been properly understood or appreciated. It is probably seen as a routine and not much thought given to it in the day to day busy life.
- Studies around future of work indicate that brain functions will need to constantly evolve and will continuously push the boundaries in ways that we can only imagine. In order to prepare for this, it's imperative that humans have a good understanding of their thinking, learning styles.
- In addition, understanding of Metacognition plays a pivotal role in improving Diversity and Inclusion in organizations
- There could be huge potential in understanding how cognitive biases play out and how to debias the ecosystem to make it more inclusive.

First part in the journey is Metacognition awareness and it is not enough to merely have this awareness, it is important that there are meaningful strategies chalked out to increase Metacognition through robust and thought through strategies.

Metacognition is a very vast topic with huge potential. It has been established through various research that it is necessary for us to transcend into deeper echelons of our subconscious mind to be more aware of our feelings and thoughts and for us to meaningfully propose intentional strategies.

At first glance, this seems like a very tall problem that would require us to possess super ordinary or psychic powers to go deep into one's brain to unravel the complexities - fortunately that may not be required at all. The solution towards creating third level of Meta metacognition or Epistemic Cognition may be achieved through myriad methods and in a holistic fashion.

One way to do this could be by leveraging psychometric assessments. There are many tools available like DiSC profile, Mayers Briggs Type Indicator also known as MBTI, SHL, Hogan's HPI assessment and CliftonStrengths Finder assessment by Gallup organization.

However, this is not a stand-alone approach or the only route to reach the upper echelons of Epistemic cognition. There needs to be a holistic thinking with open mind required to combine various strategies to psychometric assessments in order to create higher order methods of creating Epistemic Cognition which this study proposes to unearth.

1.3 Purpose of Research and Questions

The purpose of research is to create Metacognitive awareness among individuals in adult stage so as to further the reach of the concept in a corporate environment. This would lead to benefits for individuals, units and organizations. In addition, there is a dire need to create Epistemic Metacognition or Meta Metacognition which involves creation of robust strategies to hone Metacognition, taking this to next logical level. Research questions that need to be addressed are as follows:

- What does Metacognition mean from thinking, specifically decision making and learning style point of view

- How can we transcend from a state of Metacognition to Epistemic Cognition through robust strategies.
- What are the specific tools and techniques that one can use to improve Metacognition in their day-to-day life
- How do we create a holistic and integrated strategy that encompasses multiple methodologies for greater benefit of moving to Epistemic Cognition

| Business Need (The Why) | Purpose of Research (The What) | Potential Approach (The How) |
|--|---|--|
| <ul style="list-style-type: none"> • Future of work • Intersectionality in Inclusion | <ul style="list-style-type: none"> • Understanding Metacognition • Metacognition to Epistemic Cognition | <ul style="list-style-type: none"> • Holistic & integrated approach that encompasses multiple methodologies |

*Figure 1.2
Purpose of Research (Authors' own representation)*

For future research, one can also explore future potential of metacognitive awareness and extend to understand cognitive biases and the impact of working in a team construct. This is more broad based and takes the research to the next level and can be a topic for future research.

1.4 Significance of the Study

Human mind has been continuously evolving and we have constantly found opportunities to enhance capabilities and push boundaries (Soans and Kostadinovic, 2023). There have been changes on multiple fronts all around and the pandemic of recent times have only made the whole situation more complex. While change is not new and we have experienced this in the past, what is new is the pace and the intensity of change. There has been

rapid technological advancement, information overload, increased polarization on account of demographics and identities. The intensity and pace of changes in recent times have been unprecedented, leading to an uber complex, uncertain and ambiguous world.

There are strong indications that future of work is going to be more interesting. Jobs have always been evolving, the skills requirement in the beginning of this century, which is merely two decades ago, is so different from what it is now. There will be newer jobs created with advent of technology, changing demographics and emergence of boundaryless world and many existing roles will vanish (Beno, 2020, cited in Rajagopal and Provodnikova, 2023). The half-life of professional skills has reduced considerably, it used to be 10 to 15 years earlier and it is now reduced to around 5 years in 2019 (LaPrade et al., 2019, cited in Rajagopal and Provodnikova, 2023), this means a skill learnt in 2019 would be about half as valuable in 2024 or so and this is constantly shrinking.

One cannot control external factors or wish the changes to go away, however one can alter their mindset which would help them face these changes. This mindset shift is a clarion call for humans to change and this starts at a fundamental level within themselves – it starts with the revelation of how humans think, behave and act which is Metacognition and strategically moving to Epistemic Cognition. These concepts - Metacognition and Epistemic Cognition hold the key to everything else – including the make or break of the race. Metacognition and Epistemic cognition do not merely address the ‘here and now’.

Doing this would not merely alter the sail but change the direction of the wind itself to one’s favor.

Metacognition as a concept has enormous untapped potential and can be the true differentiator to thrive in future of work, this study helps leverage the concept of Metacognition in a corporate environment.

The study also strives to transcend beyond understanding of Metacognition towards creating Epistemic Cognition through a holistic and integrated approach that encompasses multiple strategies. Following are the benefits of embarking on this study:

- Unleashing individual's potential by making them aware of their own thinking styles and thereby enriching their professional journey.
- Awareness of one's self that one can bring something unique to the table is so powerful and revealing, it actually boosts one's confidence and makes them realize their full potential in a beautiful way. It also helps individuals articulate their value proposition in a better fashion. This gives the necessary insight to thrive in the future and face the complexities and nuances better.
- Compounding power of complementarity: Generally, there is a tendency for teams to be built with homogenous members, hiring managers sometimes tend to hire people who are similar to them in personality, this is called 'mini-me' bias. It is sometimes forgotten that complementarity helps a team immensely. When there are diverse and opposing views expressed in an objective and unbiased fashion, the strength of the proposal gets better immensely. This is possible only when there are people who think differently. Thinking in the same wavelength may not be beneficial all the time. While alignment to shared purpose and values, vision is required, the thinking towards achieving them can be diverse. If one does not understand their own thinking styles and are not intentional about sharing with others, then it is quite tough to build complementary teams and is a missed opportunity if not done intentionally.
- Beneficial in creating the workforce of future – Deloitte future HR trends Argarwal, Bersin and Lahiri (2018) say that organizations will not operate in a siloed fashion but more in terms of network of teams / teams of teams approach. If that is the case,

understanding of self and others' styles is of great importance (Argarwal, Bersin and Lahiri, 2018)

- Understanding own thinking styles in terms of decision making, learning style will make the individual more ready to face the challenges that the future of work will bring. It is essential that one knows the current state in order to elevate the game to gear up for future needs. This helps the organization also devise learning needs appropriately so as to be effective in their upskilling and cross skilling strategies

While the concept of Metacognition may be half a century old, this still remains an untapped concept with immense potential for applicability in adult stage in corporate environments. Changes are here to stay, and they cannot be wished away. What is in the control of an individual is the way they respond to these changes. In order to do that, it is imperative for them to understand their own style (Metacognition) and have robust strategies that hone the thinking style (Epistemic Cognition). Metacognition and Epistemic Cognition are the secret ingredients that would help one face the demands of everchanging times.

However, it needs to be remembered that these concepts need to be significantly simplified and need to be embedded into everything that an individual does in order to be successful. This should not be a flavor of the month or a passing fancy that comes out rarely. This should be deeply entrenched in the mind that it becomes a top of mind response and not as an afterthought.

In sum, this study proposes to unleash the power of Metacognition on individuals and propel them to higher strata of their professional journey by creating metacognitive strategies. In short, a better version of ourselves by understanding ourselves better and creating a better avatar of ourselves

Doing so, would not only benefit the individual but also have a ripple effect across teams, organizations, country and the entire world. The sustenance of the world may depend on it.

CHAPTER II: REVIEW OF LITERATURE

Earliest mention of the concept of understanding the brain or thinking about thinking and concept of Metacognition is mentioned by Plato in 6th century BC. This is recorded in Plato's conversation with eponymous character Meno "We must then, at all costs, turn our attention to ourselves and find someone who will in some way make us better" (Plato, Meno 96d-e2 cited in Worley, 2018). Even before that, Worley (2018), mentions that Meno asks Socrates whether virtue can be taught, and that Plato offers a metaphorical model for understanding metacognition and also offers a pedagogy for the same. Worley (2018), also quotes Theaetetus in which Socrates characterizes thinking in terms of a dialogue and mentions that Socrates describes what has become known as 'the silent dialogue' or as Socrates puts it 'the talk that the soul goes through itself with itself about the things it is considering'. Another drawing on Socrates is the characterization that thinking is a two-in-one activity, an encounter with oneself, it is the duality of myself with myself that makes thinking a true activity, in which the person who asks the question and the person who answers are one and the same (Arendt, 1971, cited in Worley, 2018).

These are deep messages on the Philosophical side and cannot be overly simplified, also deep diving into this topic is research by itself and beyond the scope of the paper. However, the intent of bringing in this dialogue is to establish the fact that Metacognition as a concept has been discussed by great minds like Socrates and Plato and there has been significant attention given by these great thinkers to the concept. It is perhaps only in the recent times that somewhere the concept has either gone into oblivion or is being practiced sub-consciously without knowing that it is being done.

2.1 Historical studies related to metacognition

Continuing the thread, the innate passion to understand the thinking behind thinking has led to creation of personality types among humans since ancient times. Researchers, philosophers, psychologists and anyone interested in the topic has contributed to understanding of human mind and also creating some kinds of personality types. While many ancient philosophies could have research dedicated to this, three ancient practices are given here:

- Human behaviour in Greek philosophy
- Trigunas from Indian philosophy
- Heart-Mind in Chinese philosophy

Review only mentions three since it is not the scope of this paper to seek out all the ancient methodologies of such characterization.

2.1.1 Study of Metacognition in Greek philosophy

In their research, Prochaska et al (2015) indicate the practice followed in early Greece where a four-pronged model was used to indicate human behavior tendencies by measuring body fluids: yellow bile as Choleric, blood as Sanguine, phlegm as Slow thinking and black bile as being Melancholic.

Cripps (2017) mentions that from when the time was in its cradle, people have believed that personality traits can be divined, and the gift of leadership was revered. It was always considered that leaders were born with certain mettle, however a quick mental survey of the great leaders would prove far from that. Further he states that they have had many differing personalities and differing styles that they are not the same at all.

While discussing the concept of bodily fluid being the basis for bucketing of personality types, the etymology is slightly unclear, Prochaska et al (2015) mentions that it is from the Ancient Greeks. However, Cripps (2017) mentions it could have been developed by the Indian Ayurveda system of medicine or by the Ancient Greeks. He further says that a surplus or

deficiency of any one of the four elemental bodily fluids was thought to directly affect one's feelings and health. It is also his opinion that all four fluids may have originated from just one bodily fluid – blood. An excess of yellow bile was expressed through overt aggression, an issue said to be associated with an agitated liver. The word 'bilious' or 'liverish' may be in existence today to call someone who is peevish and disagreeable (Cripps, 2017).

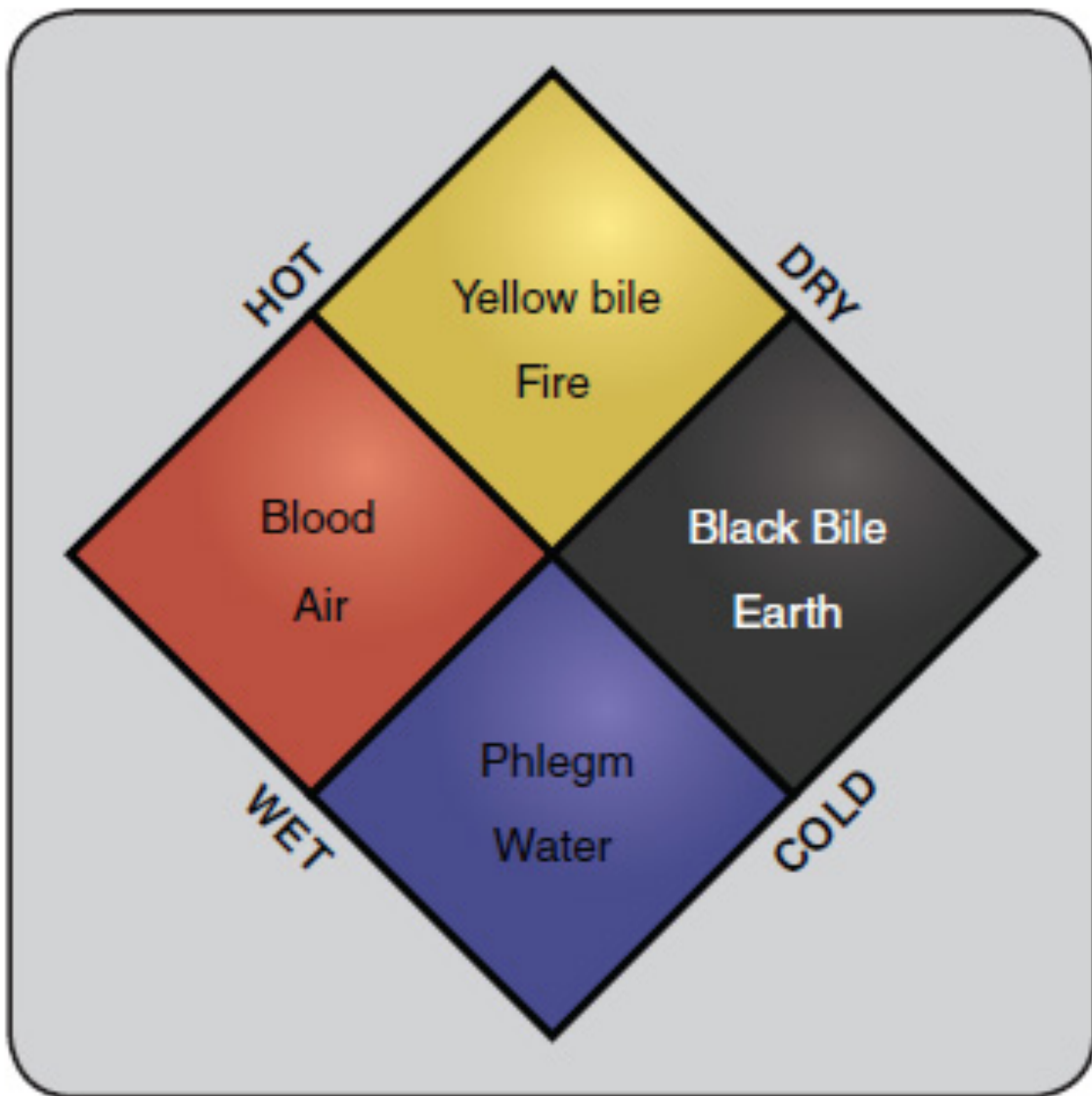


Figure 2.1
The four humours (Cripps, 2017)

Similarly, terminologies that are still used today like 'to be sanguine', 'to be choleric', 'to be phlegmatic' or 'melancholic' have had their roots from the exercise above and have

stood the test of time from Hippocrates through Galen and the Roman Empire, right through to the Renaissance (Cripps, 2017). It is interesting that even today, statements like a person is sanguine, is made to refer to someone who is optimistic and can be seen as being naïve or complacent. Those who are phlegmatic are perhaps those who do not get emotional over things. Similarly, tempered persons are referred to as being choleric and sad people are referred to as being melancholic.

2.1.2 Study of Metacognition in Indian philosophy

Similarly Indian mythology has three types of broad personalities – Sattva, Tamas and Rajas. It is called the Triguna theory of personality and is propagated by the Samkhya philosophy as one among six systems of Indian philosophy (Kumar and Thomas, 2013). They further state that it advocates the ontological dualism of prakriti which is the matter and purusa which is the concept of self. It is interesting to note that personality is considered as having two mutually interdependent constituents – self and psychological apparatus or Karana which represents the organ and functions. They further state the interaction between matter and self is the result of personality and the interaction is manifested in the form of mahat (consciousness) which confines to one individualism (ego).

Further Kumar and Thomas (2013), state that ego manifests in the mind of divergent personality of Trigunas and the three gunas are most subtle qualities of nature that underlie matter. Sattva is the quality of intelligence which creates harmony, balance and awakening. Rajas is the quality of action, passion, and quality of change. Tamas is the quality of dullness, ignorance and inertia (Frawley, 2010, cited in Kumar and Thomas, 2013)

According to Kumar and Thomas (2013), Triguna is mutually dependent on the virtue of one's dominance over the rest of the two gunas, and the personality typing is set by the different temperamental predominance. Individuals differ in their cognitive, affective, and personality aspects according to interplay of Triguna. Predominance of any one of the gunas in

individuals could be either, Sattvic, Rajasic, or Tamasic (Kisor, 2001, as cited in Kumar and Thomas, 2013).

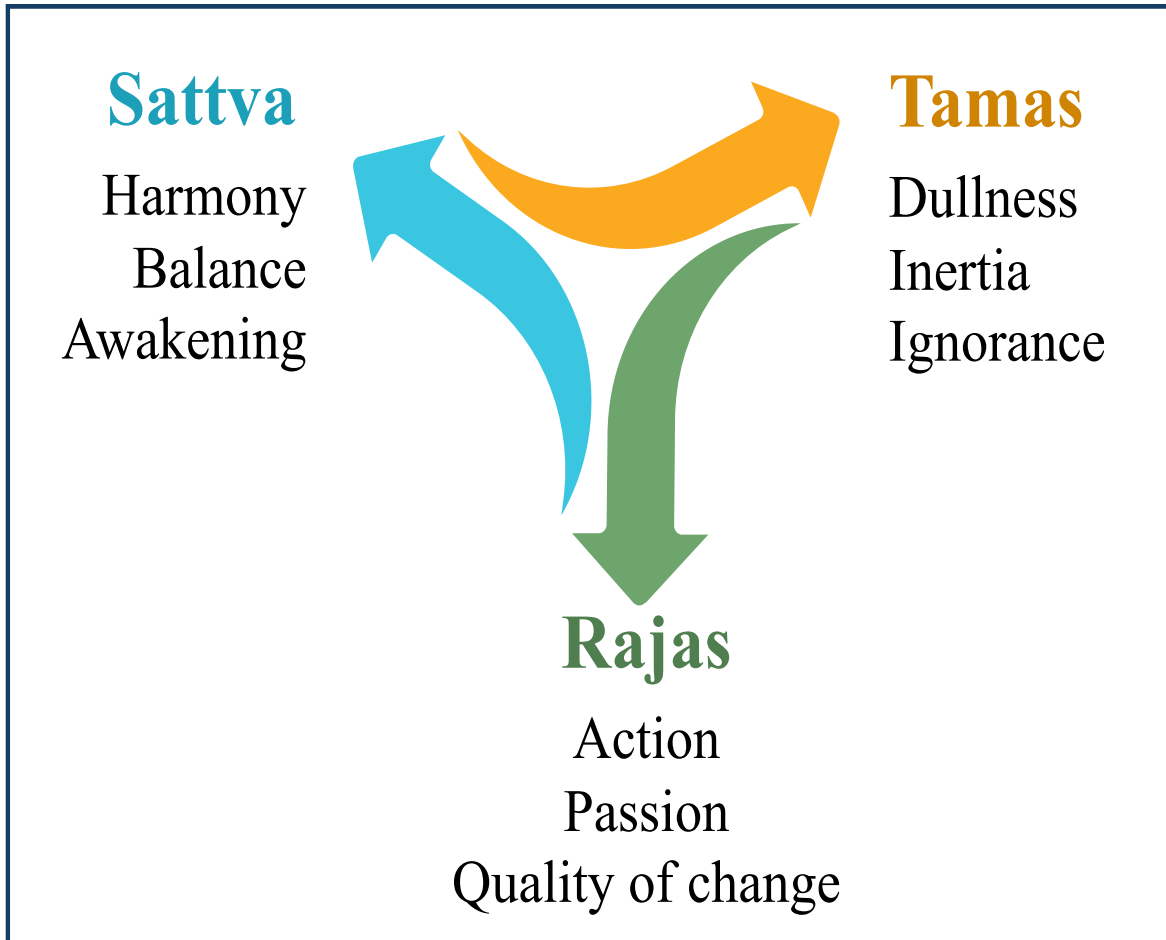


Figure 2.2
Trigunas (Kumar and Thomas, 2013)

2.1.3 Study of Metacognition in Chinese philosophy

Xin is the equivalent English term for mind in the Chinese philosophy which dates from about 6th to the end of the 3rd century BCE (Wong, 2023). Xin evolved as a picture of the heart in human beings and animals and is instrumental in directing behavior of the body, Xin can be translated as the heart-mind, this is due to the ethical guidance in Chinese thought that arises from both cognitive function of the mind and affective states attributed to heart. Further Xin is credited with thinking si, understanding ming, knowing zhi, intention zhi, felt moods

and emotions qung and desire vu. Xin is said to play a pivotal role in multiple fields of Chinese philosophy, ethics, epistemology and metaphysics (Wong, 2023).

What is interesting is that Xin can be used to arrive at ethical guidance, but that is also a point of contention between those who treat the guidance as internal or Mengzi to those who treat Xin as navigating an external normative structure and those who ignore Xin and take guidance from other authorities (Wong, 2023)

Wong (2023) mentions that term Xin plays a pivotal role in the classical texts except Mozi which approaches the heart-mind in terms of knowing Zhi, the capacity, the awareness or the understanding by which we come to know objects or acquire skills. The texts are very practical and concerned with understanding how the heart-mind or knowing works which is descriptive epistemology, which has connections with contemporary cognitive and neuro science and how it should work which is normative epistemology. Further, the central point of these texts' normative epistemology pertains to what social influences should be trained into the heart-mind. How should heart-mind relate to other parts of the person? What is knowing? What is the role of reflective thinking about emotions, desires etc. as inputs to heart-mind and some of the questions posted in classical discussions of how to live (Wong, 2023)

The tendency in early Chinese Confucianism was to differentiate among and to rank parts of the person, with the heart-mind in the lead and the leading role is holistic in important ways, involving integration of perceiving, thinking, desiring, emotional and intending functions of the heart-mind (Wong, 2023)

Texts associated with Daoism, the Daodeging and the Zhuangzi, treat the heart-mind as only part of the process of 'de', which is practical competence and knowing how to live involves a combination of wisdom, skill, and disciplined engagement of emotion and desire (Wong, 2023).

2.1.4 Study of Metacognition by René Descartes

Study of human nature has thus come a long way from the Vedic times or the times of the Greek or the Heart-Mind studies in Chinese schools of thought. Around 17th Century saw the emergence of thinkers like Rene Descartes, who paved the way for many concepts in the space of mind-body relation and specifically how our minds know. René Descartes (1596–1650) was a creative mathematician of the first order, an important scientific thinker, and an original metaphysician, among his many contributions, his new vision of the natural world, which shaped modern physics: a world of matter possessing a few fundamental properties and interacting according to a few universal laws (Hatfield, 2023). They further state that this natural world included an immaterial mind that, in human beings, was directly related to the brain, a position that led to the modern mind–body problem. According to Visnovsky and Popper (1996) Cartesian psychology is the term used for Descartes metaphysical conception of the mental as it was used in modern philosophy and as it influenced psychology as a science. Internalism can be considered to be main feature of Cartesian psychology of all kinds, a presupposition of the existence of a special mental reality in our ‘inner self’, inaccessible from the outside and therefore somewhat mysterious, a sort of ‘black box’ functioning according to immanent psychological laws (Visnovsky and Popper, 1996).

2.1.5 Study of Metacognition in the Twentieth Century

Moving closer to Twentieth Century, Cripps (2017) mentions that methodology to assess human behavior by way of psychometrics assessments had become increasingly reliable, valid and robust. These were enabled by statistical methodologies, and were contributed by statistician Charles Spearman and Louis Thurstone who was the founder and president of Psychometric Society (Michell, 1997, cited in Cripps, 2017)

However, by an interesting turn of events, Cripps (2017) mentions that Hungarian psychiatrist Leopold Szondi was in a mark of a revolt against the narrow statistical treatment

of human psyche. Szondi felt that something as complex and irrational as a human being could not be captured by a series of focused numbers, no matter how thorough the statistical methodology was (Szondi, Ulrich and Webb, 1959, cited in Cripps, 2017)

Cripps (2017) further mentions that Szondi created his own test that tried to capture the essence of the spirit of humankind as possible by widening the assessments – the goal of the test was to explore the innermost recesses of repressed impulses. The idea was to develop constructs that were elicited by evaluating the levels of sympathy or aversion by showing clients specific photos of psychopaths – the subjects were expected to point to the person they would least like to meet on a dark night and explain why that was so (Szondi et al., 1959, cited in Cripps, 2017). The responses provided by subjects provided a report that gave inputs on the subject's personality. Version of this test is still available online for interested subjects to participate and self-evaluate.

Hermann Rorschach, a Swiss Freudian psychiatrist and psychoanalyst developed the most famous psychological instrument using inkblot which assesses clients' perceptions of a series of patterned smudges (Wood, Nezworski, Lilienfeld and Garb, 2003, cited in Cripps, 2017). The way it was done is by presenting around ten original inkblots which were around 7 by 10 inches in size on separate white cards and then getting the subjects to interpret the shapes in a free association phase (Cripps, 2017). He further states that, the cards were presented in a fixed order and held, rotated and pored over by the client, who was quizzed at each stage and responses tabulated.

This seems like an unusual way to assess people, Cripps (2017) mentions that Rorschach wanted his test to act as a series of pegs upon which aspects of human personality could be hung and that the interpretation employed by Rorschach was both complex and contested. Though it may be considered by his critics as nothing more than pseudo-science (Wood et al., 2003, cited in Cripps, 2017), it is still considered to be very influential and one

of the tests most used by members of the Society for Personality assessment (Gacano and Reid, 1994, cited in Cripps, 2017). In fact, in one of the studies conducted by Wright et al (2017) almost 53.6% of the psychologists surveyed reported using them.



Figure 2.3
Ink blots from Rorschach test (Cripps, 2017)

Observing the various events and efforts involved in understanding the human brain over the centuries gives the impression that it has been a journey with its own ebbs and flows and peaks and troughs and has all the ingredients perhaps of a classic theatre – right from unearthing deep mystical approach to profound philosophical theories to formulating statistical

methodology right upto employing medical sciences, it is all there. Moving the aperture to a point in future as highlighted in the docudrama ‘Year Million’ by National Geographic ‘Mind Meld’ (2017) *Year Million*, episode E04, National Geographic, June 2017, which talks about concepts like mind melding and interconnected brain that can solve world problems in a blink of an eye due to hyper connectivity of every human’s neurons. Right now, it seems like a fantastic futuristic thinking and highly difficult to imagine how this will look like, just thinking of the possibility itself feels very overwhelming and even intimidating.

If one was to look at this not as a point in time activity but more as a journey, then it is safe to assume that as the human race continues to evolve our brains and stretch beyond known possibilities, this journey will continue forever and leave its indelible mark in the galaxy and will be remembered forever

2.2 Literature Review approach

Unearthing a topic like Metacognition can be very profound, the intent of the study is to simplify the concept and not make it more complicated and also to take it to larger population with a view towards using this in day-to-day situation. The movement that starts at an individual level and the one that will go further at team level, organization level and at a country level thereby, creating a movement unparalleled in the history of human civilization – all for a common good.

With this view in mind, it is important to scope the study and review the available literature in a structured fashion so as to not derail from the original objective of the study. It is also important to review literature from multiple angles so as to ensure that a holistic picture emerges.

Therefore, the following approach for Literature Review is to be followed:

| Literature Review Head | Elements of Review |
|--|---|
| Business Need for Metacognition (The Why) | <ul style="list-style-type: none"> • Future of Work • Intersectionality in Inclusion |
| Literature Review of Metacognition (The What) | <ul style="list-style-type: none"> • Understanding Metacognition as a concept • Various elements associated with Metacognition • Applications in Metacognition • Gaps and opportunities in Metacognition • Impact of Neuroscience on Metacognition |
| Literature Review of psychometric tools (The How) | <ul style="list-style-type: none"> • Potential of psychometric assessments • DiSC profile • Mayers Briggs Type Indicator • CliftonStrengths |

*Table 2.1
Literature Review approach*

2.3 Business Need for Metacognition (The Why)

Before embarking on the journey of Metacognition, it is important to analyse why Metacognition is important. There is a necessity at this stage of the research to establish why Metacognition is a critical topic and the actual reasons why we would need to improve Metacognition awareness and chalk out concrete Metacognition strategies. Understanding this will help unlock the various benefits of topic of Metacognition as well. In order to do that, two trends should be analysed: (a) Future of work: what are the trends and how do we future proof

ourselves and (b) Intersectionality to understand the changing dimensions of diversity and the impact of intersectionality on Inclusion

2.3.1 Future of work

The world is witnessing the fifth industrial revolution with changes on all fronts. There is unprecedented technological advancements, highly complex demographics from a diversity angle and increased shrinking of boundaries leading to enhanced globalization. All of this requires humans to adopt a thrive mindset rather than a survival mindset as this is the only way for us to prepare for the future (Rajagopal and Provodnikova, 2023). Following are the factors that shape the future of work (Beno, 2020, cited in Rajagopal and Provodnikova, 2023):

- Technological progress
- Demographic, societal and environmental changes
- The glocal play

Technological progress: The rise of the machines, fourth industrial revolution was powered by quantum computing, coupled with Internet of Things, 3D printing, Generative AI, blockchain, augmented and virtual reality individually and combined provide enormous opportunities (Rajagopal and Provodnikova, 2023). Almost one in two current activities are technically automatable and six out of ten current occupations have more than 30% activities that are technically automatable (Manyika et al., 2017, cited in Rajagopal and Provodnikova, 2023)

According to Rajagopal and Provodnikova (2023), more often than not, emergence of new technology is only seen as harbinger of bad news and the jobs or roles created by it is never taken into consideration. Rising productivity may lead to job cuts but it should not be seen in isolation (Manyika et al., 2017, cited in Rajagopal and Provodnikova, 2023). This also leads to raising income levels that are spent, creating demand for goods and services across the

economy. This gives rise to many new roles and jobs that are not even imagined earlier (Beno, 2020, cited in Rajagopal and Provodnikova, 2023).

The half- life of professional skills has reduced considerably, it is now reduced to around 5 years as per study in 2019 (LaPrade *et al.*, 2019), this means that a skill learnt in 2019 would be about half as valuable in 2024 or so.

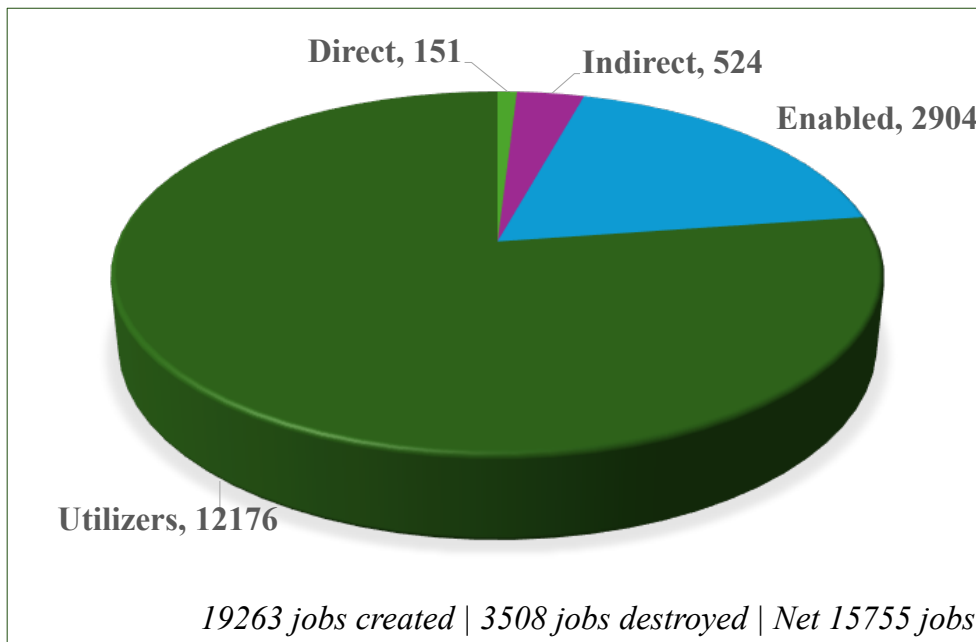


Figure 2.4
Technology job creation – personal computers example (Manyika *et al.*, 2017)

Demographic, societal, and environmental changes: This is the first time in the corporate world that we have multiple generations – baby boomers, Gen X, Millennials, Gen Z and Gen Alpha entering the workforce (Rajagopal and Provodnikova, 2023). Demographic and societal changes can have a huge bearing on work development, role creation, spending trends and even disparate factors like age structure, timing and composition of birthing, family structures, decision on retirement age can play a significant role in definitions of work development dictating future of work (Beno, 2020, cited in Rajagopal and Provodnikova, 2023).

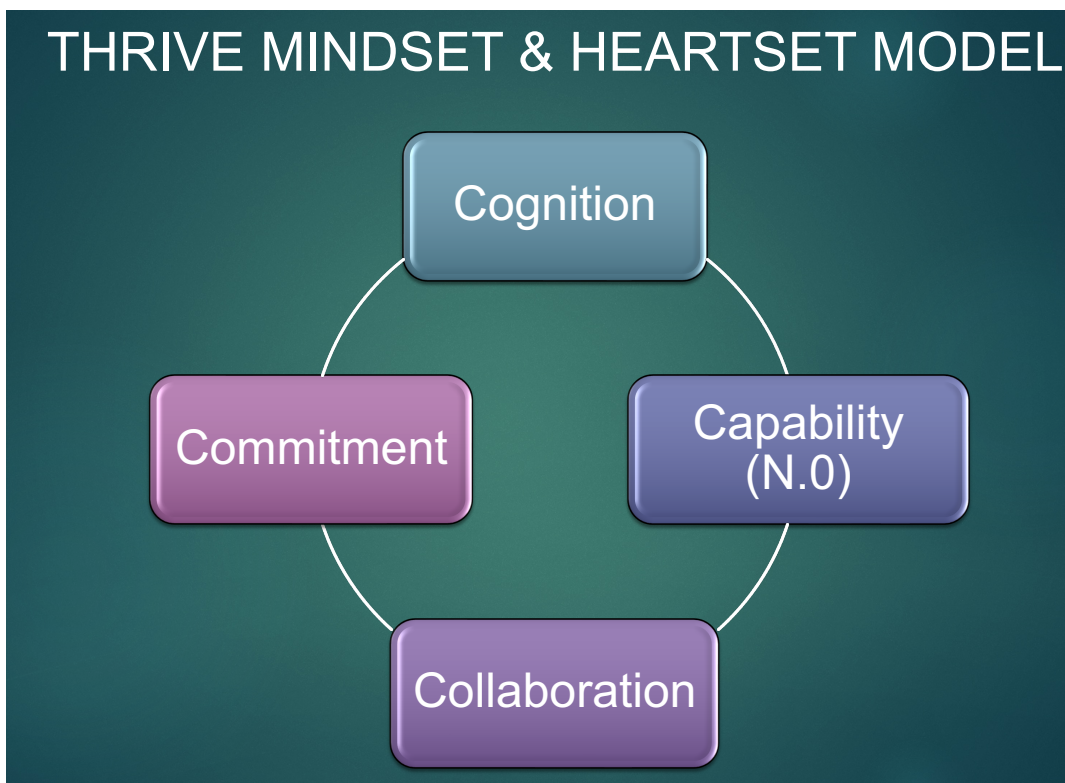
According to Rajagopal and Provodnikova (2023), impact that environment will have in shift of human power / economy is not fully understood and it is apparent that climate changes are here now and will likely displace and impact livelihoods of people in future. Natural disasters, climate changes and severe weather patterns will not only cause large scale destruction but also shift the availability (Beno, 2020, cited in Rajagopal and Provodnikova, 2023). The power of Inclusion and the intersectional points between various dimensions needs to be analysed in detail as it is a nascent and very complex phenomena and a very important one at that.

The Glocal play: The term ‘Glocalization’ is a linguistic hybrid of globalization and localization and was popularised by sociologist Roland Robertson and coined by Japanese economists to explain Japanese global marketing strategies (Blatter, 2022, cited in Rajagopal and Provodnikova, 2023). In addition to work flexibility, in terms of ability to work remote from anywhere the most important other factor in the mindset of organizations to seed roles where capability exists agnostic of geography and this will lead to emergence of newer roles and skills (Rajagopal and Provodnikova, 2023). Deloitte in their research mentions ‘open talent economy wherein the talent will determine where the roles are seeded in any organization (Barry, Schwartz and Liakopoulos, 2013). These trends also give rise to increased need for cultural acclimatisation of global cultures, understanding the socio, economic, political, and cultural notes in order to thrive (Beno, 2020, cited in Rajagopal and Provodnikova, 2023)

In their study, Rajagopal and Provodnikova (2023) mention that in order to be ready to lead the change is to build a ‘Thrive Mindset and Heartset’ that enables us to prepare ourselves for the future, they further state that ‘Building a Thrive Mindset and Heartset’ would need us to move from some of the fundamental beliefs that we have been possessing and in order to move from surviving to thriving in an uncertain, ambiguous world would help us prepare

ourselves for the future. Four characteristics that help in building a thrive heartset and mindset are as follows:

- Cognition
- Capability N.0
- Collaboration
- Commitment



*Figure 2.5
Building a Thrive Mindset and Heartset (Rajagopal and Provodnikova, 2023)*

Cognition refers to understanding their own strengths, Capability N.0 refers to the meta learning and the need for aperture to widen from ‘what’ to learn to ‘how’ to learn as mentioned in their study (Rajagopal and Provodnikova, 2023). Collaboration is about human interface with diverse humans and machine-machine interface and even human-machine interface like never seen before.

What is of particular interest is the element around Cognition. In their research, Rajagopal and Provodnikova (2023) quote McKinsey study that states that our ability to understand our strengths is one of the most important attributes we need to build in order to future proof ourselves. It can be said that ‘Ability of self to understand one’s strengths’ is the base of a pyramid that would help us to improve our self-confidence, self-motivation and enables us to become more resilient, bring in higher order energy, passion and optimism while dealing with uncertainty in a VUCA++ world (Dondi et al., 2021, cited by Rajagopal and Provodnikova, 2023).

McKinsey in their study talk about several elements under the heading of Self-awareness and self-management like ‘Understanding own emotions and triggers’ and ‘Understanding own strengths’ (Dondi et al., 2021). The desired proficiency level under the element ‘Understanding own strengths’ is when individuals know their strengths so well that they can predict challenges and can succeed even beyond their areas of expertise.

Breaking orthodoxies is also another theme in the self-leadership section as per the McKinsey report (Dondi et al., 2021). It is important that we constantly introspect on the way things are done and have a rewire if required. In the report by McKinsey, authors talk about ‘Breaking orthodoxies’ as the ability to identify and expose situations where orthodoxies and conventional wisdom may hinder progress. The desired proficiency level for this element is for individuals to challenge conventional wisdom and orthodoxies and show alternative views or paths that may lead to progress. If seen in the context of an individual, this can be applied to the mindset as well. Being open to self-thinking and having the courage and conviction to improve that thinking is a muscle that needs to be built. It may not be easy, but it is required and therefore an important muscle that needs to be developed for future (Dondi et al., 2021).

| Cognitive | | Interpersonal | |
|---|---|---|---|
| Critical thinking <ul style="list-style-type: none"> ● Structured problem solving ● Logical reasoning ● Understanding biases ● Seeking relevant information | Planning and ways of working <ul style="list-style-type: none"> ● Work-plan development ● Time management and prioritization ● Agile thinking | Mobilizing systems <ul style="list-style-type: none"> ● Role modeling ● Win-win negotiations ● Crafting an inspiring vision ● Organizational awareness | Developing relationships <ul style="list-style-type: none"> ● Empathy ● Inspiring trust ● Humility ● Sociability |
| Communication <ul style="list-style-type: none"> ● Storytelling and public speaking ● Asking the right questions ● Synthesizing messages ● Active listening | Mental flexibility <ul style="list-style-type: none"> ● Creativity and imagination ● Translating knowledge to different contexts ● Adopting a different perspective ● Adaptability ● Ability to learn | Teamwork effectiveness <ul style="list-style-type: none"> ● Fostering inclusiveness ● Motivating different personalities ● Resolving conflicts ● Collaboration ● Coaching ● Empowering | |
| Self-leadership | | Digital | |
| Self-awareness and self-management <ul style="list-style-type: none"> ● Understanding own emotions and triggers ● Self-control and regulation ● Understanding own strengths ● Integrity ● Self-motivation and wellness ● Self-confidence | | Digital fluency and citizenship <ul style="list-style-type: none"> ● Digital literacy ● Digital learning ● Digital collaboration ● Digital ethics | |
| Entrepreneurship <ul style="list-style-type: none"> ● Courage and risk-taking ● Driving change and innovation ● Energy, passion, and optimism ● Breaking orthodoxies | | Software use and development <ul style="list-style-type: none"> ● Programming literacy ● Data analysis and statistics ● Computational and algorithmic thinking | |
| Goals achievement <ul style="list-style-type: none"> ● Ownership and decisiveness ● Achievement orientation ● Grit and persistence ● Coping with uncertainty ● Self-development | | Understanding digital systems <ul style="list-style-type: none"> ● Data literacy ● Smart systems ● Cybersecurity literacy ● Tech translation and enablement | |

Figure 2.6
McKinsey report: Skills needed for future of work (Dondi et al., 2021)

From the above trends, one can infer the following:

- We are currently living in the fourth industrial revolution era witnessed by rapid evolution of technological changes made possible by quantum computing. Many researchers mention that we are already in the fifth industrial revolution which factors in sustainability.
- While Generative AI is the latest buzzword, many other revolutionary concepts like Internet of Things, 3D printing, Generative AI, blockchain, AR/VR did not exist few years ago and are currently fuelling the fourth Industrial Revolution, these may get replaced by other terms in near future due to technological advancements automatable (Manyika et al., 2017, cited in Rajagopal and Provodnikova, 2023).
- Some jobs will be obliterated due to this rapid pace yet many other jobs may get created that did not exist before requiring constant cycle of learning, unlearning and re learning.
- Half life of skills is constantly diminishing. Pandemic and associated changes have made the half life of a skill to drop even further and it is anticipated to diminish even further (LaPrade *et al.*, 2019).
- Societal and demographics constructs are continuously evolving necessitating a rethink on the existing paradigms (Beno, 2020, cited in Rajagopal and Provodnikova, 2023)
- In order to face the future and emerge successful, merely adopting a survival mindset will not help. A Thrive Mindset and Heartset is required and it calls for different approaches and strategies to get to that state (Rajagopal and Provodnikova, 2023).
- A thrive mindset and heartset has four critical elements Cognition, Capability N.0, Commitment and Collaboration (Rajagopal and Provodnikova, 2023).
- Cognition, which includes elements like understanding one's own strengths, working on it to hone it, understanding one's own emotion and trigger plus other skills like

breaking orthodoxies are some of the critical skills out of 54 that are required in the future world of work according to a McKinsey study (Dondi et al., 2021).

2.3.2 Intersectionality in Inclusion

Diversity and Inclusion as a concept has gained importance over the past few years, what stated as a matter of mere compliance has had a journey of its own to become a business imperative. Organizations that started the Diversity journey as a mere tick in the box have come a long way today and understand that it has evolved way beyond that and has strong impact on hardcore business outcomes like customer engagement, productivity and employee engagement and retention. It has been a steep evolution fueled by many factors that are intrinsic and extrinsic to organizations. Recent world events, higher understanding and appreciation of various elements of diversity have made the evolutionary curve steep. However, one can say that for every aspect appreciated, there are many more that are yet to be uncovered, making it a very vast and complex topic. Before deep diving into the concept, it is important to understand the continuum of Diversity and Inclusion in an organizational and individual context.

In the Diversity and Inclusion continuum, researchers from Deloitte mention that the first level is more compliance oriented. Diversity is seen more as a problem to be solved and managed and that actions if any are reactive and the workforce could be largely homogenous, this point in the continuum is usually seen as being compliant with any legislation that may exist in different countries pertaining to Diversity and Inclusion and organizations may take certain actions because they have to do it. Usually, efforts are localised at a particular department level like owned by Legal or HR or a Diversity and Inclusion team (Juliet Bourke and Dillon, 2018).

The second point in the continuum is identified by ad-hoc or stand-alone initiatives like specific training programs or initiation of employee resource groups is seen. A holistic approach may be absent, and the focus would be to go behind the obvious in terms of increasing

specific numbers in a particular demographic. Deloitte researchers further mention that majority of stakeholders could exhibit resistance and small number of employees may adapt or leave the journey at this point (Juliet Bourke and Dillon, 2018).

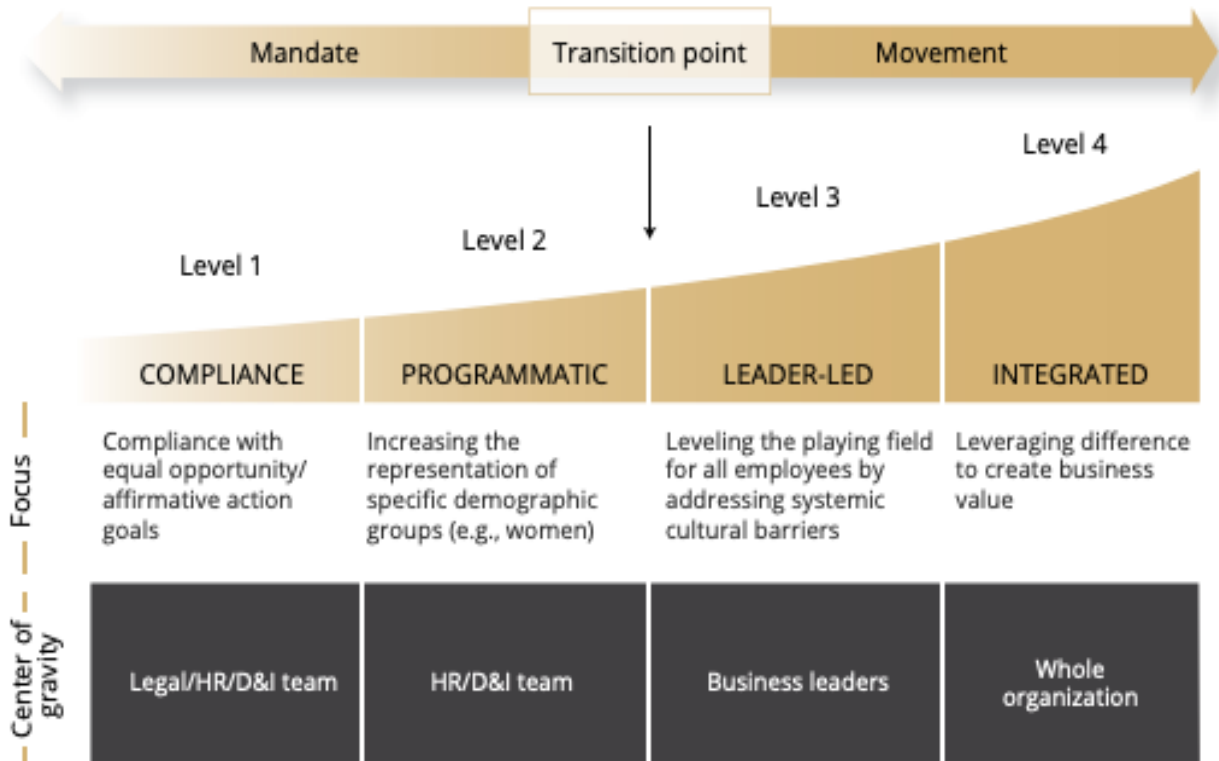


Figure 2.7
Deloitte D and I Maturity Model (Juliet Bourke and Dillon, 2018)

The transition point is in level 3 where efforts are made to level the field for all by transcending beyond programmatic offerings into addressing systemic cultural barriers (Juliet Bourke and Dillon, 2018). There is more evolved thinking on the concepts of Diversity and Inclusion and the linkage to strategy. There could be emergence of a strategy for cultural change that is able to address resistance and include wider adoption across leaders and managers. The important point in terms of monitoring progress of actions relentlessly at this stage which takes the journey to an evolutionary stage.

Level 4 which is the highest level in Deloitte’s continuum talks about a holistically integrated approach of Diversity and Inclusion (Juliet Bourke and Dillon, 2018). Researchers

mention that this point leverages the differences to create business value, and the key tenets proposed by researchers for this point in the continuum are as follows (Juliet Bourke and Dillon, 2018).

- In their research report, Juliet Bourke and Dillon (2018) mention that there is a shared sense of purpose and in an ‘Integrated’ state, Diversity and Inclusion is woven into all aspects of organization in terms of behaviors, structures and systems.
- Employee base strongly reflects the customer base, and the external brand matches the internal one (Juliet Bourke and Dillon, 2018).
- At this level, there is deep understanding and appreciation of the Diversity and Inclusion efforts by one and all and it is owned by all associates and not just a particular team or department (Juliet Bourke and Dillon, 2018).
- Also according to Juliet Bourke and Dillon (2018) at Level 4 of maturity model, the external brand matches the internal one and is in alignment. This also improves authenticity and the trust levels of the organization.
- Mature organizations know that the costs of ‘woke washing’ – appropriating the language of social activism into external environment can also be high (Dowell and Jackson, 2020)

Research by Deloitte mentions that workforce is demographically and cognitively diverse (Juliet Bourke and Dillon, 2018). the dimensions of diversity transcend beyond the obvious, that is beyond the visible dimensions of diversity into invisible dimensions of diversity as well. Cognitive diversity or diversity of thought is a recent frontier in diversity that has assumed importance. Usually while solutioning for diversity, organizations only factor in dimensions like gender, generational, race, ethnicity and may not include other dimensions like cognitive diversity which refers to thinking, behaving and learning styles. Organizations that

are on the evolved point in their Diversity and Inclusion journey factor in wide ranging diversity dimensions while crafting their strategy.

Diversity Dimension wheel as proposed by Korn Ferry consists of multiple dimensions under the following broad heads (Korn Ferry Report - A Taste of D and I, 2020):

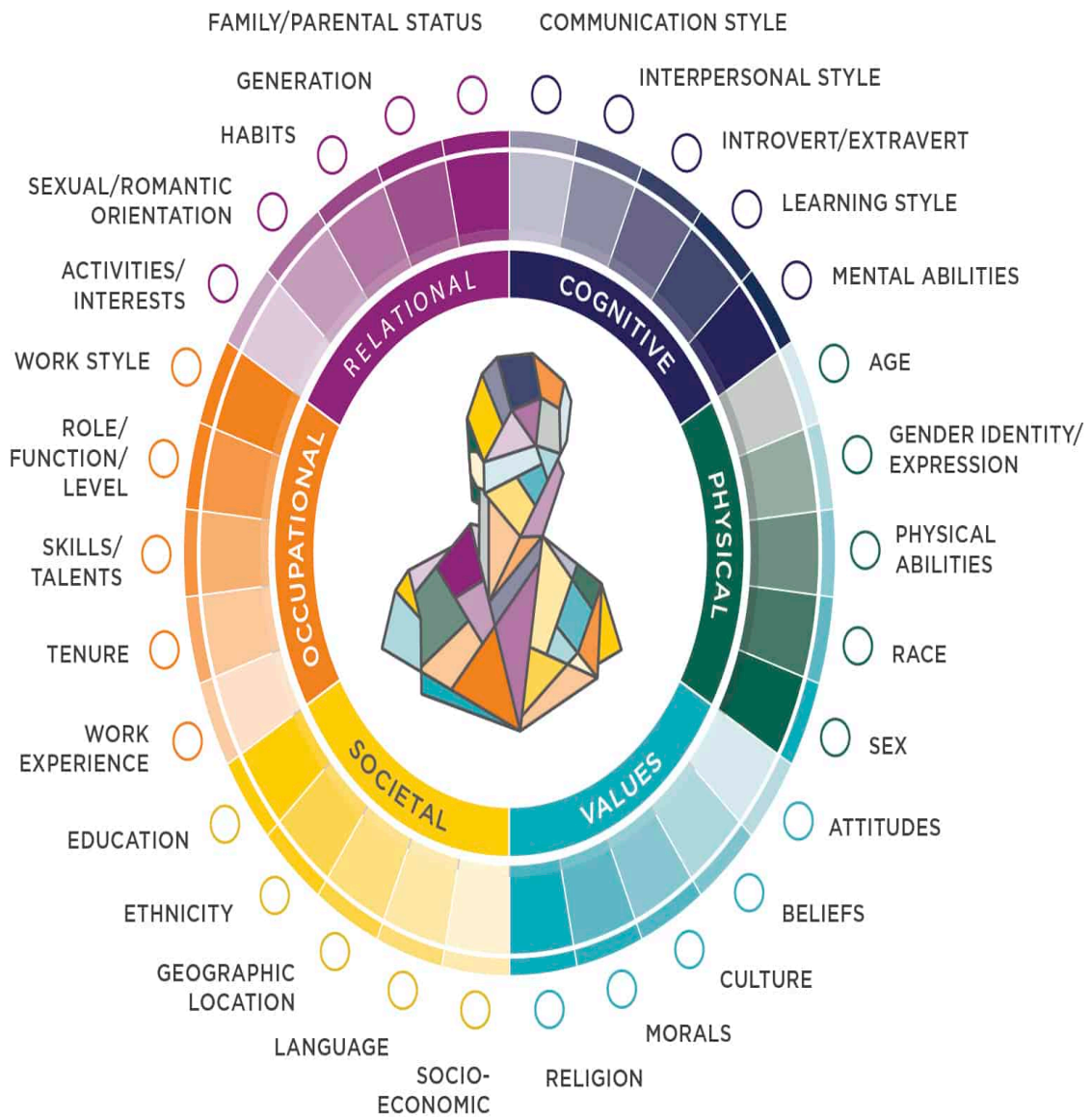
Physical attributes (Korn Ferry Report - A Taste of D and I, 2020): Who we are and what others think they see. These attributes may include but not limited to Age, Gender, Gender Identity, Race, Physical attributes, Sexual orientation, Mental abilities, Appearance.

Cognitive attributes (Korn Ferry Report - A Taste of D and I, 2020): How we think and process information, these dimensions do not come top of mind when organizations or individuals think of Inclusion. Some of the attributes could be around Thinking style, Learning style, Interpersonal style, Communication style, Introvert/Extrovert, Emotional Quotient (EQ), Intelligence Quotient (IQ)

Relational dimensions (Korn Ferry Report - A Taste of D and I, 2020): How we relate and rejuvenate could include the following dimensions of diversity such as Family status, Parental, Marital status, recreation, personal behavior, habits, generation, partner.

Occupational (Korn Ferry Report - A Taste of D and I, 2020): How we work and what we do could include the following attributes like Occupation, Work experience / tenure, Department / division, Industry, Tenure, Professional body affiliation, Status / level, Role and function

Societal dimensions (Korn Ferry Report - A Taste of D and I, 2020): How we connect and relate to society can be around multiple dimensions like the following Economic, Political, Social, Language, Origin, Education, Geographical, Social class



*Figure 2.8
Korn Ferry Diversity Dimension wheel (Korn Ferry, 2021)*

The world has become increasingly complex and nuanced. It is vital that organizations look at multiple dimensions of diversity rather than a single dimension of diversity as human beings are far more complex – bucketing them into a single dimension will not do justice. There are multiple dimensions rolled into a single person and this concept is called Intersectionality

and was popularized by a legal scholar Kimberle Crenshaw (Rajagopal and Provodnikova, 2022)

Intersectionality is about the structure that makes certain identities the consequence of and the vehicle for vulnerability and that identity does not mean Intersectionality (Crenshaw et al., 2013 cited in Rajagopal and Provodnikova, 2022). In their research Rajagopal and Provodnikova (2022) illustrate with an example that a woman employee at the workplace cannot be seen only as a woman and she could be from a specific socio-economic background, first time Graduate in the family, single parent to a teen child, introverted and belong to a specific race or ethnicity and she could be a person with disabilities or could be a caregiver to elderly parents – thus a multi-dimensional person. Since Intersectionality talks about considering multiple dimensions in a single person, the permutation and combination of possibilities are endless. This is one of the topics in D and I that is not fully leveraged and there is an opportunity for focus and impetus to further discussions and research (Rajagopal and Provodnikova, 2022).

Intersectionality is a new concept, while individuals and organizations are still grappling to fully understand the implications of various emerging diversity dimensions, it can be understood how profound to fully appreciate the concept of intersectionality. Also, as per (Crenshaw et al., 2013 cited in Rajagopal and Provodnikova, 2022) no particular application of intersectionality can grasp the range of intersectional powers and problems that plague the society and that there is an urgent need to move intersectionality to unexplored places.

In their research report, Rajagopal and Provodnikova (2022) comment about their observations around existing research around Intersectionality and they mention that the research around ‘impact of Intersectionality’ is very limited and the current studies around Intersectionality are focused on gender plus another dimension and there is literature around certain combinations of dimensions like People of Color + Gender (female) or Gender (female)

+ Persons with disabilities and there is not much research available around other dimensions or combinations of dimensions like Gender (male) + veteran status or Gender (male) + invisible dimensions etc.

While it is understandable that it is not possible to study every possibility and permutation and combination, it is evident that this is an evolving concept and a critical one at that which will shape the future of work and also have a bearing on economic impact of an organization or even at a country level.

Also, a critical aspect is that some of these dimensions are obvious or visible and therefore it is easier for individuals to align themselves or identify themselves to these dimensions. However, there are many other dimensions which need a lot of effort at the individual's level for them to be aware of and these are not obvious to them, much less to others. For instance, it is difficult to know about an individual's value systems or belief systems which are very profound. Similarly, it is important for individuals to know about their personality traits, thinking and learning styles, specifically thinking about one's thinking is Metacognition and this needs a lot of focus if one was to improve this. Awareness and strategising at individual's level is required before others are made aware of the style and before it is aggregated at an organization's level.

Impact of Intersectionality: Intersectionality as a concept is required as organizations need to formulate holistic Diversity and Inclusion strategy that factor multiple dimensions as chalking out a strategy based on single dimension may not be sustainable in the long run. There is far reaching impact from point of view of micro and macro inequities. It is not the hard-hitting data alone that helps us measure the impact of Intersectionality, but also the micro inequities that happen in an everyday workplace like micro aggression, whose impact can never be ascertained. These inequities can be seen in two broad buckets (Rajagopal and Provodnikova, 2022):

- Macro inequalities like wage gap, hiring discrimination can have a significant bearing on the household income, socio economic status of the household, thereby having a larger impact on the economy of the country as well.
- Micro inequalities like micro aggression at workplace can have a huge bearing on Career advancement, differences in title, team construct and many more.

Just to showcase, one impact of Intersectionality namely Gender-Race combination is as follows: El Gharib 2022 (cited in Rajagopal and Provodnikova, 2022) gives an example of pay parity issue in Gender-Race intersectionality in that it is important to look at multitude of perspectives, failure of this could jeopardize the achievement of global goals and perpetuate inequalities and that Intersectionality can help us understand how interconnected these challenges are at a global level.

Impact of Gender-Race in pay parity: Representation in leadership is important, but what is a matter of concern is the impact of Gender-Race in pay parity. El Gharib (2022) gives an example of pay parity issue and references about UN SDG #1 of reducing poverty. Further they mention that the factors that aggravate it are deeply rooted in the social, cultural, political, economic structures that shape the world.

El Gharib (2022) further states that it is important to look at multitude of perspectives, failure of this could jeopardize the achievement of global goals and perpetuate inequalities. Intersectionality can help us understand just how interconnected these challenges are at a global level. To unpack this, an illustration around pay parity among Gender-Race is given below as per data from research (Haan, 2024):

- Women earn 16% less than men on average. Women earn just 84 cents for every dollar a man makes (Haan, 2024)

- Women of color are among the lowest-paid workers in rural areas, with rural Black and Hispanic women making just 56 cents for every dollar that rural white, non-Hispanic men make (Haan, 2024).
- Latinas are compensated just 55% of what non-Hispanic white men are paid in 2024 (Haan, 2024)
- Black women are paid 64% of what non-Hispanic white men are paid (Haan, 2024)
- Native American women are typically paid only 59 cents for every dollar paid to white, non-Hispanic men (Haan, 2024)

From the above, one can infer the following:

- Diversity and inclusion are evolving topics that have garnered a lot of interest at both individual and organizational level. Strong impact on hardcore business outcomes makes Diversity and Inclusion a business imperative.
- There are many dimensions of diversity – visible and invisible and most of the focus is on visible aspects of diversity like gender, generational, race, ethnicity etc. Invisible dimensions of diversity like personality types, learning styles, introversion, extroversion, belief or value systems are seldom considered while formulating strategies.
- Intersectionality is a new concept which talks about how multiple aspects of diversity are rolled into an individual. One cannot consider oneself as being uni dimensional as human beings are infinitely more complex than that. Therefore, identities based only on one dimension may not be an accurate representation of the individual as there could be much more than that.
- For organizations, any strategy formulated based either only on visible aspects of diversity dimensions or based only on uni-dimensional diversity dimensions would lead to a myopic action plan that may not be tenable over long run.

- Further ignoring intersectional elements will lead to micro and macro inequities that have a bearing not only on the individual but also huge impact at organization level. In addition, some of these inequities will have larger impact on the economy of the country and therefore having an impact at world level as well.
- An important aspect is that individuals many times do not know some of their invisible dimensions of diversity like their value systems, belief systems or even their thinking / learning style, if the individual is not aware, it is impossible for unit/team or organization to know the diversity that exists in their midst on the invisible dimensions of diversity. This would impact the formulation of D and I strategy
- Earlier in the paper, it was established that demographics and Diversity and Inclusion have a huge impact on the future of work (Beno, 2020 as cited in Rajagopal and Provodnikova, 2023)
- Diversity of thought, personality, behavioral and learning styles are important aspects of Diversity and Inclusion and are Intersectional dimensions which should be seen along with other visible dimensions like gender, generational and race and ethnicity dimensions among others.

2.3.3 Key take-aways from Literature Review of the Business Need

Upon analysing trends from Future of Work and Intersectionality in Inclusion, one can infer the following key trends

The future as we know is here and is changing rapidly. Adopting a ‘Thrive Mindset and Heartset’ will help us future proof ourselves in order to face the challenges that the future may bring. The business need as to why Cognition or understanding one’s self and honing the thinking about thinking through structured strategies is key has been established.

It is equally evident that Metacognition that is diversity of thought, personality and behavioral styles are critical aspects to be considered for thriving in the future and there is a

critical business need for us to be deeply aware of Metacognition and it is important to create Metacognitive strategies.

2.4 Literature Review of Metacognition (The What)

2.4.1 Definition of Metacognition

The term ‘Metacognition’ was originally introduced in the ‘70s by psychologists (Flavell, 1979) and refers to the concept of ‘thinking about thinking’. Since then, a lot of research has been done to understand this further. Some other researchers have attempted to define Metacognition along similar lines as Flavell does. Meltzer, Pollica and Barzillai 2007 (cited in Cakici, 2018) also state that Metacognition refers to individuals’ awareness of and control over the way they process information. Kuhn and Dean David 2004 (cited in Cakici, 2018) define Metacognition as the awareness which is reportable and conscious about the cognitive aspects. Gertrude and Gertrude Hennessey 1999 (cited in Lai, 2011) say Metacognition is awareness of one’s own thinking, awareness of content of one’s conception, an active monitoring of one’s cognitive processes and an application of a set of heuristics as an effective device for helping people organize their methods of attack on problems in general.

It has been half a century since the original concept of Metacognition was proposed, this topic has gathered so much interest and research that it is said Metacognition is one of the top 100 topics in cognitive psychology and development (Plude, Nelson and Scholnick, 1998). There are three main areas in research that Metacognition has a prominent role (Efklides, 2008).

- Developmental psychology, with emphasis on theory of mind.
- Experimental and Cognitive psychology, focusing mainly on metamemory and
- Educational psychology with focus on self-regulated learning.

Further there have been a lot of work in the area of neuroscience and neuropsychology connecting Metacognition to executive functions (Fernandez-Duque et al., 2000, cited in

Efklides, 2008) and pre-frontal brain areas (Shimamura, 2000, cited in Efklides, 2008). Further Efklides (2008) mentions that research in animal metacognition started with ‘theory of mind’ in chimpanzees (Premack and Woodruff, 1978), is now expanding to other species (Foote and Crystal, 2007) as well.

Coming back to humans, Koriat (2007) mentions how study of metacognition can shed light on some fundamental issues about consciousness and its role in behaviour. Because of its study around the awareness of human thinking, behaviour, it is amply evident that study of metacognition has far reaching implications and is interwoven into many more branches like Psychology, Neuroscience, Philosophy, Ontology, Metaphysics, Epistemology, Anthropology and even Spirituality

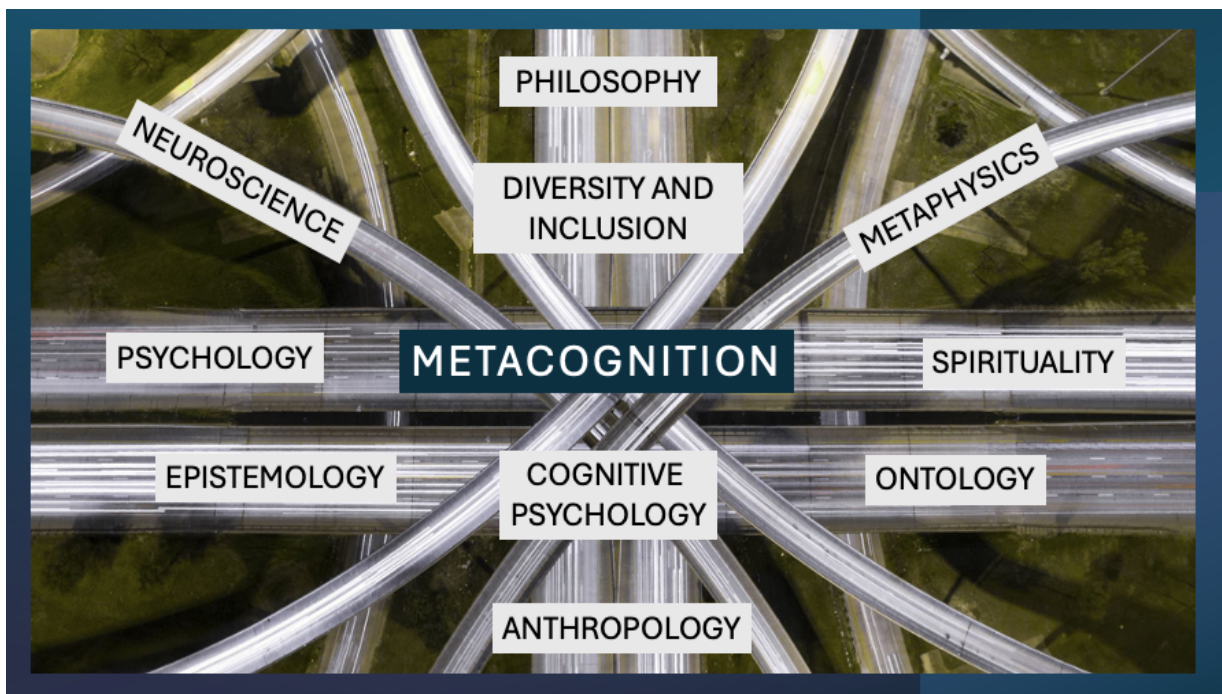


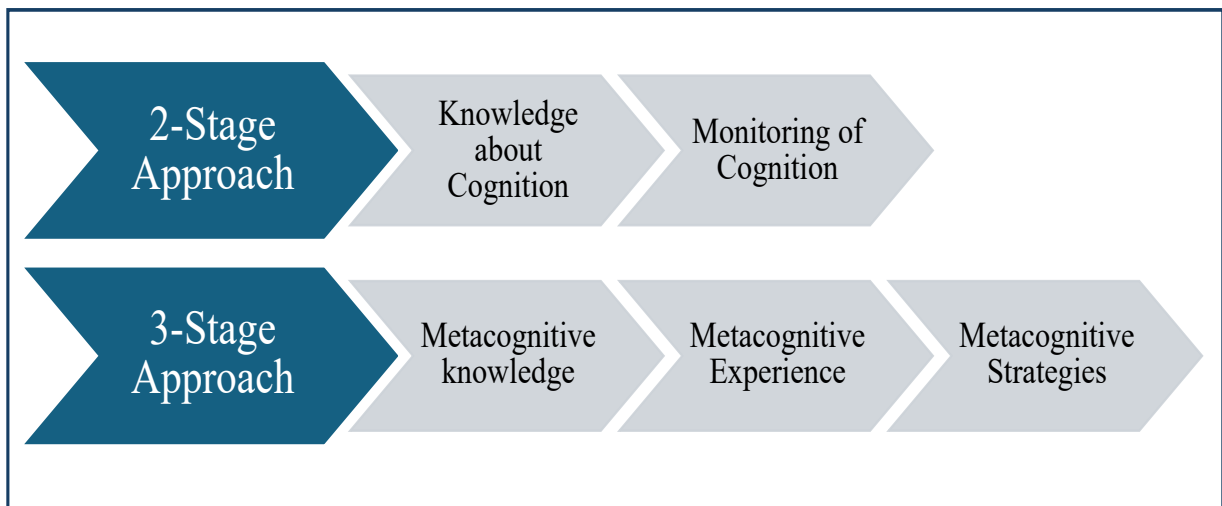
Figure 2.9
Metacognition intersectionality (authors' own representation)

2.4.2 Elements of Metacognition

There are two different ways in which researchers describe the elements of Metacognition. One set of researchers see this as a two-step approach and the other set of researchers see this as a three staged approach:

- Two-stage approach: Knowledge about Cognition and monitoring of Cognition (Flavell, 1979; Schraw, Crippen and Hartley, 2006, cited in Lai, 2011)
- Three stage approach: Metacognitive knowledge, Metacognitive Experience and Metacognitive Strategies or Metacognitive Skills (Efklides, 2008; Kitchener, 1983).

Whichever way one approaches Metacognition, it is obvious that there is a stage beyond merely creating Metacognitive awareness, we need to go beyond that. Kitchener (1983) also says this - first level of Metacognition viz. Metacognitive knowledge alone will not suffice.



*Figure 2.10
Elements of Metacognition*

Kitchener (1983) calls formulation of Metacognition strategy as ‘meta-meta cognitive level’ of monitoring or epistemic cognition a combination of Epistemology and Cognitive psychology. The term ‘epistemology’ comes from the Greek words ‘episteme’ and ‘logos’. ‘Episteme’ is ‘knowledge’ or ‘understanding’ and ‘logos’ is ‘account’ or ‘reason’ (Steup, Matthias and Ram Neta, "Epistemology", *The Stanford Encyclopedia of Philosophy*, (Fall 2020

Edition). Greene, Sandoval and Bråten, (2016) state the connection of epistemic cognition to psychology, disciplinary education, the sociology of science and philosophy, reaching back as far as to Plato's work on the nature, source, limits, and justification of knowledge. Because of its vast nature and interlinkages, it is also noted that many scholars find the disparate and contradictory terminology quite confusing for researchers and practitioners alike and it is observed that there are potential walls between scholarly discipline that share a mutual interest in epistemic cognition (Hofer and Bendixen, 2012; Sinatra and Chinn, 2012, cited in Greene, Sandoval and Bråten, 2016). Before we proceed to other areas, it is important to understand the logical steps among the various elements in Metacognition before we get to Epistemic cognition, next chapter addresses this.

Kitchener (1983) gives an illustration to say how the Metacognition steps lead from one to another, it can be seen as a two-tiered approach, the first tier of Metacognition can exist by itself and is not dependent on the other two, but the reverse is not possible. The second tier operates in conjunction with the first and third tier acts in conjunction with the other two.

The first level, individuals are said to enter into cognitive tasks like memorizing, computing, reading, perceiving etc. the second tier revolves around the 'how' of tier 1 – how do we perceive, how do we memorise etc. – this is around how particular strategies are invoked to solve the task and when these are deployed (Kitchener, 1983). The third level of epistemic cognition includes strategies used to identify and choose between form of solution required for different problem types. Knowledge of Metacognition is only the first step, the real benefit comes from control or regulation of Metacognition through strategies (Kitchener, 1983).

Flavell 1979, (cited in Lai, 2011) also categorizes the constituent elements as (i) 'person' knowledge which includes anything one believes about the nature of human beings as cognitive processors, (ii) "task" knowledge, which includes knowledge about the demands of different tasks; and (iii) 'strategy' knowledge which is knowledge about types of strategies

likely to be most useful. Flavell 1979, (cited in Lai, 2011) notes that these different types of knowledge can interact, as in the believe that one should use strategy A versus strategy B to solve task X, rather than solve task Y.

While it is interesting to know that the person knowledge that is understanding human nature as cognitive processors finds a mention in many theoretical framework, it is seldom researched or understood deeply. Much of the literature that exists hovers around the ‘process’ side and the ‘strategy’ side based on process, seldom on the ‘person’ performing the task. While this is one observation, continued literature review was performed to understand the areas where application of Metacognition was performed which is shown in subsequent chapter



*Figure 2.11
Metacognition to Epistemic Cognition (Authors' own representation)*

2.4.3 Applications in Metacognition

While analyzing the literature, two main aspects emerged in the application of Metacognition. One aspect is to understand the areas where Metacognition is widely researched, and the other is to understand the types of research around Metacognition from an applicability standpoint.

While analyzing the first aspect, we find much research supports the assertion that cognitive and metacognitive processes develop in young children and early adolescence (Kitchener, 1983; Flavell, 1979; Wellman, 1978; Masters, 1980). Because of this assertion, there is a lot of literature in application of Metacognition in the field of learning. On the second

aspect, in their study on Applied Metacognition (Perfect *et al.*, 2002) mention there are four types of research around Metacognition:

- First group are theory-based researchers where application is not too relevant, the goal is to understand basic processes.
- Second group of researchers are those who are interested in basics of theory, but try to establish connection to everyday life – they stress on ecological validity
- Third type of research is labelled applicable research. Applicable research implies ecologically valid research but research for which applications follow naturally (Herrmann and Yoder, 1998).
- Fourth type is ‘application research’ – this involves tools, specific instruments, products or services which have been designed to work in specific domains (Perfect *et al.*, 2002)

Further the dominant trend in metacognition research is the search for relation between monitoring and control. In the applied sense, researchers are interested in understanding people’s study strategies and how these strategies can be improved (Perfect *et al.*, 2002). Further analyses of literature reveals that there is a lot of papers around the first type around pure theory and much of literature on second and third types are around specific aspects in learning among young children

2.4.4 Metacognition Imperatives

From analyzing the literature, it is evident that there are opportunities in the field of Metacognition research. This can be categorized into three buckets as given below

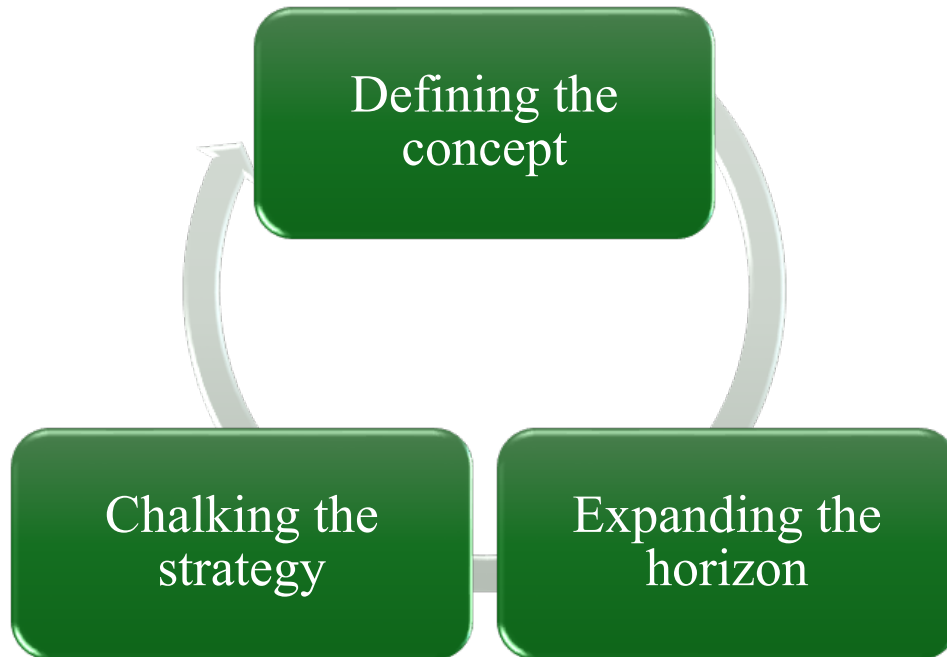
Defining the concept - In previous chapters, we have seen many research papers around Metacognition and the myriad definitions. Desoete and Ozsoy (2009) make a very interesting point that while many researchers agree that there is a concept called Metacognition, no one agrees as to what exactly Metacognition is about. They compare this to the sighting of Loch Ness monster where descriptions of the monster vary significantly. Following needs to be done:

- There is significant opportunity for us to define what is metacognition. The whole concept needs to be defined in way and manner that is palatable for users to understand and absorb and not kept as an esoteric subject which is beyond the grasp of many people. The aim of the research should be to take the concept to grass root level, which is at an individual level, then unit level and then at an organization, country level and at a global scale as a movement.
- Post simplification, the concept needs to be propagated so as to create awareness among the right audience. It is almost half a century since the topic was introduced and still there is very little absorption of the concept.
- Post propagation of the concept, we need users to talk about actual scenarios where they have applied the same. Hearing the concept being internalised and applied would lead to more awareness generation for the greater good of humankind.

Expanding the horizon - There is significant amount of research in learning styles of children and the effect Metacognition has on them. Metacognition is concerned with guiding the learning process itself (Harris, 2003, cited in Cakici, 2018) and the ability to reflect on, understand, and control one's learning (Schraw and Dennison, 1994, cited in Cakici, 2018). Similarly, many studies are conducted in the field of learning – more specifically self-regulated learning or learning of languages or study patters etc. In addition, some research around Metacognition hovers around understanding of decision making, improving quality and in some cases effect of feedback on performance assessment in organizations (Kitchener, 1983; P. R. Lyons and Bandura, 2019).

There is a huge opportunity to expand the horizon with respect to Metacognition research and absorption. Currently it is extremely focused on specific phase in lifecycle which is the child state or young adult state especially around the learning styles.

Research needs to expand beyond child stage to include adult stage and those working in corporates. Already from limited research, it has been observed that there are significant benefits of the study of Metacognition in organizations. If Metacognition research excludes adult stage and focuses only on children, then the whole benefit to individuals at adult stage, impact to organizations and team constructs cannot be fathomed.



*Figure 2.12
Opportunities in Metacognition research (Authors' own representation)*

Chalking the strategy - Researchers explain the dichotomy in cognitive psychology – between procedural knowing (knowing how) and declarative knowing that is, knowing what (Kuhn and Dean David, 2004). Similarly, research calls out the Cognitive process models in detail as seen in chapters earlier. However, one aspect that is not coming out clearly is the ‘How part’ viz. understanding that the person has about themselves – their own thinking, behaving or learning style which would have a profound impact on the declarative or procedural knowledge or anything else for that matter (Kuhn and Dean David, 2004). Epistemological meta-knowing that is knowledge and knowing in general whether it pertains to one’s own knowing or applicable to anyone’s knowing needs further research. Both sides are important

as in, one must know about themselves, and one needs to know what others know about themselves. Seldom there is interest or appetite or patience to know how one is perceived by others. Going by that logic, one may not know entirely about themselves in light of the metacognition topics discussed here.

2.4.5 Key take-aways from Metacognition

From the above, one can infer the following aspects with respect to the concept of Metacognition:

- Metacognition as a concept was introduced almost half a century ago and is an important concept at an individual level, team level and organizational level.
- However, there is not much awareness of this concept, existing research is predominantly focused on children especially around the learning styles.
- Metacognition as a topic is in the intersection of so many fields and there have been pioneering work connecting this to multiple areas of Neuroscience, Psychology, Philosophy, Diversity and Inclusion, Anthropology, Cognitive Psychology, Anthropology and even Spirituality
- Metacognition has huge benefit in future of work as Cognition is one of the ways to building a heartset and mindset which will help individuals and organizations to thrive in the volatile, dynamic and ambiguous future.
- Metacognition will also help individuals be aware of some of the invisible dimensions of diversity namely cognitive diversity. Having more awareness of metacognition along with specific strategies to improve it, will throw light on an individual's specific dimensions and also the intersectionality at play.
- Metacognition imperatives: There is an urgent need to focus on the following:
Defining the concept: The very concept of metacognition must be simplified and made accessible for right audience to absorb and internalize.

Expanding the horizon: Research and absorption should expand beyond child stage to include adult stage as well

Chalking the strategy: Strategies around metacognition to epistemic cognition journey must be shared widely so more individuals can benefit from the same.

2.4.6 Impact of Neuroscience on Metacognition

Any discussion on Metacognition is not complete without understanding and appreciating Neuroscience. Neuroscience can be a very heavy and nuanced topic; however, a basic understanding will help us validate the work around Metacognition. This is almost the starting point of any discussion around this topic. Upon reviewing the literature of Functional Neuroanatomy, it was evident that pre-frontal cortex plays a significant role in Metacognition. The first step would be to understand basic Neuroanatomy:

Central Nervous system consists of the brain and spinal cord. Brain is the main part of the nervous system is extensively involved in information processing and co-ordination. It is divided into following parts (Cuffari, 2020):

- Cerebrum: largest part of the brain and includes cerebral cortex, basal ganglia, hippocampi and amygdala. Cerebrum is further divided into four lobes: Occipital, Parietal, Temporal, Frontal (Cuffari, 2020).
- Brainstem: Includes medulla, pons and midbrain (Cuffari, 2020)
- Cerebellum: located at the back of the head also called little brain (Cuffari, 2020).

Of particular interest to the study of Metacognition is the frontal lobe in Cerebrum, Frontal lobe is a relatively large lobe of brain, extending from front of brain towards the back of the brain. If frontal lobe is impacted, it can cause wide ranging issues including behavioral issues (Cuffari, 2020, Walker et al., n.d.)

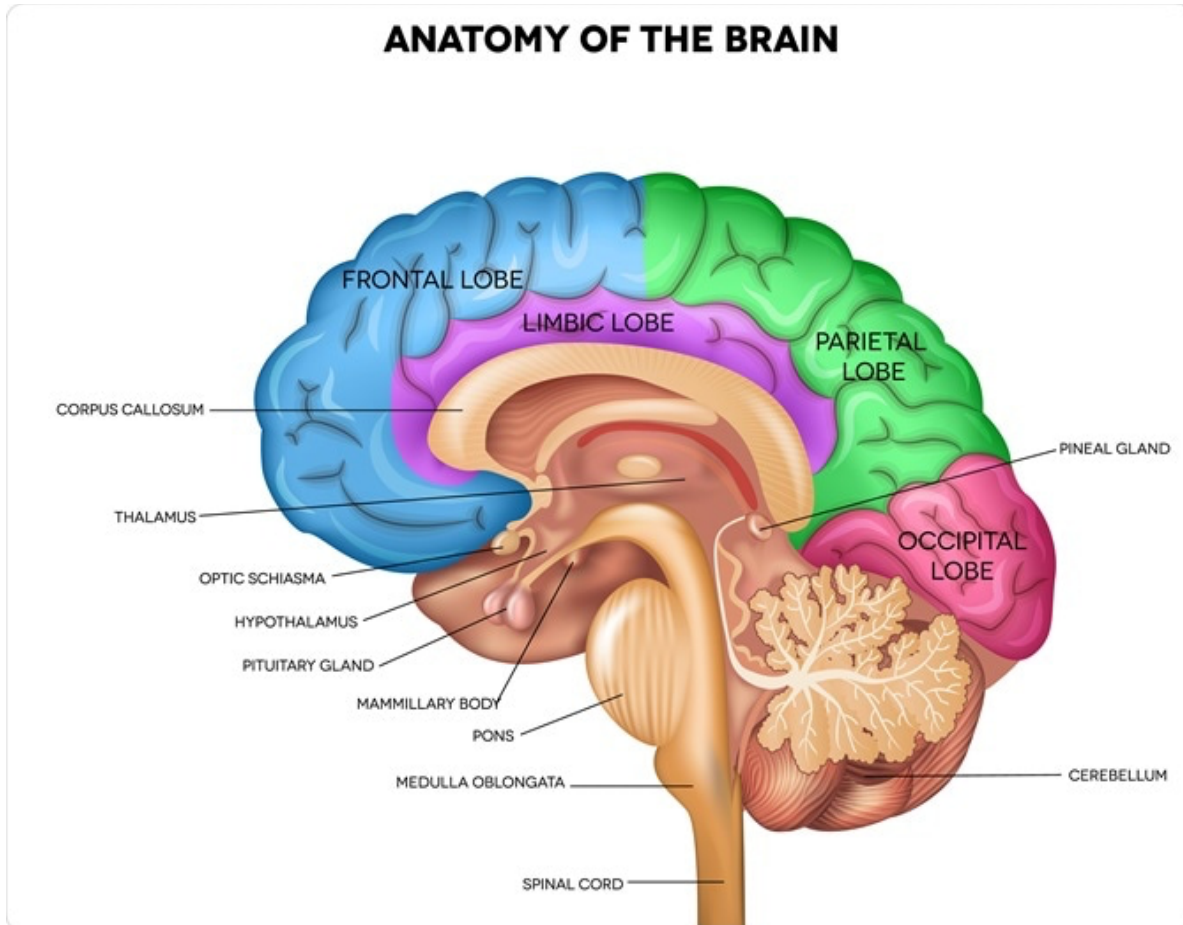


Figure 2.13
Anatomy of the brain (Cuffari, 2020)

Frontal lobe accounts for almost one-third of the brain mass and has following key divisions and are responsible for performing plethora of activities (Walker *et al.*, no date)

- Motor Cortex
- Premotor Cortex
- Supplementary motor cortex
- Prefrontal Cortex
- Broca's Areas and
- Frontal eye fields

Frontal lobe is responsible for modifying and imposing constrictions on reflexive behaviors and this part of the brain starts developing from infancy stage. The functions of various divisions are as follows (Walker *et al.*, no date; Travis Dixon, 2016; Cuffari, 2020):

- Prefrontal Cortex: Ability to concentrate, personality and emotional traits, abstract thinking, working memory, executive functions including ability to plan and implement a series of goal directed actions. Out of this, medial prefrontal cortex as a brain region is related to self-thought, aids in retrieving posterior parietal cortex
- Motor cortex is involved in voluntary movement and premotor cortex is involved in storage of motor programs, sensorimotor integration etc
- Supplementary Motor cortex is involved in intentional preparation for movement, procedural memory

Of the above, Pre-frontal cortex and specifically medial pre-frontal cortex play a vital role in the thinking about thinking. According to Travis Dixon, (2016) Human behaviour is much more complex for us to fully understand, and hence appropriate usage of terms is important. There have been extensive studies on this and one such subject of research is Phineas Gage who was working as a railroad worker who was putting dynamite into rocks while working with a team to lay tracks. He used a six-foot bar to pound the dynamite powder and during the act, the dynamite exploded causing the bar to pierce through Gage's left eye and through his skull. The pole landed around 50 ft away after piercing through the skull. Gage survived and was conscious while he rode on the cart to nearest town to get treatment.

Further because of this incident, Gage seemed to have major behavioral changes and went from being a rather mild-mannered person to a totally different person as stated by his friends and family. This was one of the first and foremost cases that links brain damage to personality change and emphasizes the impact of pre-frontal cortex on behaviour and self-thinking (Travis Dixon, 2016). Stuss and Knight (2002) mention that reports published confirm

that massive damage to the frontal lobes can cause dramatic changes in personality while keeping sensation, movement, consciousness and most cognitive faculties intact. The first half of twentieth century the dilemma of the frontal lobes unfolded in the form of a dialectic between those who considered it the seat of the highest integrative functions of the human mind (Brickner, 1934; Ackerly, 1935; Goldstein, 1936 as cited in Stuss and Knight, 2002) and those who commented on the paucity of deficits associated with substantial frontal lobe damage (Hebb, 1945; Landis, 1949 as cited in Stuss and Knight, 2002). Stuss and Knight (2002) further state that evidence from comprehensive case reports, showed patients with frontal lobe lesions became puerile, profane, slovenly, facetious, irresponsible, grandiose, and irascible, while others lost spontaneity, curiosity, initiative, and developed an apathetic blunting of feeling, drive, attentive power, and behavior. Frontal lobe damage also was associated with erosion of foresight, judgement, and insight, and an inability to delay gratification or experience remorse.

Pre-frontal cortex (PFC) can be thought of as ‘personality center’ and is the cortical region that makes us humans unique. Pre-frontal cortex also helps us process real time inputs from environment and helps us compare that input to past experiences and makes us reach to them. PFC also helps us exhibit our insights, planning capability into actions that define who we are. However, with all this, role of PFC in our lives is fully not understood and there is a lot of research going on in the field of Neuroscience (William R and Bruce W, 2023)

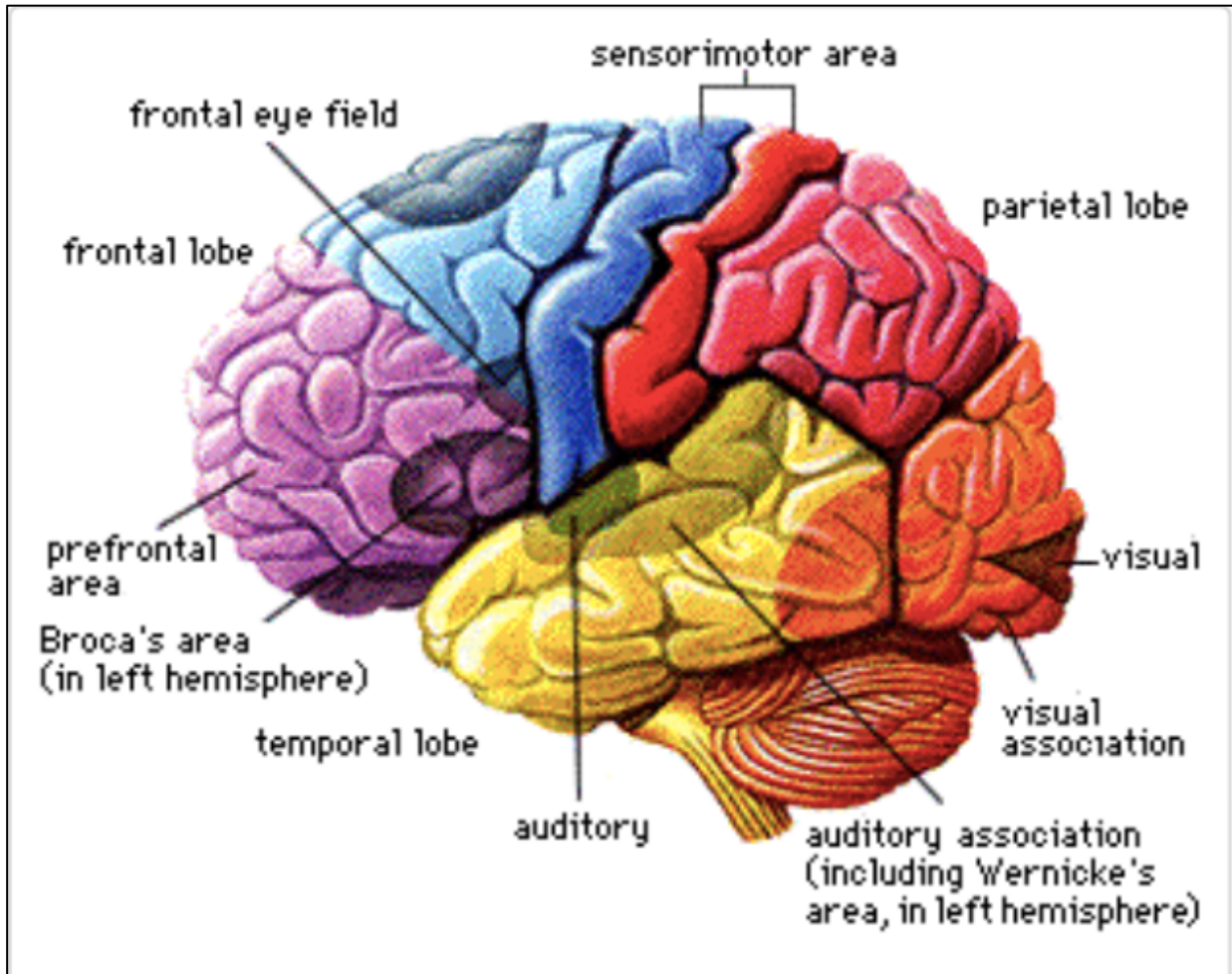


Figure 2.14
Anatomy of brain - Frontal lobe (Travis Dixon, 2016)

Today research on applied neuroscience is progressing at a rapid rate and there are clinical trials that are being conducted on various facets of the research. According to (Travis Dixon, 2016) some of the methods of measuring and monitoring brain activity is through functional Magnetic Resonance Imaging called fMRI and quantitative Electroencephalogram (qEEG), while they provide fairly accurate results, it is also slightly cumbersome to implement these. For one we cannot have someone in an fMRI machine all the time while they are taking decisions or solving problems. However, a part of it can be accomplished through qEEG where studies are conducted real time by subjects wearing qEEG leads during an actual team meeting or when decisions are being taken.

If the progress of field of Neuroscience is any indication to go by, then it definitely would hold the key towards unlocking Metacognition and helping in the journey from Metacognition to Epistemic Cognition. With any rapid progress, this also would raise questions on ethical nature of research and therefore it is an area that needs to be dealt with lot of caution and mindfulness.

2.4.7 Key take-aways from Literature Review of Neuroscience

Neuroscience as a study has always intrigued and interested researchers. With the rapid progress of improved techniques to measure human brain, it has become possible to understand the brain functions better than ever possible.

Neuroscience and neuropsychology connect Metacognition to executive functions in research done in early 2000s (Fernandez-Duque et al., 2000, cited in Efklides, 2008) and pre-frontal brain areas (Shimamura, 2000, cited in Efklides, 2008)

Pre-frontal cortex and specifically medial pre-frontal cortex play a vital role in the thinking about thinking. Pre-frontal cortex can be thought of as ‘personality center’ and is the cortical region that makes us humans unique. However, with all this, role of PFC in our lives is fully not understood and there is a lot of research going on in the field of Neuroscience (William R and Bruce W, 2023)

Metacognition as a concept is interwoven with Neuroscience. Studying metacognitive concepts without understanding of Neuroscience is not possible. The study is complex and fraught with many nuances. Also oversimplifying Neuroscience or merely correlating one part of the brain to a particular function is also an immature approach as the human brain is intricate and complex

As one embarks on the journey of Metacognition, one cannot ignore the role played by Neuroscience on Metacognition and with passing time, one will be able to better understand, appreciate and control the pre-frontal cortex in a way and manner that will help everyone better

understand Metacognition and help devise better and sharper strategies. The major watch area is to approach Metacognition and Neuroscience in an ethical manner. As with any progress or advancement, there would be a dark side to it and unethical means to further these concepts would lead to dangerous consequences that one can only imagine at this point.

2.5 Literature Review of psychometric tools (The How)

Metacognition is a very vast topic with huge potential, research in earlier chapters have established the business need as to why Metacognition could be the mega differentiator for thriving in future and why it has a huge bearing on concept of intersectionality that has the power to solve micro and macro inequities that have a bearing not only at an individual, unit or organization level but also at a country level in terms of economy.

Further, earlier chapters also brought out the nuances of the concept of Metacognition and three possibilities were put forward: Defining the concept, Expanding the horizon and chalking the strategy.

The next logical step is to create strategies to improve Metacognition. It is not enough if one just understands the concept, one needs to act on it and improve it. It is necessary for subjects to transcend into deeper echelons of our subconscious mind to be more aware of our feelings and thoughts and for us to meaningfully propose intentional strategies.

At first glance, this seems like a very tall problem that would require us to possess super ordinary or psychic powers to go deep into one's brain to unravel the complexities - fortunately that may not be required at all. The solution towards creating third level of Meta metacognition or Epistemic Cognition may be achieved through a good understanding of psychometric assessments in conjunction with other methods. It would be worthwhile to analyze the potential of psychometric tests and also understand some of the tests that exist in the industry.

2.5.1 Overview of Psychometric assessments

Study of human brain by various researchers and scientists are ongoing for many centuries as seen in the various sections earlier. One wishes that there is a super machine or a secret formula that can measure all of the neuronal activity that can tell what is happening in the brain all the time. This is wishful thinking as of now and there is no one machine or formula that does this. However, over many years, we have seen the rise of psychometric tests that provide a proxy to human behaviour.

Psychometric assessments are tools that have varied forms of tests that assess the cognitive capabilities of individuals. we have already seen how human mind can work in myriad ways. Psychometric assessments are one way of ascertaining how that mind can work, it is indeed understandable what a daunting task it could be, it almost feels that the tool would become overwhelmed just looking at the enormity of the problem.

Before deep diving into higher order methods, it is important to understand the psychometric assessments more closely. Psychometric assessments are tools that have varied forms of tests that assess the cognitive capabilities of individuals. These can be administered by organizations for many reasons. There are different scenarios in which these tests are used, they could be used for the purpose of recruitment, at hiring stages when some organizations want to assess the behaviors of candidates, they use various psychometric tests. Similarly, when there is an Organization Development (OD) interventions, organizations may use these tools. These tools are also used ahead of major talent management actions like promotion in some organizations. It could also be used to ascertain the training needs analysis so as to craft individualized development plans for their associates. In some situations, there could be specific requirement like cross cultural acclimatization or specific coaching needs which need an anchor point, and the psychometric tools provide that leverage for leaders, Coaches and

Human Resources teams. Therefore, it can be said that psychometric tests are used at various points of an employee lifecycle, and it is the need that governs when and how it is administered.

2.5.2 Potential of Psychometric tests

Also, in earlier chapters mentioned the evolution of psychometric assessments, from the time of looking at portraits to icon reading to reading from graphics, the evolution of psychometric tests have come a long way. According to Passmore (2012), psychometrics tests have wide ranging impact, some of them are given below:

- Psychometric tests are a good starting point for discussion, in the absence of a psychometric test, it would be difficult to have this discussion as it brings out vulnerabilities in a structured and scientific fashion (Passmore, 2012)
- These measure someone's ability or personality in an objective manner and not their subjective impressions (Passmore, 2012)
- Passmore (2012) further states that Psychometric tests show different roles or styles people in the group may possess and all of these roles are equally valued
- Psychometric tests are revealing, and the subjects can learn more about themselves and in turn enjoy learning more about themselves (Passmore, 2012)
- They help people identify areas for improvement: Passmore (2012) further state that these psychometric tests help people identify areas for improvement as results are thought provoking and relevant.
- People have a choice about the roles they take and the ones that are best suited to their strengths (Passmore, 2012)

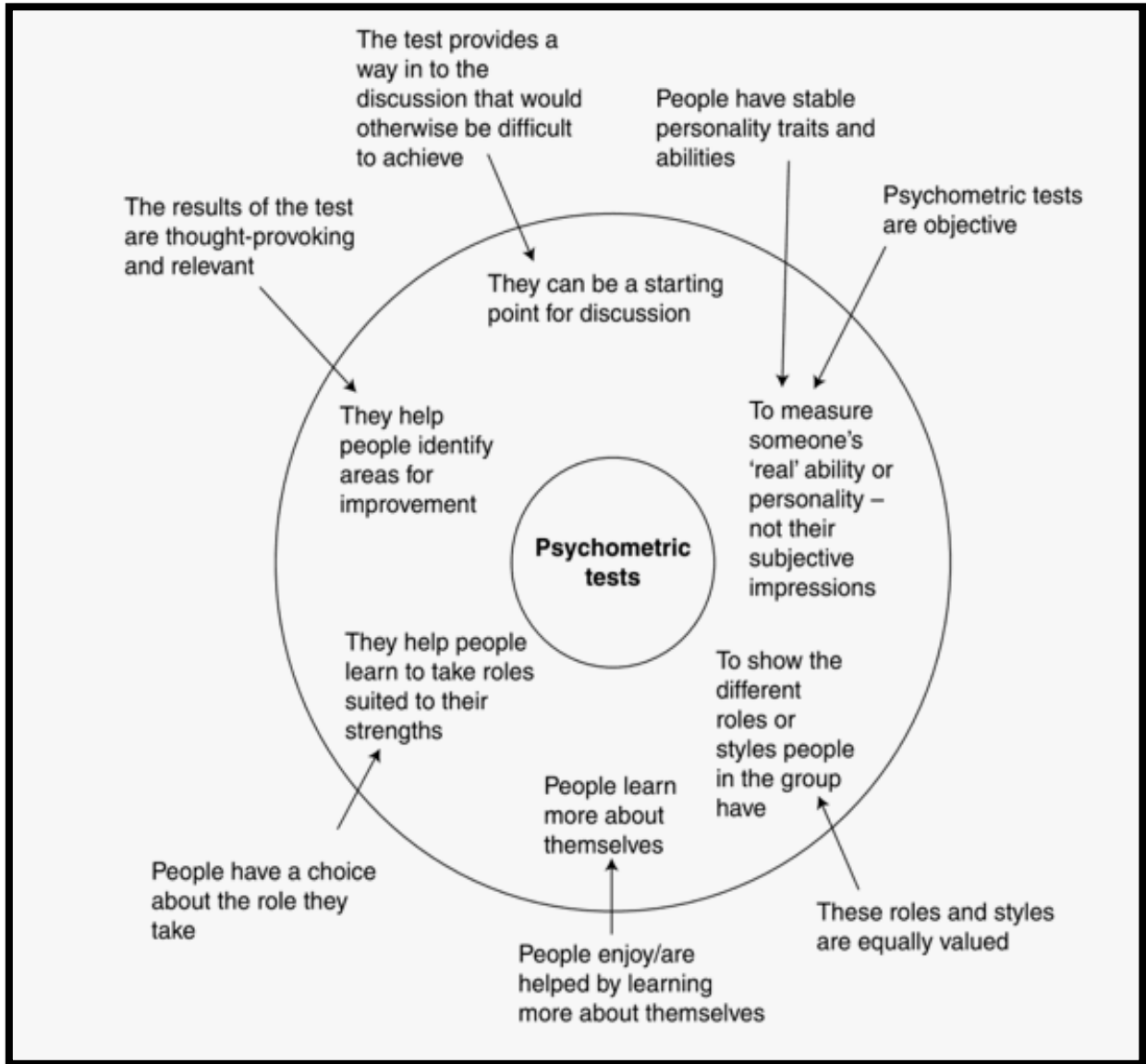


Figure 2.15
Potential of Psychometric tests (Passmore, 2012)

The next logical step would be to analyze some of the common psychometric tools that are widely used in organizations. This is just an illustrative sample of the available tools and not a comprehensive one as there are too many tools and capturing all of them would be too vast and exercise and beyond the scope of this research. Similarly, each of these tools have their own methodology, history, science and meta-analyses behind them, full understanding of all of these aspects will also be a huge exercise and beyond scope of the research. Therefore, we will focus on the key highlights of three of these tools in our study.

2.5.3 DiSC tool

DiSC tool was designed by Marsten in early 20th century, according to Prochaska et al (2015). DiSC profile is one of most extensively researched, reliable and popular self-assessment instruments for learning about personal style and does not indicate intelligence levels or values. In addition, they mention that DISC is a comprehensive, self-scoring and self-interpreting profile that provides an in-depth knowledge about an individual's behavioral characteristics.

According to Personality Profile Solutions, the organization running DiSC assessments, 'D' in DiSC stands for Dominance which is embodied by direct, strong-willed, and forceful characteristics, 'i' stands for Influence: sociable, talkative, and lively as characteristics, usually they are fast paced and accepting ('DiSC styles Everything DiSC', no date). 'S' in DiSC stands for Steadiness – gentle, accommodating, and soft-hearted are characteristics represented by those with a Steadiness profile and those with 'C' or Conscientiousness embody characteristics like private, analytical, and logical. There could be many combinations of these profiles possible using permutation and combination methodology, while some will have only D, i, S or C profiles, others may have combinations like Di, iD, iS, Si, CS, SC, CD, DC ('DiSC styles Everything DiSC', no date).



Figure 2.16
 DiSC tool (*'DiSC styles Everything DiSC'*, no date).

Prochaska et al (2015) states that there are other elements that are important in psychometric assessments like values which cannot be ascertained by DiSC profile alone and as a result of this, value exercises are incorporated into learning a profile. Further depending on the need of the study, there are other information which are collected as a context to the study like birth order, birth date, values and many others.

According to Prochaska et al (2015), if a person has a high tendency to control that is a High in 'D' or Dominance, then there might be a connection with birth order, this information can help a person better understand themselves and how they developed some of the thinking and how leadership may affect others and also question how other's leadership may affect their thinking and behavior. The personal belief systems which are not measured through the DiSC

profile needs to be overlaid so as to understand what the subject and others believe as right and wrong. Ethical decisions and how the subject understands and uses the instincts are driven by values (Prochaska et al., 2015).

In essence, it appears that the assessment by itself may not be self-sufficient to ascertain multiple dimensions and would give only high-level insights to the subject going through the assessment. There has been many research including the one by (Prochaska, Sampayo and Brent Carter, 2015) on correlation of various factors along with DiSC assessments to make this complete and holistic observation of the subjects' leadership style.

2.5.4 Mayers-Briggs Type Indicator (MBTI)

Another personality test that is often quoted by many in organizations is Mayers-Briggs Type Indicator or more commonly called MBTI. According to Pittenger (1993), MBTI was developed by Isabel Briggs and her mother Katherine Briggs, and this was based on Carl Jung's work around this topic. The genesis of developing this tool was to aid in personnel selection in the 1940s and Mayers thought that different occupations favored different personality orientations, and that Jung's theory provided a theoretical link to this instrument. According to Puji and Ahmad (2016), there are several models of instruments that can be used to identify learning styles and Mayers-Briggs Type Indicator is one such tool. Pittenger (1993) describes the four dimensions in MBTI of Extroversion (E) vs. Introversion (I), Sensing (S) vs. Intuition (N), Thinking (T) vs. Feeling (F), Judgement (J) vs. Perception (P).

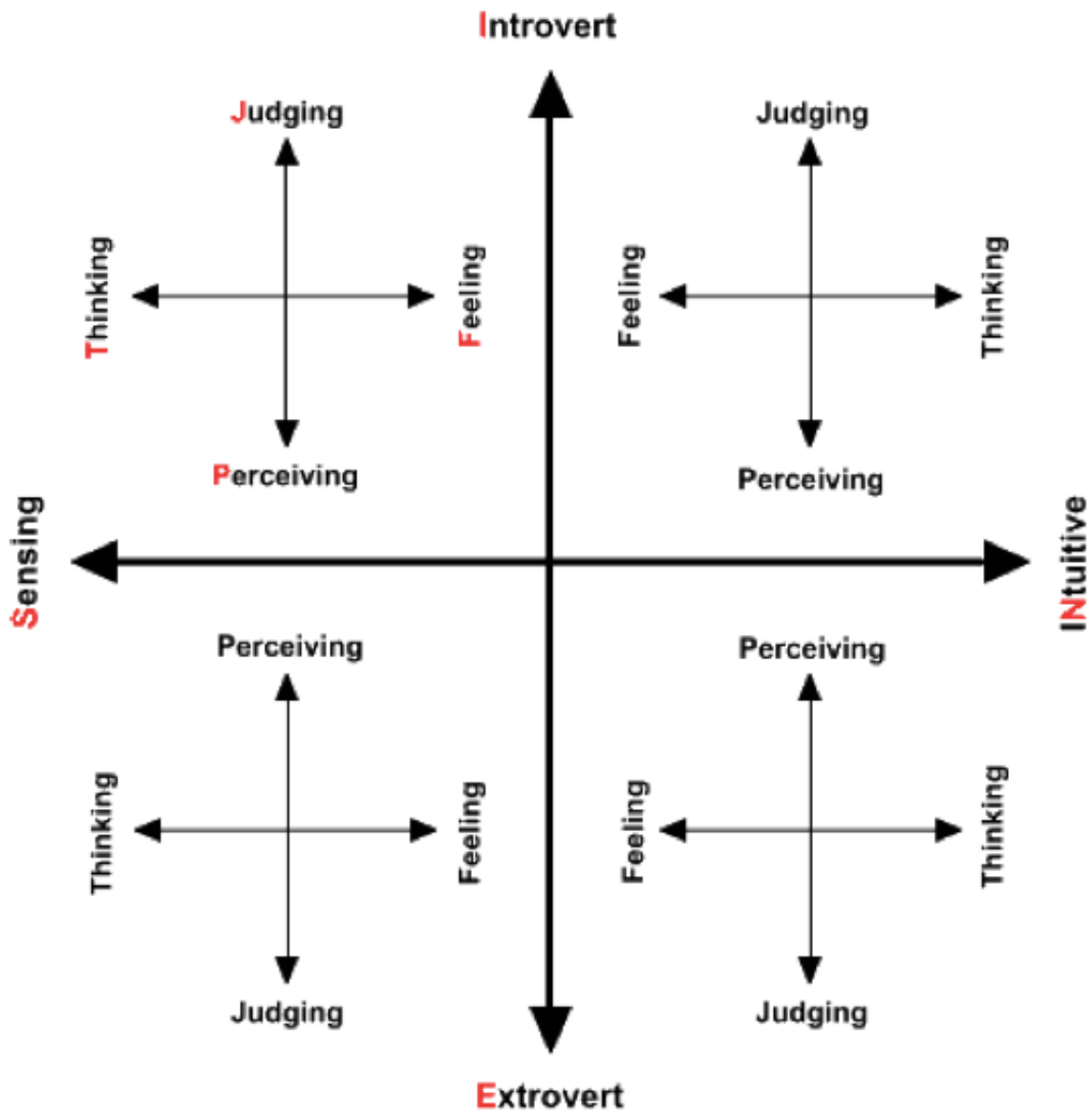


Figure 2.17
 Mayers Briggs personality types (Fajta, 2015)

Pittenger (1993) states that the first dimension, Extroversion (E) vs Introversion (I) reflects the perceptual orientation of the individual, Extroverts are said to react to immediate and objective conditions in the environment and introverts look inward to their internal and subjective reactions.

Pittenger (1993) further states that the next dimensions are Sensing (S) vs. Intuition (N). Those with a sensing preference rely on that which can be perceived and are considered to be oriented towards things that are real. People with an intuitive preference rely more on their nonobjective and unconscious perceptual processes. Thinking (T) vs. Feeling (F) is a preference for thinking indicates the use of logic and rational processes to make deductions and decide upon action. Feeling represents a preference to make decisions that are based on subjective processes that include emotional reactions to events (Pittenger, 1993).

The fourth dimension in MBTI is Judgement (J) vs. Perception (P). According to Pittenger (1993) judgement-perception preferences were invented by Briggs and Myers to indicate if rational or irrational judgements are dominant when a person is interacting with the environment. The judgmental person according to Pittenger (1993) uses a combination of thinking and feeling when making a decision, whereas the perception person uses the sensing and intuition processes

The usage of MBTI is quite wide spread, Pittenger (1993) mentions about how millions of copies of the test are administered in diverse places like schools, universities, community groups, organizations of all scales, management workshops and counselling centers. Subjects who have even a basic understanding of psychometric test would be aware of the MBTI instrument as it is introduced into the life at early stages (Pittenger, 1993)

There can be 16 different possibilities for a subject because of four sets of dimensions. The various possibilities are INTJ, INTP, ENTJ, ENTP, INFJ, INFP, ENFJ, ENFP, ISTJ, ISFJ, ESTJ, ESFJ, ISTP, ISFP, ESTP, ESFP. Each of these have their own characteristics (Simkus, 2024)



Figure 2.18
 Mayers Briggs personality types (Simkus, 2024)

Pittenger (1993) has validated the assessment from a statistical structure, reliability and validity standpoint and argues there are many limitations of the study:

Relation between MBTI type and Occupation cannot be established: According to Pittenger (1993), there is no evidence to show positive relation between MBTI type and success within an occupation. Pittenger (1993) argues to say that there is nothing to show that a person who is Extroverted, Sensing, Feeling and Perception (ESFP) is a better or worse salesperson than someone who is Introverted, Intuition, Thinking and Judging (INTJ).

The stereotyping of people neatly into 16 boxes prevents including unique characteristics of the subject thereby losing out on broader perspective (Pittenger, 1993)

Fajta (2015) mentions that the application of MBTI has to be done with care as the use can be harmful if not used correctly. When used incorrectly, it can lead to discrimination and poor counselling and organizations may end up hiring or firing people by personality type, as MBTI is not reliable at identifying a type permanent. Also similar to other researchers, they also mention about non-reliability of test-retests where even after few weeks, around 50% may end up being classified into a different type of persona.

Therefore, from above observations, it can be assumed that MBTI may not be a reliable tool for higher order epistemic cognition.

2.5.5 CliftonStrengths tool

In mid 20th century Donald Clifton, a World War II veteran posed a very significant question – ‘What will happen when we look at what is right with people rather than fixating what is wrong’. This profound question led to what can be called evolution of Strengths based psychology (Buckingham and Clifton, 2001)

The natural patterns of thinking, feeling and behaving styles are called ‘Talent’ and can be categorized into ‘34 CliftonStrengths themes’. Research says that significant amount of investment on these natural talents is required for it to emerge as a Strength - A Strength can be defined as ‘consistent near-perfect performance in any activity’. (Buckingham and Clifton, 2001). For this research Donald Clifton was honored by American Psychologist Association’ as Father of Strengths-Based Psychology and grandfather of positive psychology (Rath, 2007).

Strengths movement started almost six decades ago with a simple question posed by Donald Clifton. His question was “What would happen if we studied what was right with people rather than what’s wrong with people” (Buckingham and Clifton, 2001)

Donald Clifton was a veteran who served during World War II as a navigator. He received Distinguished Flying Cross medal for his service during the War. However, he realized that he had seen much of the war and suffering and wanted to do something good for humankind. His simple quest to understand what's right with people led to the massive launch of Strengths psychology which became a Strengths movement. For his stellar service to this field, Donald Clifton was honored by American Psychologist Association' as Father of Strengths-Based Psychology and grandfather of positive psychology (Rath, 2007).

CliftonStrengths tool is an online assessment that has around 177 questions that takes 30 to 40 minutes to complete, the assessment helps to (Buckingham and Clifton, 2001; Rath, 2007):

- Discover what individuals naturally do best
- One can learn how to develop greatest talents into Strengths
- Use personalized results and reports to maximize potential

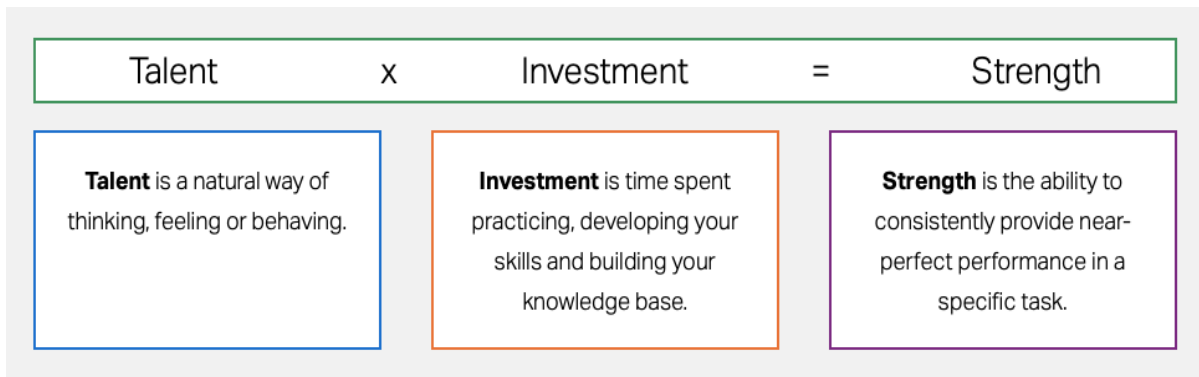
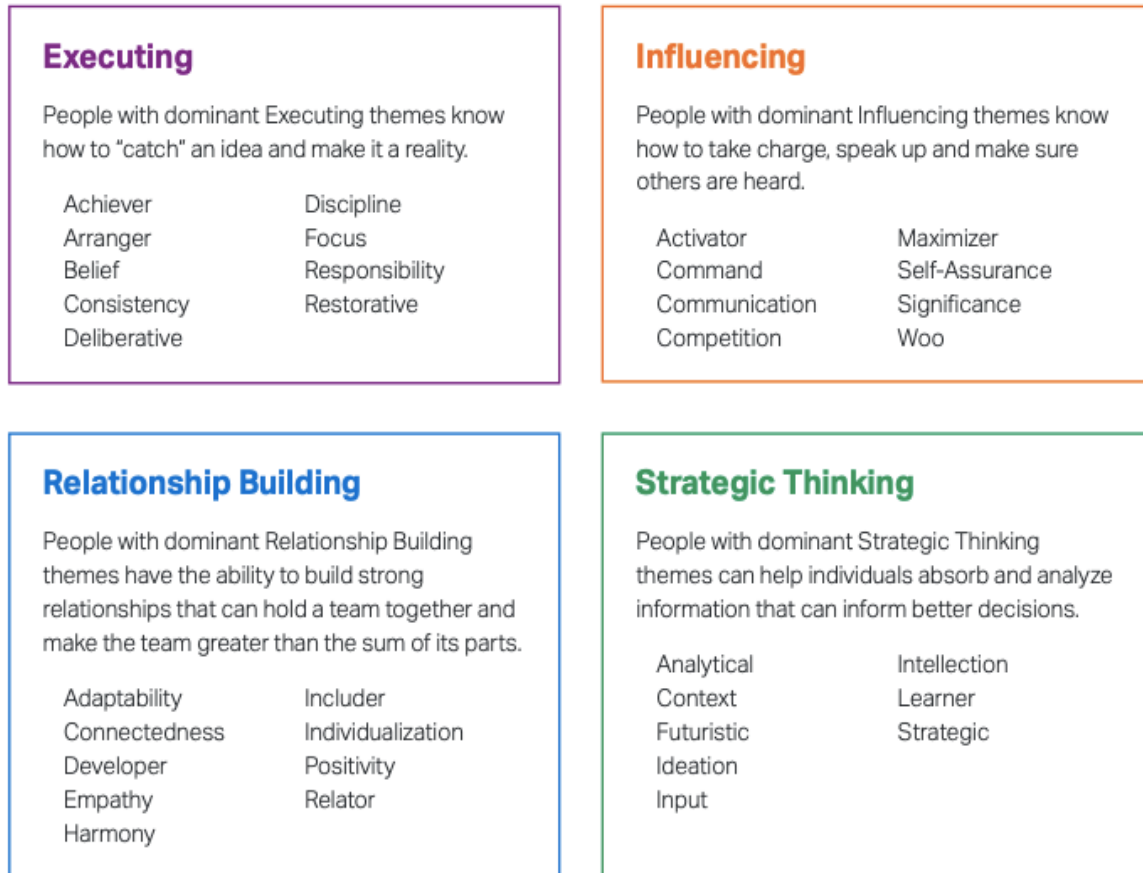


Figure 2.19
Definitions CliftonStrengths (Buckingham and Clifton, 2001; Rath, 2007)

At the end of the assessment, there are set of 34 CliftonStrengths that emerge, these CliftonStrengths are very unique for every individual. These 34 CliftonStrengths are bucketed into four domains – Executing, Influencing, Relationship Building and Strategic Thinking (Buckingham and Clifton, 2001; Rath, 2007)

The four domains – Executing, Influencing, Relationship Building, Strategic Thinking



*Figure 2.20
Domains and CliftonStrengths (Buckingham and Clifton, 2001)*

Executing Domain of CliftonStrengths: Individuals with dominant Executing Themes know how to catch an idea and make it a reality, Gallup Research says that high performing teams rely on individuals with high Execution themes because they make things happen. Individuals with dominant Executing themes work tirelessly to achieve the goals (Buckingham and Clifton, 2001; Rath, 2007). Achiever, which is one of the themes in this domain would look like this - People exceptionally talented in Achiever theme have a constant need for achievement, they feel that every day starts at zero and at the end of the day, there is a need to achieve something tangible in order to feel good about themselves. Every day would include all weekends, weekdays and even vacation days. Focus is another theme in the Executing theme

and is slightly a rare theme across the world (Buckingham and Clifton, 2001). Those with Focus set goals which serve as the compass, and this determines the priorities and corrections necessary to be made in order to stay the course. Other themes in this domain are Arranger, Belief, Consistency, Deliberative, Discipline, Responsibility, Restorative are other themes in Executing domain

Influencing Domain of CliftonStrengths: Individuals who have dominant Influencing themes are able to speak up, take charge and make others are heard (Buckingham and Clifton, 2001; Rath, 2007). Those who have dominant Activator theme in Influencing Domain may look like this: Those individuals have a strong bias for action and are always eager to get started, they may be constantly asking the question ‘When can we start?’ (Buckingham and Clifton, 2001; Rath, 2007). Command is another theme that is in Influencing Domain and is one of the rarer themes across the world, individuals who are exceptionally talented in Command look like this (Buckingham and Clifton, 2001) – they love to take charge and can impose their views on others, similarly they are unfazed by confrontation and know that confrontation is the first step towards resolution. Those with Command are able to draw people to them as they have presence and have command. The other themes in Influencing domain are Competition, Communication, Maximiser, Self-Assurance, Significance and Woo.

Relationship Building Domain of CliftonStrengths: Individuals with strong Relationship Building themes have the ability to build strong relationships that can hold team together and nurture strong relationships and high performing teams rely on people with strong Relationship Building themes to bring individuals together and make the team greater than the sum of the parts (Buckingham and Clifton, 2001). Adaptability is one of the themes in this domain and those talented in this theme prefer to go with the flow and they are in the moment. Those with Adaptability tend to be very flexible at heart even when demands of work are pulling them in different directions. Empathy is another theme in this domain, someone

exceptionally talented with Empathy can feel what others are feeling as though others' feelings is their own. They can see the world through their own eyes and share the perspective. They innately can find the right words and right tone as situation demands as these individuals can anticipate the need well (Buckingham and Clifton, 2001; Rath, 2007). Other themes in this domain are Connectedness, Developer, Harmony, Includer, Individualization, Positivity, Relator.

Those with Strategic Thinking dominance usually help absorb and analyze information that can lead to better outcomes. An individual with a dominant Analytical theme would look like this – they always look for reasons and effect and they have the ability to think about all of the factors that may affect a situation (Buckingham and Clifton, 2001) Learner is another theme in Strategic Thinking and it is one of the common themes in the world – those with high Learner will love to learn, the process more than the content or result will be exciting for those who are exceptionally talented in Learner theme. Other themes in this domain are Context, Futuristic, Ideation, Input, Intellection, Strategic.

While each CliftonStrengths are unique, it is also possible to form few talent groupings also called packages and these show how certain themes work together (Nelson, 2022).

- Anticipation and imagination: Those who can naturally imagine possibilities, foresee challenges and anticipate what lies ahead, themes that can be packaged in this are - Deliberative, Futuristic, Ideation, Strategic (Nelson, 2022).
- Detail oriented: Subjects who value attention to detail and precision, following themes could be packaged together - Analytical, Discipline, Individualization (Nelson, 2022).
- Perspective: Global perspectives, future focused, introspection and focusing on individuals could have the following themes packaged together - Connectedness, Context, Futuristic, Individualization, Intellection (Nelson, 2022).

- Social: Subjects who possess high levels of multiple ‘social’ themes that make them more accepting, dependable, relatable – Communication, Includer, Individualization, Relator, Responsibility, Woo (Nelson, 2022).
- Speed: Some CliftonStrengths are grouped together because of their emphasis on efficiency, these themes go together for fast paced people who naturally work quickly – Achiever, Activator, Adaptability, Learner (Nelson, 2022)

The research does not say that subjects have to ignore their weakness. It is about maximizing the potential and keeping the weakness in mind and continuously applying the strengths, there is possibility to be a leader in anything the subject does (Buckingham and Clifton, 2001).

Extensive research around CliftonStrengths over the last 60+ years mention that the combination of talents is so unique that the chance that the same top five CliftonStrengths themes in same order for two people is one in 33 million. Asplund (2021) states that from 34 CliftonStrengths, any of them could be No. 1 theme and removing one theme, 33 CliftonStrengths that are possible for second theme and 32 as possibilities for the third one and so on. A probability equation shows $34 \times 33 \times 32 \times 31 \times 30$ which comes to 33,390,720 which means there is a one in 33,390,720 likelihood of having a CliftonStrengths ‘identical twin’, that is how unique each individual is. Since some themes are more common than others, the chances of having an identical twin in top five is much higher or lower than 1 in 33 million (Asplund, 2021).

According to their research, that is how unique humans are and that is how complex the brain function is. The years of research also has proven that those who apply CliftonStrengths (Asplund, 2021)

- are more energetic, well-rested and happy
- are more likely to achieve their goals

- have higher confidence and self-awareness
- are more engaged and productive at work
- are less likely to experience negative emotions like worry, sadness and stress

Further, Gallup's CliftonStrengths meta-analyses (statistical integrations of data from multiple studies) around relationship between Strengths-Based Employee Development and Organization Outcomes also show that strengths benefits team and organizational outcomes, Strengths-based development leads to (Asplund *et al.*, 2016):

- Customer Engagement: 3.4–6.9% increase
- Employee Engagement: 9.0–15.0% increase
- Profit: 14.4–29.4% increase
- Safety Incidents: 22.0–59.0% decrease
- Sales: 10.3–19.3% increase
- Low Turnover Orgs: 5.8–16.1 pts decrease in turnover
- High Turnover Orgs: 26.0–71.8 pts decrease in turnover

According to Asplund and Hickman (2021), 25 million assessments have been completed as of date, upon analyzing these 25 million assessments some key take aways that emerge are as follows:

- Race, Nationality and Gender have no bearing on an individual's Strengths. This goes to prove that every individual is unique which proved Dr. Donald Clifton's original insight (Asplund and Hickman, 2021)
- There is an impact of Strength on not only individual's performance but also on team performance especially when they are coached (Asplund and Hickman, 2021)
- Empirical research suggests that strengths-based developmental interventions have a positive impact on positive psychological and positive organizational behavioural constructs like hope (Snyder et al., 1991, cited in Hodges and Clifton, 2004), well-being

(Diener, 1984, cited in Hodges and Clifton, 2004) and confidence (Bandura, 1982, cited in Hodges and Clifton, 2004)

In the Research paper published by Gallup researchers (Hodges and Clifton, 2004, pp. 9-11) studied the impact of CliftonStrengths awareness on participant behaviors. There was strong agreement to following statements – (a) ‘Learning about CliftonStrengths has increased my self-confidence’ (63% Agree/Strongly Agree), (b) ‘Focusing on CliftonStrengths has helped me to be more productive’ (60% Agree/Strongly agree). In this research, Gallup has mentioned that the participants took part in a very minimal strengths-based developmental intervention (Hodges and Clifton, 2004).

Among more intensive interventions, including classroom instruction and individual coaching with a trained consultant, initial research indicated a higher magnitude of positive results on survey items. Gallup researchers note further research is needed – especially to probe on ‘Impact of CliftonStrengths on specific behaviors like self-confidence / resiliency etc. (Hodges and Clifton, 2004).

Research shows that Signature CliftonStrengths that is the top CliftonStrengths may not necessarily help an individual choose the field or the domain that they need to work in, for instance they will not help an individual choose between being a retailer, a lawyer or even a carpenter, what they can help one do is to make the most of whatever field they choose (Buckingham and Clifton, 2001).

However, CliftonStrengths may have a little more to offer on the ‘role’ one can choose, in their research over several decades that people who excel in the same role possess some similar themes (Buckingham and Clifton, 2001).

Some of the journalists they interviewed found that the theme Adaptability was in the top as their job would involve them to handle very different subject, tone and location every single moment (Buckingham and Clifton, 2001). Similarly many of the doctors they

interviewed had top theme of ‘Restorative’ as they were faced with patients in need of help every single day. However, it is not a simple one to one mapping. The combination of themes is important. They emphasize that they do not support the assertion that one can play any role one sets their mind to but do emphasize on the point that whatever one sets their mind to, they will be most successful when they craft their role to play to their Signature talents most of the time.

While there is a lot of merit in understanding and imbibing the CliftonStrengths research, one should also keep in mind the following aspects:

- Research says that every talent or Strength that we possess also has a barrier to it (Rath, 2007). For instance, take the example of someone who has high Analytical theme, their nature is to understand the why, what and how of every proposal and would focus on getting to the root causes. However, they should also realize and know the barriers that come with Analytical and know when and how much they should leverage this strength. If not balanced well, a Strength may become a weakness
- It is important that one understands the team dynamics and how our CliftonStrengths would play out in a team context. Especially while dealing with others who have similar, contradictory or complementary CliftonStrengths, one should have Metacognitive awareness and learn to leverage the goodness of everyone and not be biased only by their own CliftonStrengths (Buckingham and Clifton, 2001). This is also the intersection between CliftonStrengths, Metacognition and Diversity and Inclusion where it is proven that cognitively diverse teams are more productive and successful as seen in earlier chapters (Juliet Bourke and Dillon, 2018)
- Also, for the benefit of individuals and organizations, one should not stop with merely doing the CliftonStrengths assessment and knowing our CliftonStrengths, that would merely take us to the first level of Metacognition. We should effectively conceive

strategies using the “Name It-Claim It-Aim It” model recommended by Gallup Organization (Hodges and Clifton, 2004) to take Metacognition continuum to Epistemic Cognition. However, many organizations mostly stop with the first level and seldom have the appetite to go to subsequent tiers.

2.5.6 Comparison of CliftonStrengths and DiSC and MBTI

Comparison of CliftonStrengths with DiSC assessments: Research by Gallup Organization (Hickman and Claire Evans, 2018) states that while DiSC is based on Marston’s Four Dimensions of Behavior, CliftonStrengths is based on 34 personality themes. Hickman and Claire Evans (2018) further mention that behavior defines how someone acts and therefore could be situational whereas CliftonStrengths does not measure a state but rather measures a person’s traits. Hickman and Claire Evans (2018) also reiterate that CliftonStrengths provides actionable insights and advise on how to turn a talent into a Strength, whereas DiSC result may provide broad awareness of behavior style.

Research from Gallup Organization, compares CliftonStrengths to MBTI (Myers-Briggs Type Indicator), Hickman (2017) mention that MBTI provides broad awareness and not detailed descriptors like CliftonStrengths and that CliftonStrengths assessments not only provide context for performance development but also builds a common language within an organization, deepening the essence of positive psychology. Hickman (2017) in their research report provide an analogy that MBTI can be seen as a ZIP code whereas CliftonStrengths puts the subject right in front of the door which means its more precise.

Of all the available psychometrics, for the purpose of this study, the plan is to deep dive and analyse how CliftonStrengths can help in improving Metacognition to Epistemic Cognition. This is because CliftonStrengths creates a common language and is steeped in decades of research. In addition, this also espouses positive psychology by studying what’s right with people. However it will be worthwhile to introspect if a psychometric study alone

will provide the magic formula to move Metacognition to Epistemic Cognition or if it would be better to consider a holistic approach due to the nuances and complexity associated with the topic.

2.5.7 Key takeaways from psychometric tests

It is important to move the awareness of Metacognition to Epistemic Cognition and this requires robust and structured strategies. Measurement through psychometric assessment is a good starting point towards increasing Metacognition awareness and formulate strategies to move to Epistemic cognition

Psychometric assessments have been there for a long time and have had an evolutionary journey. There have been instances of very interesting ways of assessing human brain through diverse psychometric tests, some of them long retired and some of them continuing even now. Organizations use psychometric tests for a variety of purposes, like providing coaching, assessing training needs, during OD interventions at a group level.

Psychometric tests provide huge potential as they are a good measure of someone's real ability or personality and they can be good starting point for discussion (Passmore, 2012). Another potential is that it helps individuals learn to take roles suited to their strengths (Passmore, 2012)

There are many tools in the market like DiSC, MBTI, CliftonStrengths SHL, Hogan HPI, Saville Consulting Wave, Mental Toughness Questionnaire etc. Each study has its own history, advantages and limitations. It is beyond the scope of this study to deep dive into every psychometric test that exist in the market. For the purpose of literature review, three psychometric tests were deep dived: DiSC, MBTI and CliftonStrengths.

DiSC originated with American psychologist William Moulton Marston and DiSC has four dimensions of behaviour – Dominance, Influence, Steadiness, Conscientious (Hickman and Claire Evans, 2018). Behaviour defines how someone acts which can be more situational.

Elements that are important in psychometric assessments like values cannot be ascertained by DiSC profile alone (Prochaska, Sampayo and Brent Carter, 2015). This assessment by itself may not be self-sufficient to ascertain multiple dimensions and would give only high-level insights to the subject going through the assessment.

MBTI or Mayers-Briggs Type Indicator, measure and types individuals into 16 personality types measured by distinct polarities of preference: Introversion or Extroversion, Sensing or Intuition, Feeling or Thinking, Judging or Perceiving (Hickman, 2017). While ‘Sensing or Intuition’ depicts how naturally individuals prefer to take in information and Thinking or Feeling indicates the basis on which they evaluate that information (Hickman, 2017). According to (Hickman, 2017) ‘Introversion or Extroversion’ and ‘Judging or Perceiving’ are considered “orientations” that determine how individual exhibits psychological functions. While compared to CliftonStrengths, it is understood that CliftonStrengths reveals a more precise approach to one’s uniqueness (Hickman, 2017). In addition, Hickman (2017) mentions that while Myers-Briggs provides a broader awareness but does not provide the detailed descriptors that CliftonStrengths does.

Overall taking all aspects into consideration, from the Literature review and study of the three psychometrics, CliftonStrengths seems to provide more context to performance development making it a good tool for individuals on the journey from Metacognition to Epistemic Cognition. In addition, CliftonStrengths also helps build a common language within an organization to shed light on essence of positive psychology by way of studying what is right with people (Hickman, 2017).

2.6 Summary of Literature Review

From Literature review, it is understood that we need to create Metacognitive awareness and devise strategies among adults who are working in organizations so that it benefits them at individual level and at a team level, thereby bringing immense benefits.

2.6.1 Summary of Literature Review of Business Need (The Why)

- The future as we know is here and is changing rapidly - the world is currently experiencing the fourth industrial revolution era because of rapid evolution of technological changes made possible by quantum computing. It is even said that due to focus on Sustainability, the world may actually be witnessing the fifth Industrial Revolution era.
- While Generative AI is the latest buzzword, many other revolutionary concepts like Internet of Things, 3D printing, Generative AI, blockchain, AR/VR did not exist few years ago are currently fuelling the fourth Industrial Revolution, these may get replaced by other teams in near future due to rapid technological advancement that has increased in pace and intensity. More newer roles that did not exist in the past are getting created and some are getting obliterated due to rapid advancement on multiple fronts (Manyika et al., 2017, cited in Rajagopal and Provodnikova, 2023).
- Cognition is one of the four elements that helps build Thrive Mindset and Heartset and includes elements like understanding one's own strengths, working on it to hone the same (Rajagopal and Provodnikova, 2023). Therefore increasing Metacognition awareness and strategies helps build Thrive Mindset and Heartset that helps us to future proof ourselves.
- Diversity and Inclusion are evolving topics that have a bearing on future of work and there are many dimensions of diversity both visible and invisible (Korn Ferry, 2021). Most of the focus on obvious dimensions like gender, race, generational, race/ethnicity.

Invisible dimensions of diversity like personality types, learning styles, introversion, extroversion are seldom considered while formulating strategies.

- Intersectionality is a new concept which talks about how multiple aspects of diversity are rolled into an individual, one cannot consider oneself as being uni dimensional as human beings are infinitely more complex than that (Crenshaw et al., 2013 cited in Rajagopal and Provodnikova, 2022). Concept of Intersectionality has huge impact on micro and macro inequities on individual and organizational level and subsequently impact the economy of the country as well
- Even if we transcend from the awareness of dimensions stage, many times individuals are not self aware of their invisible dimensions – like their value systems or belief systems or their personality styles, thinking or behaving styles etc. This could limit the ability of organizations to factor in multiple dimensions or the intersectional aspects if the individual themselves are not aware of this.
- Metacognition that is diversity of thought, personality and behavioural styles are critical aspects to be considered for thriving in the future and there is a critical business need for us to be deeply aware of Metacognition and it is important to create Metacognitive strategies.

2.6.2 Summary of Literature Review of Metacognition (the What)

Defining what Metacognition is, by itself could be a starting point as there is no common agreement on what this could mean. Literature on research around Metacognition among children and students specifically pertaining to field of education is available. However, there is not much literature around metacognition research around adults and in a corporate environment, this seems to be a huge opportunity area.

One also understands that creating mere Metacognitive awareness is not enough, it is required to have concrete strategies that will help in enhancing metacognition. Meta

metacognition is called Epistemic cognition. The route from metacognition to meta metacognition or Epistemic cognition is to be chalked out through specific intentional strategies.

Neuroscience and neuropsychology connect Metacognition to executive functions in research done in early 2000s (Fernandez-Duque et al., 2000, cited in Efklides, 2008) and pre-frontal brain areas (Shimamura, 2000,cited in Efklides, 2008)

Pre-frontal cortex plays a vital role in the thinking about thinking. Pre-frontal cortex can be thought of as ‘personality center’, however role of PFC in our lives is not fully understood and there is a lot of research going on in the field of Neuroscience (William R and Bruce W, 2023)

Through augmented research and passing time, one will be able to better understand, appreciate and control the pre-frontal cortex so that it will help us better understand Metacognition and help devise better and sharper strategies.

2.6.3 Summary of Literature Review of Psychometric assessments (the ‘How)

Transcending from Metacognition awareness to Epistemic Cognition stage requires robust and structured strategies. Measurement through psychometric assessment is a good starting point towards increasing Metacognition awareness and formulate strategies to move to Epistemic cognition.

Psychometric assessments have been there for a long time and have had an evolutionary journey. Organizations have used psychometric tests for a variety of purposes, like providing coaching, assessing training needs, during OD interventions at a group level among many others. There are many others in the market like DiSC, MBTI, CliftonStrengths, SHL, Hogan HPI, Saville Consulting Wave, Mental Toughness Questionnaire etc. Each of these are steeped in their own history, advantages and limitations.

Literature review of this study focused on three psychometric tests – DiSC, MBTI and CliftonStrengths. Upon review of these three tests, it was found that CliftonStrengths provided more context to performance development making it a good tool for individuals on the journey from Metacognition to Epistemic Cognition. In addition, CliftonStrengths also helps build a common language within an organization to shed light on essence of positive psychology by way of studying what is right with people (Hickman, 2017)

2.7 In Conclusion

To summarise the multitude of takeaways from the Literature Review, following can be inferred:

- Cognition or understanding of one's self is critical component required to thrive in future of work which is going to be more complex, volatile and ambiguous.
- Inclusion should include invisible aspects of diversity as well like Cognitive Diversity or different thinking styles. Intersectionality is a new concept in D and I which talks about multiple aspects being rolled into one. Therefore understanding of one's thinking, learning and personality styles are very important to further Inclusion in unit, organization or even at a country level
- Metacognition as a concept has existed for almost half a century, however most of the studies have revolved around its impact on children and that too impact on learning. Not much literature or studies exist among adult stage. Study on Metacognitive awareness are extremely limited among adults and its impact on individuals, units and organizations is not well known.
- Understanding Metacognition is the first step and creating robust Metacognitive strategies is the next step. One way to do this is through psychometric assessments
- There are many psychometric assessments available in the market, however upon deep diving of literature on three assessments – DiSC, MBTI and CliftonStrengths revealed

that CliftonStrengths creates a better performance context which would be ideal to create Metacognitive Strategies.

- Tools and techniques like CliftonStrengths can be a very powerful craft towards creating Metacognition awareness and can be instrumental in proposing strategies. The assessment itself is the beginning of the long journey and not the end destination itself and the unearthing of reports from assessments needs to be deep and not superficial. Also, it is to be combined with multiple other factors as human brain functions at a very complex level.

Therefore, following research questions are raised:

- What does Metacognition mean, specifically from thinking, specifically decision making and learning style point of view
- How can we transcend from a state of Metacognition to Epistemic Cognition in order to unlock potential through lens of Strengths psychology. What are the specific tools and techniques that one can use to improve Metacognition in day-to-day life
- How can we explore future potential of metacognitive awareness and extend to understand cognitive biases and the impact of working in a team construct

While one looks at the above questions, it feels like a very tall ask that requires us to go into the brain of the subjects or perform qEEG or fMRI all the time which is humanly impossible as lab conditions cannot be simulated all the time and it's not practical or feasible

However, fortunately this can be circumvented by developing an innovative Research Methodology that helps study the emotions, feelings and thinking behind the actions of subjects in various situations. This would mean going beyond the traditional methods of Research Methodology into concepts that may not be used traditionally.

While crafting the Research Methodology, it is critical to keep the following aspects in mind:

- Create a methodology that enables researchers to capture the essence of human experience and studies it from various angles – not only the outcome but the feelings and emotions associated with it
- Study should focus on understanding the why and how of human behaviour in situations in a scientific method which may be non-quantitative.
- Attempts to understand the subjects' personal knowledge and emphasizes the importance of personal perspective and interpretation
- It is imperative that the study looks at a whole new methodology that factors in the above aspects in order to answer the research questions put forth in earlier chapters.

CHAPTER III: METHODOLOGY

3.1 Overview of the Research Problem

Based on the gaps and opportunities enumerated earlier, this research will strive to create awareness of concepts like Metacognition, Epistemic cognition in corporate environment and create simple framework that can be used to create Metacognitive strategies through the lens of Strengths philosophy.

3.2 Research Purpose and Questions

Metacognition is not a new concept; it has been in existence for almost half a century. However, there are huge opportunity areas in this field as current research mostly touches specific cohorts like children and that too in the domain of education.

This research would focus on establishing the fact that Metacognition can unlock hidden potential of adults and set them up for success in organizations. This is not a nice to have but a need in the current VUCA (Volatility, Uncertainty, Complexity and Ambiguity) world, in our endeavor to push the boundaries of human mind, it is critical and vital that we understand the thinking about thinking, else everything else will be superficial.

It is not enough to just understand Metacognition as a concept, but there has to be intentionality, materiality to move Metacognition to Epistemic Cognition. This study strives to provide a framework or an approach for the transition. While this is being embarked on, understanding of tools available already like CliftonStrengths assessment is beneficial and creating strategies through the lens of Strengths psychology in addition to other elements is researched and proposed here.

In addition, understanding of future possibilities of Metacognition in terms of how it applies in team construct etc. can be embarked upon.

The study strives to find answers to the following Research Questions:

- Question 1: What does Metacognition mean, specifically from thinking, learning and decision-making style point of view
- Question 2: How can we transcend from a state of Metacognition to meta-metacognition or Epistemic Cognition. How do we create a framework or structured approach so as to improve Metacognition in their day-to-day life
- Question 3: How can we explore future potential of metacognitive awareness and extend to understand cognitive biases and the impact of working in a team construct

3.3 Research Design

This section strives to outline the various layers of Research Design. According to Saunders, Lewis and Thornhill (2019), Research methodology also referred as Research Onion has following components:

- Research Philosophy and Research paradigm
- Research Approach
- Research Choice
- Research Strategy
- Approach to Data collection
- Data analysis and Data visualization

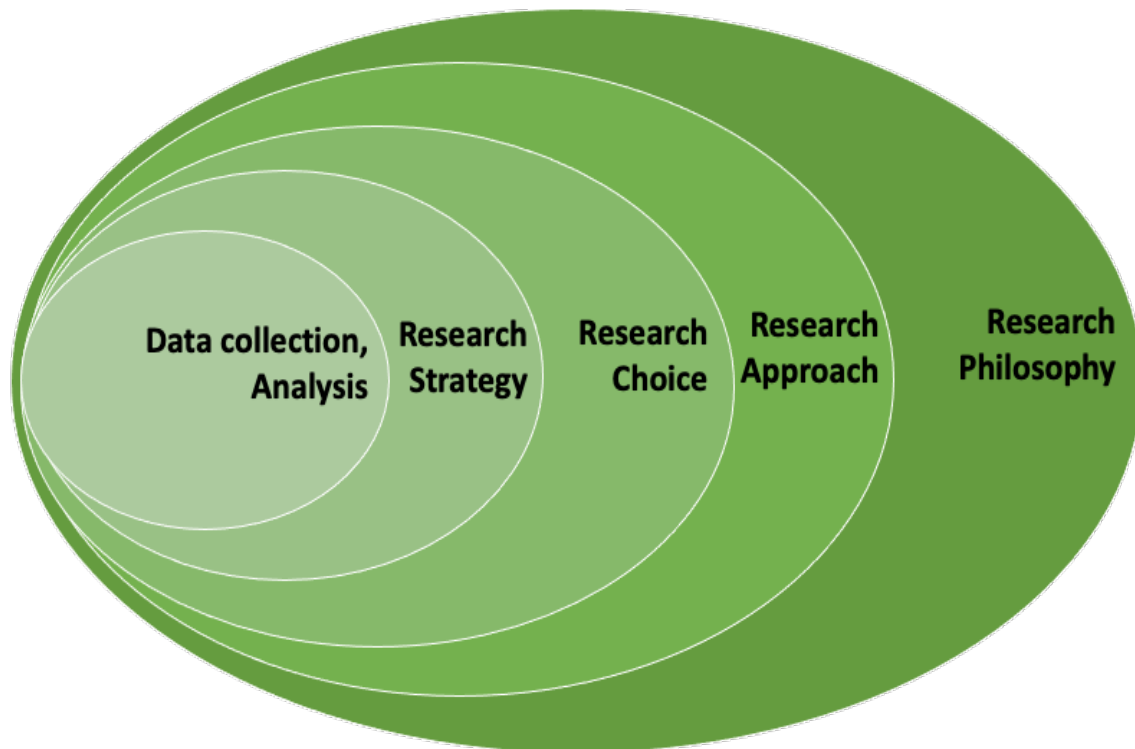


Figure 3.1
The Research Methodology (authors' own representation)

3.3.1 Research Philosophy and Research Paradigm

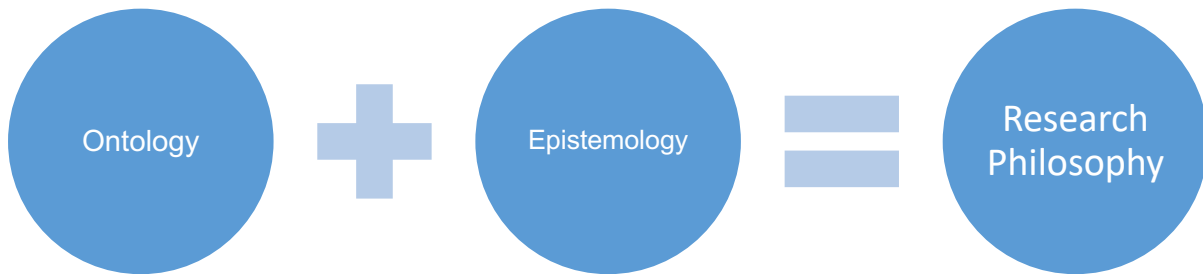
Research Philosophy is shaped by two components Ontology and Epistemology. Ontology answers following questions, 'What is the nature of reality', 'What shapes the reality' and 'What is the relationship between each component'. The three major beliefs of Ontology according to Qureshi (2020) are:

- There is only one reality - Singularity
- There are multiple realities or truths - Depends on how we perceive the truth
- There can be one or many realities or truths

Epistemology shows how we know about reality or truth. It can be defined as 'the view on what constitutes acceptable knowledge' (Wahyuni, 2012). Major beliefs of Epistemology according to Qureshi (2020) are:

- Knowledge can be measured and can be measured using any reliable tools
- Knowledge can be interpreted or explained and cannot be measured

- Knowledge can be measurable, or it can be explained / interpreted



*Figure 3.2
Ontology, Epistemology and Research Philosophy (authors' own representation)*

This research focuses on formulation of Metacognition strategies and how they can be applied to corporate world in order to unlock potential. This would translate to an Ontological belief of 'existence of multiple realities or truths' and epistemological belief of 'knowledge can be interpreted or explained'. The research philosophy this leads to is 'Constructivism'. Constructivism is also called as Interpretivism or Social constructivism. For purpose of this research paper, this is referred to as Constructivism.

In constructivism, it is believed that reality is constructed by social actors and people's perceptions of it. Since this is dependent on human perspectives and experiences that are subjective, social reality may change and can have multiple perspectives (Hennink, Hutter and Bailey, 2011, cited in Wahyuni, 2012). This means that individuals bring in their own backgrounds, assumptions and experiences through social interaction and contribute to shaping of the reality.

Constructivists feel that phenomena must be understood as complex 'wholes' that are bound up with historical, socioeconomic and cultural contexts in which they are embedded and should not be studied in silos (Lodico, Spaulding and Voegtler, 2006). According to Wahyuni (2012), The Research Paradigm of 'Constructivism' has following constructs:

- Ontology (position on nature of reality): Socially constructed and subjective, multiple truths can exist.
- Epistemology (view on what constitutes acceptable knowledge): Subjective meaning and social phenomena, Focus on details of situation, reality behind subjective meanings and motivating actions
- Axiology (Role of researcher and researcher's stance): The researcher is part of what is being researched, cannot be separated and so will be subjective (Saunders, Lewis and Thornhill, 2019; Guba and Lincoln, 2005; Hallebone and Priest, 2009, cited in Wahyuni, 2012)

Research Philosophy and paradigm are center pieces to any research and shape the Research strategy and Research Approach. While there could be many combinations of paradigms, this research broadly follows the paradigm of Constructivism and believes that there are multiple truths, knowledge can be interpreted or explained and researcher is emic, that is brings in insider perspective (Wahyuni, 2012)

3.3.2 Research Approach:

Research approach that is proposed for this study is through Inductive reasoning. Inductive reasoning also referred as 'bottom-up' approach uses observation to build a picture of the phenomenon being studied (Lodico, Spaulding and Voegtle, 2006). In an Inductive reasoning study, data is collected in the following three steps:

- Systematically observe the phenomena under study
- Look for patterns or themes in observation and
- Develop generalization from analyses of these themes

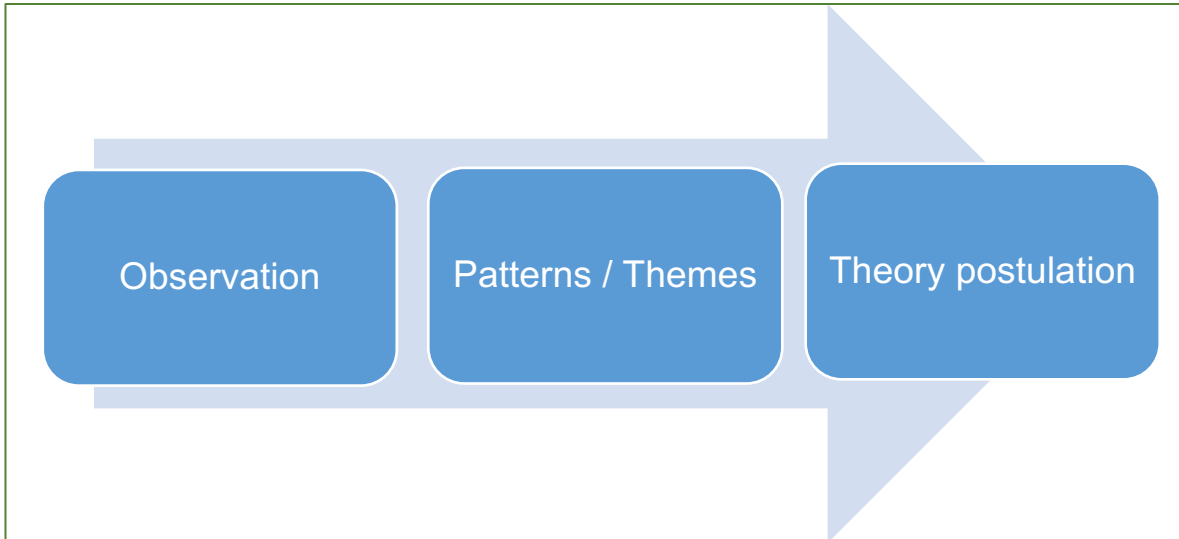


Figure 3.3
Inductive Reasoning (authors' own representation)

Inductive Reasoning is generally associated more with Qualitative research which collects and summarizes data using narrative or verbal methods (Lodico, Spaulding and Voegtle, 2006)

3.3.3 Research Choice and Research Strategy

Choice of Research is Mono method and will be Qualitative research. Qualitative research is the process of acquiring data by studying subjects in their natural habitat. According to Himanshu Vashishtha, (2019) 5 Types of Qualitative Research [Online]. Available at <https://sixthfactor.com/5-types-qualitative-research-methods/> (accessed: 14 April 2023), the focus is on understanding the why and how of human behavior in situations and is defined as a scientific research method to obtain non-numerical data. Some characteristics of Qualitative research:

- Qualitative research is subjective in nature and collects data through observations, interviews and document analyses and summarise the findings primarily through narrative or verbal means (Lodico, Spaulding and Voegtle, 2006)
- Qualitative researchers are interested in understanding the meaning people have constructed, that is, how people make sense of their world (Merriam and Tisdell, 2016)

- Qualitative researchers usually use methods such as participant observation or case studies which result in a narrative, descriptive account of a setting or practice. Sociologists using these methods adopt a form of interpretive sociology (Driscoll and Parkinson, 2002)

The type of Qualitative Research Method used in this study is Phenomenology. Word Phenomenology can be broken into ‘Phainomenon’ which means appearance + ‘logos’ which means reason or study; therefore, Phenomenology is study of phenomenon according to Philo (2018) Husserl's Phenomenology: Method of Philosophizing [Online]. Available at <https://www.youtube.com/watch?v=ePQIagmcCXc> (accessed: 14 April 2023). Some definitions of Phenomenology are given below:

- Study of a Phenomenon can be on anything that exists of which the mind is aware or conscious as per Philo, (2018) Husserl's Phenomenology: Method of Philosophizing [Online]. Available at <https://www.youtube.com/watch?v=ePQIagmcCXc> (accessed: 14 April 2023).
- Phenomenology attempts to capture the ‘essence’ of human experience and is used to study an event or activity as it happens, from various angles (Lodico, Spaulding and Voegtler, 2006).
- Phenomenology is based on a paradigm of personal knowledge and subjectivity and emphasize the importance of personal perspective and interpretation (Lester, 1999)

Philosopher Edmund Husserl who lived between 1859 to 1938 is considered the father of Phenomenology or ‘fountainhead of Phenomenology in twentieth century’ (Vandenberg 1997, cited in Groenewald, 2004). Around the turn of twentieth century, Husserl established Phenomenology as a philosophy to challenge Rene Descartes’ Cartesian philosophy that was more objective and empirical (Barnacle, 2001, cited in Sloan and Bowe, 2014). Husserl strongly believed that people can be certain about how things appear or present themselves and

rejected the belief that objects in external world exist independently and that the information about objects is reliable (Eagleton, 2011; Fouche, 1993, cited in Groenewald, 2004).

Phenomenology can be divided into two types - descriptive or interpretive. Descriptive phenomenology developed by Edmund Husserl is also known as transcendental phenomenology. Post this, Martin Heidegger developed Interpretive phenomenology which is known as 'hermeneutic phenomenology' (Langdrige, 2007; Laverty 2003, cited in Sloan and Bowe, 2014). Hermeneutics is the interpretation of text or language by an observer and can be used as a methodology or as an enhancement of phenomenology (Webb and Pollard, 2006, cited in Sloan and Bowe, 2014). The four steps in Phenomenology are (Greening, 2019):

1. Bracketing: This is the preliminary step and a central element of Phenomenology where the preconceived beliefs and opinions of Phenomenologist concerning the research are identified and isolated. 'Bracketing' is also called as transcendental reduction or phenomenological epoché and the researchers need to be able to approach the study without pre-assumptions or definitions. Researchers need to eliminate any factors which disturb their perceptions or any factor they consider as external factors (Greening, 2019)
2. Intuiting: This is the second step post Bracketing. In this step, researchers are totally immersed in understanding the phenomenon. They avoid criticism, evaluation or opinion on the material submitted by participants. This step stives to provide a shared understanding of a phenomenon on what is being studied (Greening, 2019)
3. Analysing: Analyses is the third step and involves coding and categorizing and making sense of significant meanings of phenomenon. It is important for researchers to persistently work with the data so as to unearth key essence and universal themes (Polkinghorne 1989; Moustakas, 1994 cited in Greening, 2019)

4. Describing: this is the final step and a critical one - researchers strive to comprehend and provide definitions of the phenomenon. The researcher synthesizes all of the statements regarding each participant's experience into one consistent statement that describes and captures the essence of the experience being studied (Giorgi and Giorgi, 2003)

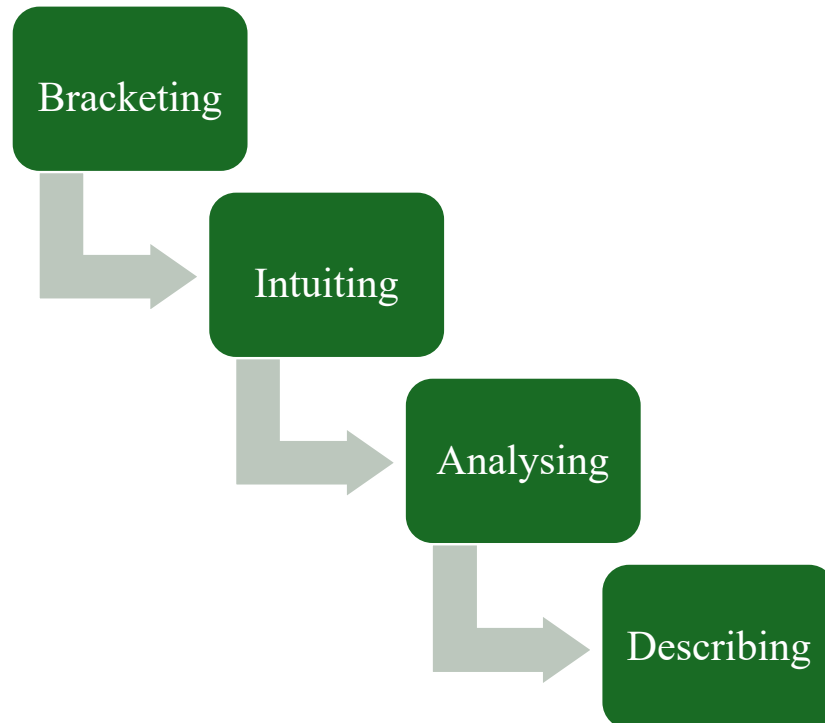


Figure 3.4
Steps in Phenomenology (authors' own representation)

3.3.4 Participant Selection

Participants are middle to senior level respondents in multiple organizations and have gone through the CliftonStrengths assessment earlier in their career. Each respondent has at least 15 years of rich corporate experience and their experience band goes up to around 30 years for some respondents.

All participants have had formal or informal coaching responsibility in their careers and have been conducting coaching sessions for their coachees actively either for their direct or

indirect reportees in the organization. Almost all of the respondents are also certified coaches in one or more psychometric assessments and almost all are certified CliftonStrengths coaches globally.

The industries they represent are very diverse and varied and ranges from IT enabled Services to airline industry to healthcare to Market Research. Similarly their designations and Business Units they are working in, are also so diverse, from Six Sigma Quality to Human Resources to Market Researcher and consultant.

Since Research Strategy is around Phenomenology, participant selection was done carefully so as to ensure there was maturity in the perspectives received and the ability to articulate the experience they have gone through.

Also there was sufficient trust built into the process to ensure there was high candor in the responses. This is important as the respondents had to share their feelings, emotions and what they go through during their thinking process and not merely give responses. The coaches brought in some element of vulnerability in the responses given the nature of questions and hence this made the discussions more authentic.

3.3.5 Instrumentation

Keeping in mind the key principles of the Research Strategy of Phenomenology and maturity of respondents, it was decided to use a semi-structured questionnaire for the study. Upon reviewing the existing literature, there seems to be very little guidance on how actual interviews in phenomenological research is supposed to be done (Bevan, 2014). Some of the salient features highlighted by Bevan (2014) are as follows:

- Questions should be kept broad and open ended so that the subject has sufficient opportunity to express their point of view (Giorgi, 1997, cited in Bevan, 2014)
- Questions should be kept in a manner which reflected a generalist approach (Giorgi, 1997, cited in Bevan, 2014)

- Some practical advice was provided for phenomenological researchers in that the questions be asked in the vocabulary and language of the individual being interviewed and that multiple interviews with same respondent be conducted (Benner, 1994, cited in Bevan, 2014)
- Other advice is that the researcher should listen actively, which should lead to areas for clarification and probing (Benner, 1994, cited in Bevan, 2014)

| Phenomenological Attitude | Researcher Approach | Interview Structure | Method | Example Question |
|-------------------------------------|--|--|--|---|
| Phenomenological Reduction (Epoché) | Acceptance of Natural Attitude of Participants | Contextualization (Eliciting the Lifeworld in Natural Attitude) | Descriptive/Narrative Context Questions | "Tell me about becoming ill," or "Tell me how you came to be at the satellite unit." |
| | Reflexive Critical Dialogue With Self | Apprehending the Phenomenon (Modes of Appearing in Natural Attitude) | Descriptive and Structural Questions of Modes of Appearing | "Tell me about your typical day at the satellite unit," or "Tell me what you do to get ready for dialysis." |
| | Active Listening | Clarifying the Phenomenon (Meaning Through Imaginative Variation) | Imaginative Variation: Varying of Structure Questions | "Describe how the unit experience would change if a doctor was present at all times." |

*Table 3.1
Structure of phenomenological interviewing (Bevan, 2014)*

Therefore, an open-ended semi-structured questionnaire was used so as to provide opportunity to participants to provide their point of view. The questionnaire was only a guide and there were questions to clarify the phenomenon as well as using imaginative variation techniques mentioned above (Bevan, 2014).

3.3.6 Data Collection Procedures

As discussed in earlier chapters, the defining features of Phenomenology are to focus on individual experiences, beliefs and perceptions and to use text as a proxy for human experience (Ryan and Bernard, 2000). A Phenomenologist's role is to 'give voice' to those perspectives (Lodico, Spaulding and Voegtler, 2006)

The questions and observations are aimed at drawing out individual experiences and perceptions and in-depth interviews is an ideal method for collecting phenomenological data (Ryan and Bernard, 2000).

3.3.7 Sample size

Sample size and data collection strategy used in the study is given below:

- In-depth interviews with six middle to senior level leaders in multiple organizations who have embarked on their metacognitive journey.
- In addition, two of these respondents were interviewed from the angle of a Coach as well to get different perspectives and greater insights into their experience coaching others using structured methodology like CliftonStrengths. This different perspective is very critical in understanding not only their own experience going through the journey, but they would also be able to provide the experience of Metacognition in the lens of others which would remove certain biases.

3.3.8 Data Analysis

Data analysis involved thematic analysis of interview transcripts which led to codification and arriving at themes and sub themes of data. Following steps were followed during data analysis (Dudovskiy, 2024):

- Step 1 - Developing codes: the data captured as part of the research was categorised into codes and short meaningful titles. While there are software available to help with codes, manual coding was done during this study. This helped the researcher give correct voice to the respondents' feelings and emotions beyond their thinking and not rely on a software which may have missed nuanced responses.
- Step 2 - Identifying themes: the codified data was identified into common themes and patterns

- Step 3 - Summarizing data: the identified themes were then seen in conjunction with research objectives and final conclusion arrived at.

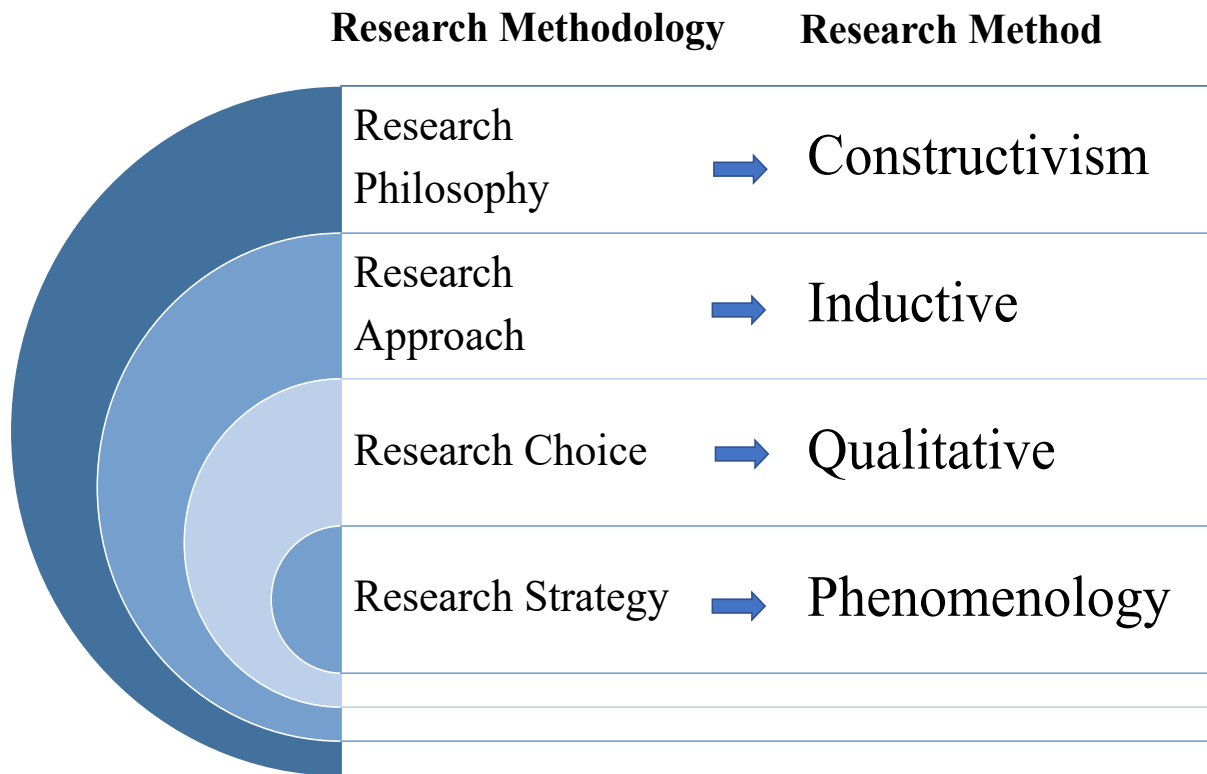
Data visualization in Qualitative studies: There are lots of tools available today as to how data can be visualised in Qualitative studies. However, the difference is in understanding what needs to be conveyed. For instance, if the data portrays comparison, then researchers utilise Wordcloud or heatmap or speedometer, however if we need to represent data on comments or words then icons and quotes or wordcloud can be used (J. Lyons and Evergreen, 2018). Combination of visualization options are to be used in the study to represent the findings in an appropriate manner.

3.4 Research Design Limitations

- Since this is a qualitative study, data is collected only among select respondents and has the limitations that come with such studies.
- Also, a phenomenological approach was used which renders it to more of an in-depth study with select few sample.
- Large scale data collection and analysis is out of scope of this study.

3.5 Conclusion

In summary, the study follows the Research Philosophy of Constructivism, Inductive research approach and the study will be Qualitative in nature. Phenomenology type of Qualitative research was followed.



*Figure 3.5
Research Methodology (authors' own representation)*

CHAPTER IV: RESULTS

The study strives to find answers to the following Research Questions:

- Question 1: What does Metacognition (thinking about thinking) mean, specifically from thinking, learning and decision-making style point of view
- Question 2: How can we transcend from a state of Metacognition to meta-metacognition or Epistemic Cognition. How do we create a framework or structured approach by integrating Strengths philosophy so as to use to improve Metacognition in their day-to-day life
- Question 3: How can we explore future potential of metacognitive awareness and extend to understand cognitive biases and the impact of working in a team construct

The questionnaire was divided into three parts in order to answer the above questions.

First part consisted of Understanding Cognition / Meta cognition and questions around their thinking style – specifically their problem solving and learning style. Since this research focused on phenomenology, questions around emotions and association of their thinking and learning style to physical objects were also asked. This was to ensure that the study focused on phenomenon of thinking and learning styles of which the mind is aware and conscious. So both awareness and consciousness of thinking and learning styles were asked. The questions around emotions and association to a physical object both capture the essence of human experience from various angles

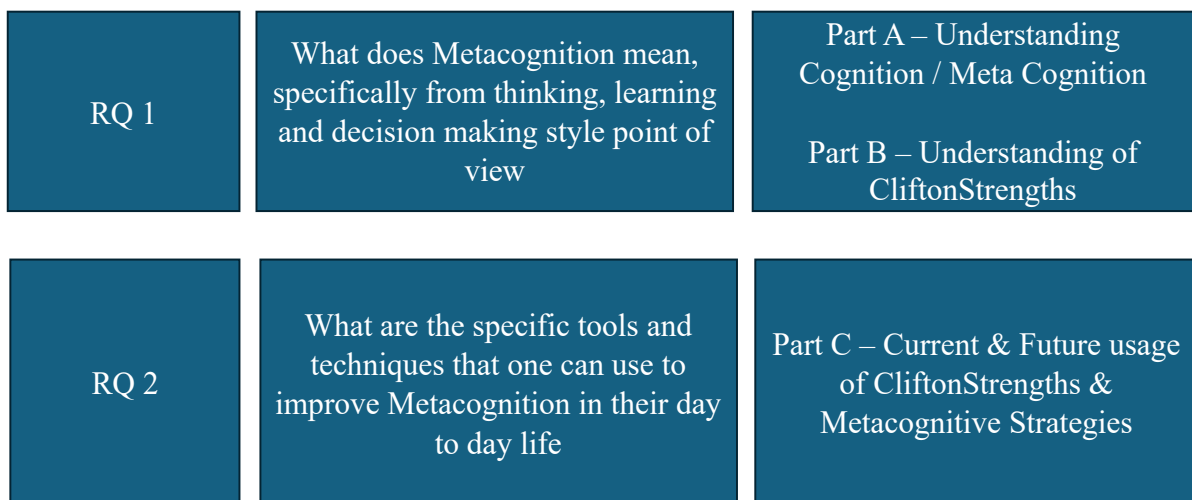
Second part of the questionnaire focused on their understanding of CliftonStrengths assessment report and questions around usage. Specifically questions were asked around what their top CliftonStrengths are, and what emotions they felt when they received their report. There were also questions around the current usage of their CliftonStrengths assessment.

The third part of the questionnaire focused on the Metacognitive Strategies – questions were posed around proposed future usage of CliftonStrengths and if they can suggest any other strategies apart from Strengths philosophy. Third part also focused on some barriers to Metacognition and why it is actually difficult to embrace Metacognition

The first and second parts of questionnaire address the first Research Question in terms of what Metacognition means to participants from thinking, learning, problem solving aspects. The third part of questionnaire focuses on the second Research Question in terms of specific CliftonStrengths usage and tools and techniques that one can use to improve Metacognition in their day to day life

Since there was a careful selection of coaches and Phenomenology technique was used, rich insights emerged from the study

Structure of the Questionnaire



*Figure 4.1
Questionnaire Structure (authors' own representation)*

4.1 Research Question One

While the larger focus of the research is to understand how to create metacognition strategies, the foundation is to check the awareness of the concept of Metacognition. How aware are the participants in terms of their cognition specifically thinking and learning styles.

Questions around their thinking style with respect to problem solving and learning styles were posted to them. As mentioned earlier, Research Strategy of this study is Phenomenology and hence the researcher sought to understand the emotions and feelings behind their thinking as well.

As part of the first question, research sought to understand the phenomenological approach towards problem solving and decision making and learning styles through following aspects:

- Deep understanding of their style of problem solving and decision-making and learning as to understand the consciousness and awareness of the process
- Emotion attached with the above styles
- Association of problem solving and decision making and learning to abstract objects

4.1.1 Understanding of ‘thinking’ style

Upon answering questions pertaining to their problem solving and decision making style, most participants were very aware of the process steps they take while solving a problem or taking a tough decision in their lives

However from the responses, these appeared to be more process driven approach and not really a conscious effort. The participants approached this as a ‘thing to be done’ while speaking about the process and the emotions attached to it. It appeared to be a process deeply entrenched in their brain which is done automatically.

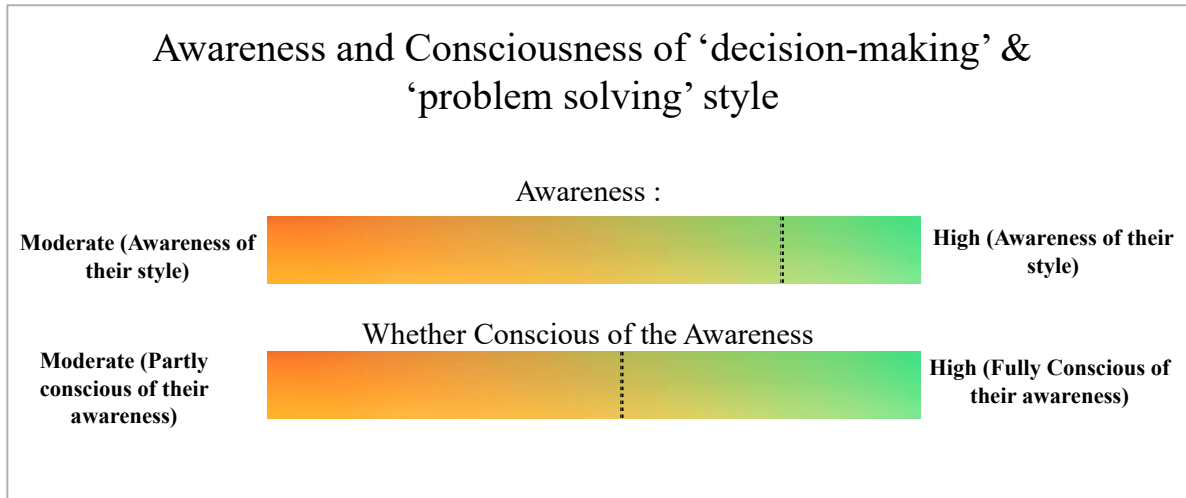


Figure 4.2
Awareness and consciousness of 'thinking' style (authors' own representation)

Upon asking participants to share how they approach 'problem solving' or 'decision making' as a process, following styles emerged:

- Weighing in benefits and risks of the problem before making decisions and eliminating high risk-low benefit options during the process of decision making
- Nature to Nurture approach: Dive into research, search for information and devise alternate plans (Plan A, Plan B) as solutions
- Embracing the environment: Taking cue from environment, acknowledging the emotional state. Just merely focusing on the problem without acknowledging their emotional state does not render justice to the process
- Understanding of problem and solutions and focusing on 'byte-sized' chunks. Alternatively look at larger picture and arrive at multiple solutions through an interactive approach
- Another aspect participant mentioned about problem solving is around the time we have at hand in approaching the problem. If there is sufficient time at hand, then we can look at larger picture, arrive at multiple solutions through an interactive approach but if you

don't have sufficient time at hand, best alternative is to choose from most appropriate solution. So, it really depends on time sensitivity

- Approaching problem in 3-4 ways and analysing root cause, trigger points and learning from it so as to improvise for future
- Epiphany that not all problems are the same or equal and spending time on solving the right problems as some problems are not worth solving
- Around decision making, participant mentioned that context is key. Who you are making decisions for or with and what is the other person's involvement and commitment before taking decisions – all these aspects are paramount.
- Similar to problem solving, time that is available for decision making also would determine the approach to take. For instance, when you do not have sufficient time and immediate decisions are to be taken, then best outcome with least impact will be considered.

As we can see, there are myriad ways of approaching problem solving or decision-making and each participant has a unique way of approaching it

4.1.2 Emotions exhibited during 'thinking' style

Question was posed regarding emotions, participants feel while solving a problem or when they have to take decisions, most participants mentioned 'Anxiety and Worry' and some said they feel 'Happy'. Yet very few spoke about being calm and relaxed and Intrigued

- Worry or Anxiety as there was doubt in participants' mind as to what would happen if things don't work out, what would happen to them. Also, some mentioned that if it's a strategic problem there would be element of anxiety for bigger problems down the road. Some participants also mentioned that they feel anxious while presented with a problem and they feel like blaming others most of the times

- Context or background seems to be the key to some participants, they mentioned that if the problem does not depend on anyone else, then deep reflection of how it would affect them. Also, while solving problems that concern themselves alone and nobody else around them, then they also seem to introspect keeping that context in mind and then address the challenge accordingly.
- Some respondents mentioned about remaining calm and the need for having space to relax and think. That would help them make conscious efforts to analyze situations instead of jumping ahead and projecting the solutions far.
- Those who mentioned they are excited presented a unique way of addressing the problems, they spoke of it as a visual puzzle or a knot that needs to be unknotted. They felt they need to figure it all out.

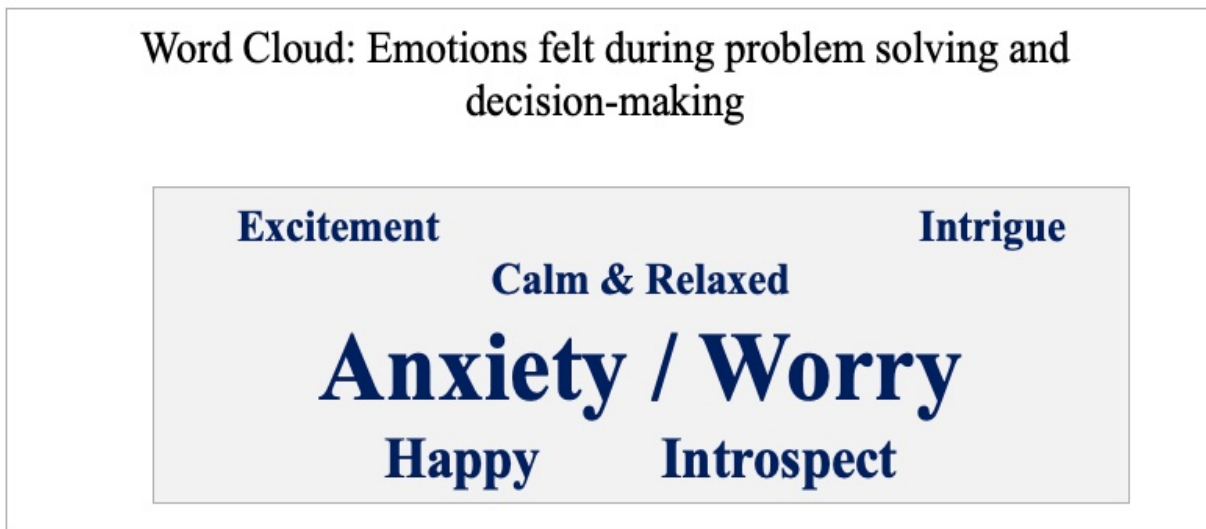


Figure 4.3
Word cloud of emotions – ‘thinking’ style (authors’ own representation)

4.1.3 Association of ‘thinking’ style to physical object

Respondents were asked about which automobile comes into their mind when they think of their Thinking style, this method widely used in market research studies to ascertain the association of the participants about their thinking style at a sub conscious level. The answers received from subjects was very revealing and interesting to study.

Some participants associated their thinking style to a fast car like an autonomous Electric Car which is also futuristic, some others spoke about it like a race car – once the driver is in the car, they would go fast on their thinking journey.

Yet some others spoke of it as a slow car like an entry level car that picks up slowly and picks up speed later but never reaches blinding speed – this would mean they would go about solving problems in a slow manner which would pick up speed later on, but still, they would not take a speedy route towards identifying a solution.

Some other participants also spoke about their Thinking style as an adaptable vehicle that would do anything anywhere which meant they would try not to get stuck in problems but would focus on solutions

Similar association was also seen when some participants spoke about their thinking style as a ‘Hybrid car’ that would be thoughtful, not too slow but not too reactive and fast either.

Yet another association that came to mind for associates was a kind of business sedan that is a good performance car which helps a person to move from point A to point B.

Mind Map : Association of Thinking style to automobile

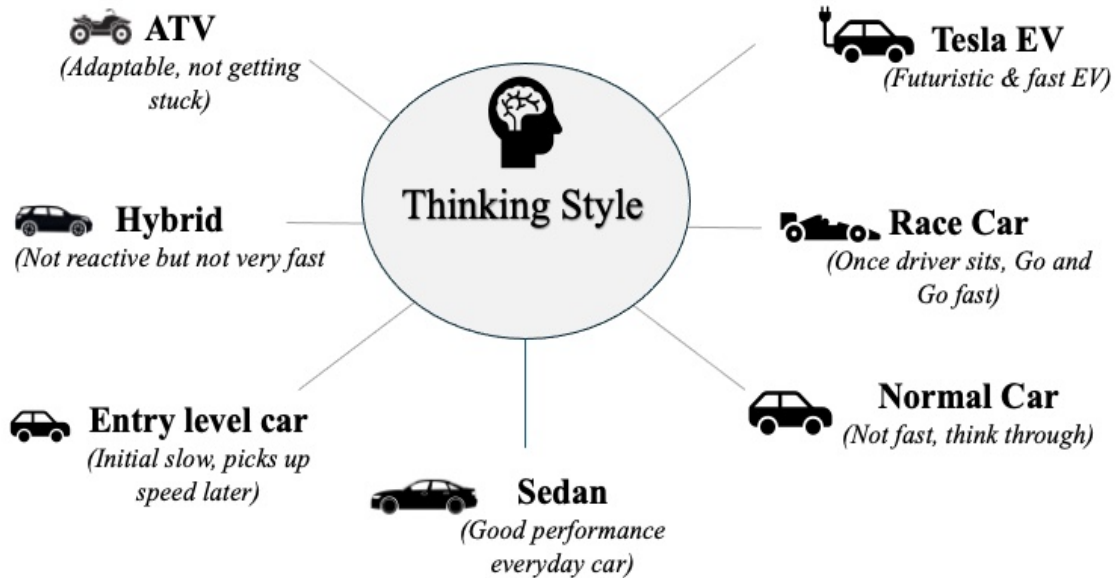


Figure 4.4
Mind map: Association of thinking style (authors' own representation)

4.1.4 Understanding of 'learning' style

Upon answering questions pertaining to their learning style, it was observed that most participants were very aware of the learning methodology they adopt and were also very conscious of their style.

This must be due to the structured way in which learning has been happening in our life over the many years which has made us more aware and conscious of our learning style. In addition to the structured nature, application of learning also is an important part that has led to us being more aware and conscious of the entire learning cycle. Also as highlighted in subsequent section, emotions attached to Learning are also significantly more positive.

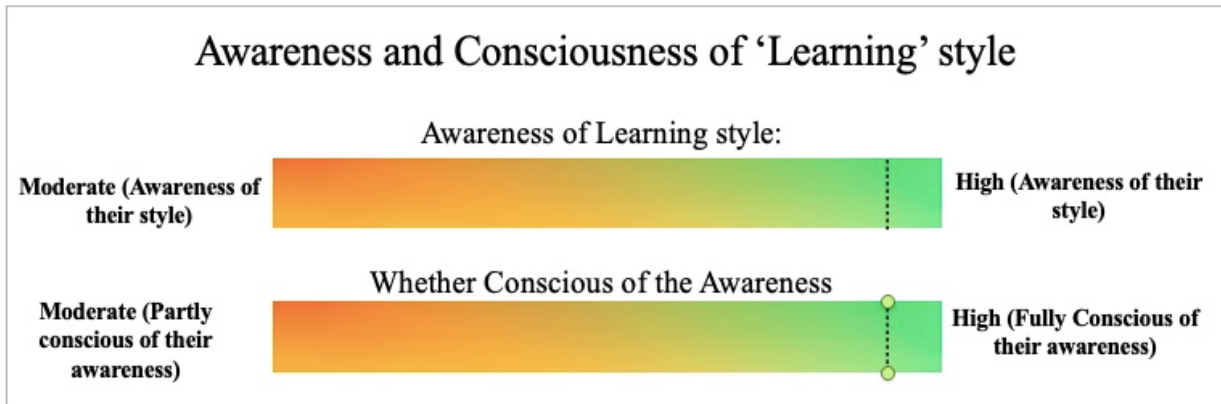


Figure 4.5
Awareness and consciousness of learning style (authors' own representation)

How do the respondents learn: There were variations observed in 'thinking' style in the past section, similarly, 'learning style' also saw a lot of variation in the way respondents learn:

- Some participants mentioned they were either visual or auditory learners or both. Of this, some mentioned they respond a lot to what they hear or see and like to either watch or read aloud or listen at same time in order to retain the learning
- Some others mentioned they need to teach others in order to retain what they learnt better. It was interesting to note that the respondent learnt a particular skill all by themselves and in order to assimilate and retain the learning better, went and taught another person. By teaching, you learn better seemed to be the theme in this case.
- Some other participants have higher consciousness and awareness of their learning style and mention that reflection is key to retention. They also mentioned that in their younger days, they would learn to apply the concept, however with maturity of age and experience they mention that they learn to appreciate based on self-reflection. Also, to some participants, the 'why' of learning is paramount, they need to understand the purpose as to why they are learning something.
- Response to this question also yielded a result that participant mentioned they would learn anything that piques their curiosity.

- Some mentioned they would learn from anything or anywhere and genre / topic / author is not important. Similarly, they also mentioned they would learn from anything or anyone around them, even from a note left anywhere.
- Interesting, innovation and improvement were key ingredients that would make some participants learn
- In fact, some added that if it excites them and if they find it interesting initially, they would go deeper and then pursue to the depths to understand this deeply.
- In addition to this, some respondents also mentioned about their unique ways of assimilation, like one respondent spoke about practicing violin while reading which helped them assimilate and retain the learning better. Yet some others mentioned about very specific genre of books or specific authors they read in order to gain knowledge.



“ I will be frustrated if I am
forced to Learn
I will be excited if I am told to
learn and like it
I will be elated when I find
something to learn and like it ”

Figure 4.6

Quote: Participant's response on their learning style

4.1.5 Emotions exhibited during ‘learning’ style

As was mentioned earlier, most respondents mentioned learning evokes very positive emotions in their mind.

- They used superlative positive emotions like ‘very happy’, Joy, Love learning etc. Respondents also mentioned that there was a sense of interest and excitement and an element of reward upon learning something.
- Reflection during the process of learning also meant that they have become better over last year as they have learnt and grown.
- Yet another respondent also mentioned about curiosity which leads them to learn new things. Their ability to dive in and being poked by the proverbial ‘concept pin’ gave them the urge to learn and apply.
- What is also interesting is the difference in emotions experienced by same person if the learning was forced on them. In that case, respondents did say that they would probably not be interested, and they may do it more as a task to be accomplished and as a responsibility they need to complete. In such cases they mentioned that they may not enjoy it as much
- In a similar vein, another respondent mentioned that there was always an element of impatience during the learning process. What next seems to dominate the feeling resulting in the respondent missing out the now and present.

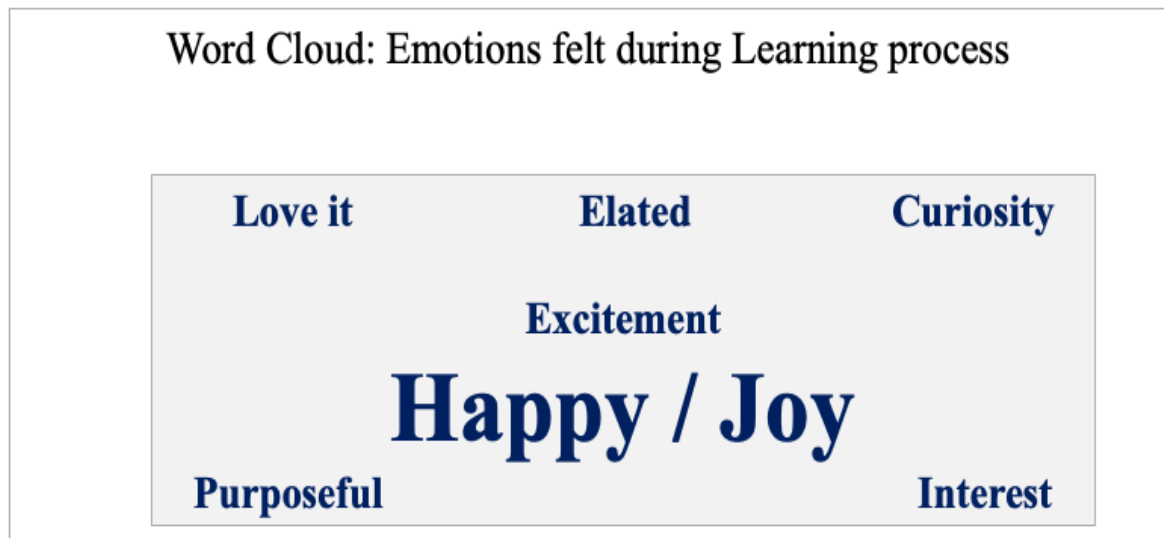


Figure 4.7

Word Cloud: Emotions – ‘Learning’ process (authors’ own representation)

4.1.6 Association of ‘learning’ style to physical object

Respondents could easily relate their learning process to an automobile

- This question yielded variety of responses. Some spoke of their learning style as a hybrid car which has a combination of traditional and innovative methods
- Some others spoke of it as a fast car like a race car as that was reflective of their learning style
- Another respondent had an interesting anecdote to compare their learning style to an American muscle car as they are very specific and is made to race and designed for certain purposes. They mentioned that not everybody loves them but once you need it, its specific and heavily invested in certain things.
- Automatic car with gear shifts that move forward was how another respondent put it. This was reflective of their style to quickly assimilate and apply what they have learnt.

Mind Map : Association of Learning style to automobile

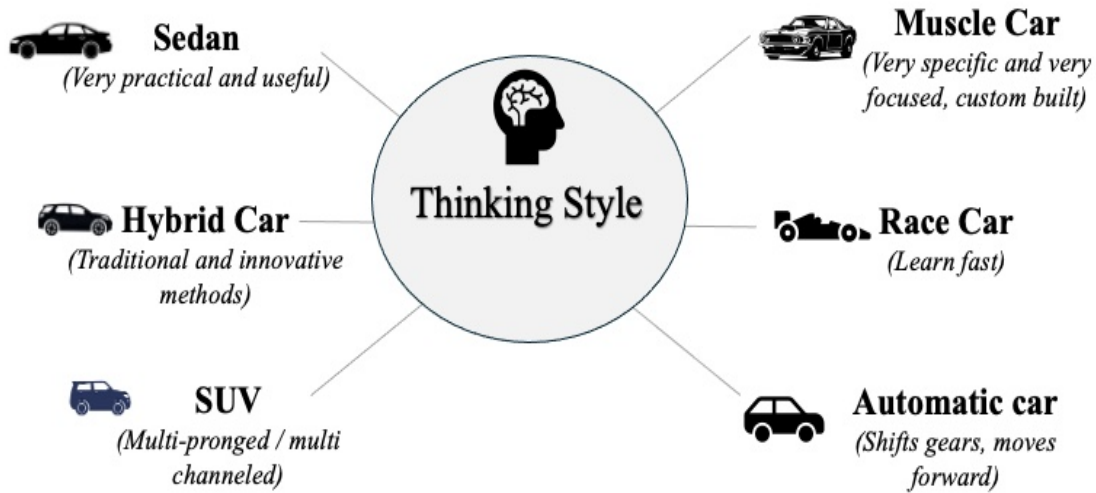


Figure 4.8
Mind map: Association of learning style (authors' own representation)

Participants were also asked to comment on whether they spend time on their thinking style. Some interesting aspects that emerged from this question are as follows:

- Some participants mentioned they think they spend time introspecting on their thinking style, they spoke about self-reflection and introspection as ways of doing so
- Also, they were humble enough to take feedback from other people about their thinking process and also mentioned that collaborating is an effective way of getting better outcomes than thinking alone
- Another participant mentioned about their experience in coaching young adults and the way they learn and think being very different. They mentioned it is being tied to their default talent definition.
- Also, some mentioned they will not think too much about their thinking or learning style and will go with the flow and they would just do it.

Unpacking Part B of the Questionnaire

Second part of the questionnaire also related to first Research Question in terms of understanding of Metacognition through the lens of the participant, specifically around their understanding of their CliftonStrengths and current usage. Following aspects were covered as part of this section of the study:

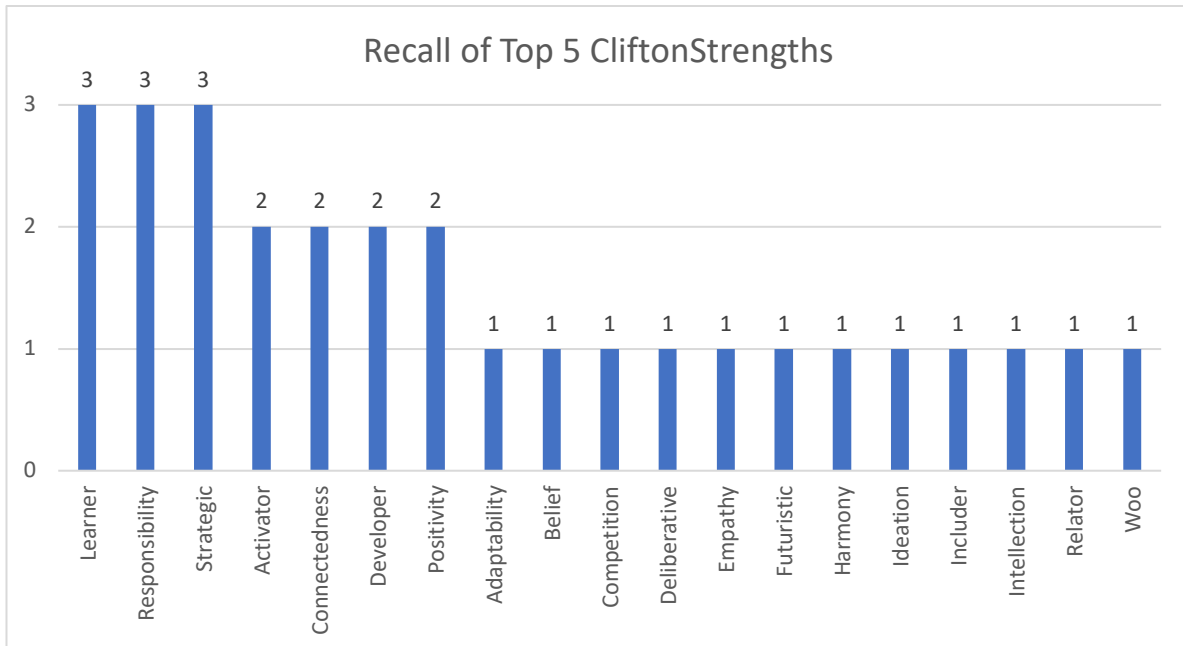
- Ability of participants to recall their top CliftonStrengths – top 5 and top 10 CliftonStrengths. All participants had undergone CliftonStrengths assessment earlier.
- Their feeling and emotion when they first received the report and why they felt that way
- A tagline or sentence that describes them best – keeping their CliftonStrengths in mind
- How have they used their CliftonStrengths in their career

4.1.7 Understanding of the respondents' CliftonStrengths

Participants had gone through their 34 CliftonStrengths profile earlier in their career. While asked about their top 5, the recall was a mixed bag. While around 70% were able to recall their top 5 CliftonStrengths in some random order, around 30% had difficulty recalling the Top 5 CliftonStrengths. Almost 80% of participants had difficulty recalling CliftonStrengths 6 to CliftonStrengths 10.

Learner, Responsibility and Strategic were the themes that emerged as most recurring among the participants interviewed, this was followed by other themes like Activator, Connectedness, Developer, Positivity.

However, it must be remembered that if we were to choose another set of participants, this picture would look very different. This is due to the astounding diversity in CliftonStrengths profiles and in how people express their CliftonStrengths (Asplund, 2021)



*Figure 4.9
Recall of Top 5 CliftonStrengths (authors' own representation)*

Looking at the recurring themes that emerged from the study reveals the following:

- Respondents exceptionally talented in ‘Learner’ theme have strong desire to learn and want to consistently improve. The entire process of Learner excites them more than the outcome (Buckingham and Clifton, 2001; Rath, 2007)
- Those extremely talented in ‘Responsibility’ theme take psychological ownership of what they say they will do. They are committed to stable values such as honesty and loyalty (Buckingham and Clifton, 2001; Rath, 2007)
- Respondents talented in ‘Strategic’ theme create alternate ways to proceed when they are faced with any given scenario. When they are exposed with any scenario, they can quickly identify patterns and issues (Buckingham and Clifton, 2001; Rath, 2007)

4.1.8 Emotions exhibited while receiving report

When asked what emotions the respondents felt when they received the report, almost all of them commented that the report was so like them, and they mentioned that it resonated with them, and they were curious to know more. Also, some of the respondents had taken some other psychometric assessments through their life, that talked about personality traits and behavioral strengths, they did mention that CliftonStrengths was closest description of themselves. They said it felt instinctively like them and it was an intuitive tool. Some respondents also mentioned that this assessment helps them understand how they spend time with themselves.

Further they said that understanding of their top 5 CliftonStrengths also gave them more confidence and made them more self-aware of who they are and what they are capable of. The results also gave them a sense of curiosity and yet for some others, they wanted to see whether there was any accuracy in the report and wanted to satisfy their curiosity by learning more about the tool and about themselves.

- Some respondents mentioned they had a vague idea about patterns of their behaviour / thinking style, but never knew why they would do so. For instance, a respondent with high Input and relatively low Focus knew that they were good in assimilating information from multiple sources. Those with high Input usually collect and archive – it may be collecting and archiving information or data or artifacts, ideas or even relationships (Buckingham and Clifton, 2001; Rath, 2007)
- This respondent mentioned that this was both a Strength for them and a non-Strength too at times. While they were studying, they were taking in irrelevant information other than subjects of study as well, thereby losing focus. What they did not know or realize till they had done their CliftonStrengths profile is why they were behaving the way they

did. So, it was a moment of ‘epiphany’ for them when they went through CliftonStrengths.

- Another respondent spoke about their high Adaptability strength. They mentioned they cannot do a 9am to 5pm job at all due to their high Adaptability. They needed different challenges every single day. They tend to go with the flow, therefore they chose a profession that gave them different challenges every single day. This respondent mentioned that understanding of CliftonStrengths was kind of life altering as they could understand themselves better and take appropriate life decisions.
- While speaking of their CliftonStrengths, some mentioned that knowing their CliftonStrengths also helped them strategize their actions better. They mentioned how they found a sweet spot while identifying participants for their tough meetings. They mentioned they are better dealing with smaller number of folks in meetings than large number of audience. Knowing it made them exploit that further and thoughts came out clearly. A respondent with high Relator Strength enjoys close relationships with others. (Buckingham and Clifton, 2001; Rath, 2007)
- A contradictory yet interesting point was made by a respondent who has gone through challenging professional phase recently. They mentioned that during their most challenging phase, they did not lean on Strengths psychology. They observed that they have seen subjects go and lean on Strengths only when they are in a position of Strength / power. They also spoke of CliftonStrengths as not having that human or personal touch and it did not come across as human. It was seen more as a technical tool.
- Another respondent spoke about how they became more efficient and painted a vivid picture of themselves before and after taking the assessment. They spoke about how they used to keep quiet before others in open forum due to their own ‘Belief’ and

understanding the strengths and non-strengths helped them to be more efficient than before (pre assessment period).

- While there are significant benefits to knowing each person's Strengths, it is also important to understand that over doing or under doing a particular Strength is not a good strategy. There are blind spots that some respondents spoke about for each Strength that they are aware of and keep reminding themselves as potential pitfalls they must avoid.

4.2 Research Question Two

The larger focus of the research is to understand how to create metacognition strategies, and what are the tools and techniques that one can use to improve Metacognition in day-to-day life. Following questions were posed:

- Questions around how they are currently relating to CliftonStrengths and their current usage patterns was posed to the participants.
- In addition, questions around their intent to utilise CliftonStrengths in future was also posed. Intent was also around getting deeper understanding of other strategies they use or have seen others use to improve metacognition.
- In addition, there was also a question posed around potential barriers to Metacognition. Need to understand why this is so difficult for people to adopt and change. This understanding is key as this would provide insights on how people can overcome the resistance and change for better.

Researcher actively practiced Bracketing as a pivotal step while analysing the data to the above questions. This was required so there is no preconceived belief and opinion of the researcher concerning the research. This was important to do since the researcher is also a certified coach.

4.2.1 Tagline associated with CliftonStrengths

Respondents were asked to arrive at a tagline or a sentence that describes them best based on their top CliftonStrengths. The taglines they came up with are spontaneous, top of mind recall (TOM), keeping in mind the behavioral manifests of their top CliftonStrengths.

The participants were also asked to mention why they came up with these taglines and which themes among their top 5 were they thinking about while coming up with these taglines. Here are some of the taglines mentioned by participants:

“Trust needs to be earned, and Values can be learned”

- Participant has high Belief and Connectedness in their top CliftonStrengths. In addition, they have high Relator and hence they have come up with this tagline
- Those with high Belief theme have certain core values that are unchanging. Out of these values emerges a defined purpose of their lives (Buckingham and Clifton, 2001; Rath, 2007)
- Those with Relator theme as one of their top talents enjoy close relationships with others. They find deep satisfaction in working hard with friends to achieve a goal. (Buckingham and Clifton, 2001; Rath, 2007)

“FOMO: Fear of Missing Out”

- The respondent mentioned they don't want to miss out on anything, and they need to understand pros and cons for everything ahead of time every time.
- Respondent mentioned they came up with this tagline due to their high Deliberative, connectedness and learner themes
- Those with high Deliberative theme are best described by the serious care they take in making decisions or choices. They are better at anticipating obstacles and risks (Buckingham and Clifton, 2001; Rath, 2007)

- Those with high learner theme have a great desire to learn and want to continuously improve. The process of learning rather than the outcome excites them. (Buckingham and Clifton, 2001; Rath, 2007)

“A curious, perceptive committed and diligent catalyst”

- This respondent spoke about the tagline keeping in mind their top CliftonStrengths of Strategic, Learner, Responsibility and Activator
- Those who have high Strategic create alternate ways to proceed. Faced with any scenario, they can quickly spot the relevant patterns and issues (Buckingham and Clifton, 2001; Rath, 2007)
- People with high Activator theme can make things happen by turning thoughts into action. They want to do things now rather than simply talk about them. (Buckingham and Clifton, 2001; Rath, 2007)

“Idea Catalyst, provide new ideas, tend to take action as well”

- This respondent mentioned they based the tagline on their top CliftonStrengths Activator, Adaptability, Ideation
- Those with high Ideation are fascinated by ideas, they are able to find connections between disparate phenomena (Buckingham and Clifton, 2001; Rath, 2007)
- People strong in Adaptability theme prefer to go with the flow. They tend to be ‘now’ people who take things as they come and discover the future one day at a time (Buckingham and Clifton, 2001; Rath, 2007)

“Love it, Live it: Continued enthusiasm, energy and passion”

- This respondent had thought of many of their top 10 themes while formulating the tagline. Specific themes they wanted to amplify through the tagline are Positivity, Maximiser, Achiever, Focus, Woo

- Those with high Positivity have contagious enthusiasm. They are upbeat and can get excited about what they are going to do (Buckingham and Clifton, 2001; Rath, 2007)
- Those with high Achiever possess high levels of stamina. They take immense pleasure in being busy and (Buckingham and Clifton, 2001; Rath, 2007)
- Respondents with high Maximiser theme focus on strengths as a way to stimulate personal and group excellence. They seek to transform something strong into something superb (Buckingham and Clifton, 2001; Rath, 2007)
- It is interesting to see how unique and different these taglines are, and it goes to prove that each one of us is unique in the way we think, feel, behave and learn.

4.2.2 Current and future usage of CliftonStrengths

While awareness of CliftonStrengths was a mixed bag with some knowing their top CliftonStrengths and yet some others knowing only a part of the top 5, it was interesting to understand how many actually were using CliftonStrengths in their day-to-day life. The result is that current usage straddles across the entire spectrum starting from they have not been using it currently. Right from not applying the CliftonStrengths at all to the other extreme of using it very often

- Those who were aware and answered that they will use it very frequently mentioned they would use CliftonStrengths in everything they do or think
- Those who were aware and said they would not use it frequently mentioned they would probably utilize it at some level and not on a daily basis, they mentioned they would use it in particularly challenging situations on way forward
- Those who were aware and said they would use it very frequently also added they would use it extensively and knew how they operate with their CliftonStrengths
- Another respondent mentioned they use it everyday situation, not all CliftonStrengths all the time, but some of them quite frequently.

Bubble chart: Awareness and current usage of CliftonStrengths

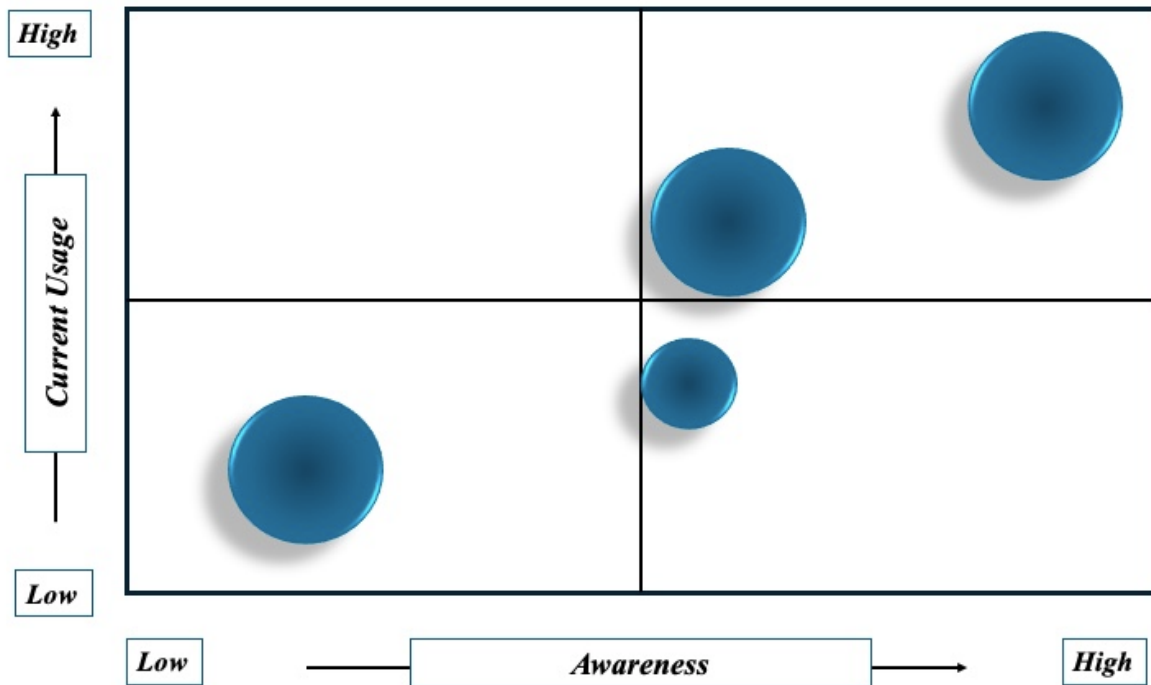


Figure 4.10
Bubble chart: Awareness vs. current usage of CliftonStrengths (authors' own representation)

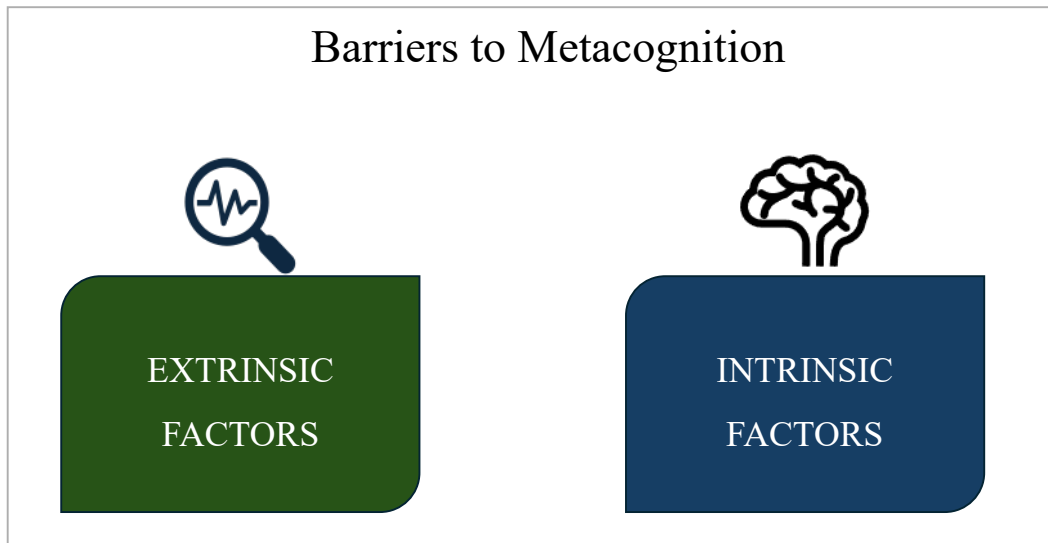
On the future usage, it was a split camp of respondents. Those who were using it extensively currently also spoke about using this in future to a great degree. Yet some other participants also mentioned why they were not so keen on using it extensively and had their own methodology that they were planning to embark on.

4.2.3 Barriers towards achieving Metacognition awareness and strategies

In order to create higher metacognitive awareness or chalk out metacognitive strategies, it is important to understand what are the barriers that are blocking Metacognitive awareness or Metacognitive strategies. Some of the responses received from respondents are around the following themes:

Extrinsic factors: factors that are external to the subject, those could be from the environment, family, society and culture etc.

Intrinsic factors: these factors are mostly internal, and the torch is focused on the subjects. It could be very many factors mostly triggered from within and not so much from environment or society, culture etc.



*Figure 4.11
Barriers to Metacognition (authors' own representation)*

Extrinsic factors:

- Some of the aspects that have a bearing on Metacognition awareness are around societal standards and instilling what success means – chalking out limited set of measures that will make one happy and motivated. There are expectations set in terms of what success is like in terms of salary, car, club affiliations etc. This may prevent realisation of higher order metacognition awareness and prevents willingness to learn and grow.
- There could be strong external stimuli like social media or generic motivational techniques that require very less thinking. They are readily available and can be used without any customization or specialized thinking. It would give a strong pull for subjects to go for them rather than spending time, energy and focus on customizing to suit the style.

Intrinsic factors:

- Balancing physical, mental and emotional states and the profound impact they have on cognitive styles. An example of this would be around the difference in solving problems in different states of mind. This involves understanding balance between thinking and feeling and that is a tough act.
- Respondents also mentioned about the need for a mindset shift. Mindset shift from cortisol thinking to a dopamine thinking. Cortisol thinking gets activated from a negative thinking and increases frustration. This needs to shift to a dopamine thinking which releases more positive vibes and helps improve the Metacognition awareness
- Realisation that it is not only important to climb ladders outside but also the ladder within ourselves. Inward orientation and realisation is a critical aspect. While self-esteem is important, the refusal to spend time within ourselves and understand our own brain is missing in most cases. One of the questions posed by respondent is how much time we have spent in our life trying to understand ourselves and how much do we check with others about our own style which could lead to demystifying blind spots.
- Some of the awareness techniques can be flavor of the month. We could lay a lot of emphasis on a technique that energises us for the moment. But sustenance would be key as these take a long time to embed this into our core. Also, peak and trough will not work as sometimes we would end up overdoing and sometimes underdoing the awareness and strategies. Keeping an even keel is important.

One of the most important barrier is from within the subject themselves, if they are not ready or not willing to adopt, then the mindset change will not come about. This is deep seated and requires lot of introspection

4.2.4 Strategies used by subjects

When posed question around how they improve Metacognitive strategies, the answers were very illuminating. Considering the fact that all of them are coaches and have had decades of experience being a coach, it is interesting to note the choice of strategies they would adopt for themselves. While some of the subjects mentioned they will rely on CliftonStrengths nudges and blind spots of their top CliftonStrengths, many mentioned their own ways of coping with Metacognition. They ranged from very simple ones to highly complex realised methods.

Some of them appeared to be leveraging generic and readily available levers to improve Metacognition while some others were hyper customised and evolved Metacognition Strategies.

Metacognition strategies

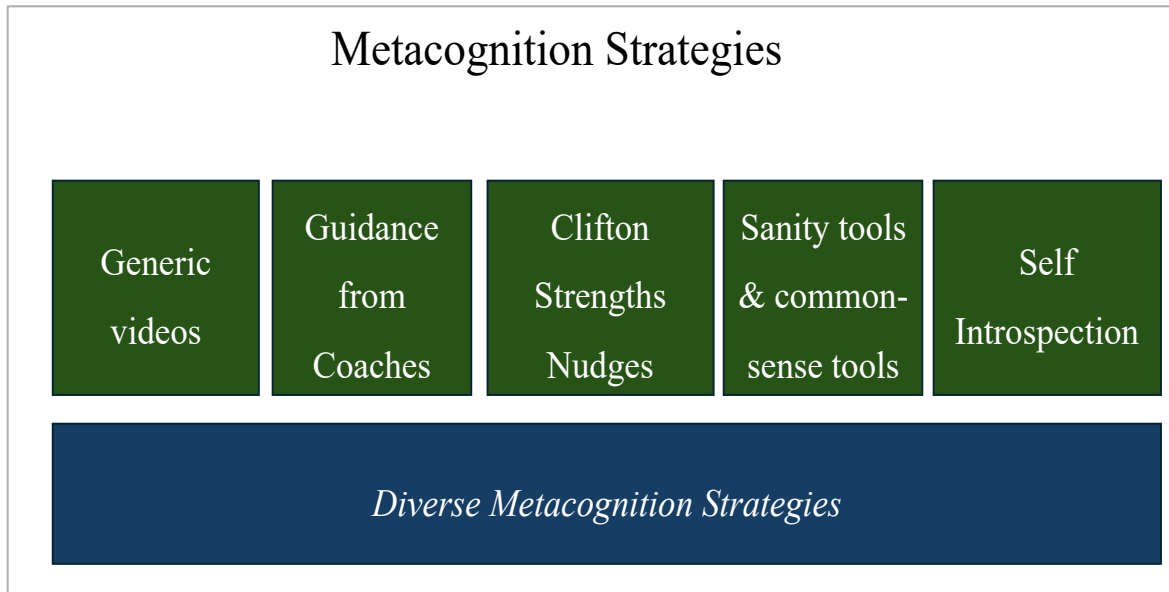
- Some respondents spoke about very generic ways of improving Metacognition, they mentioned watching motivational videos on the internet to boost their Metacognition.
- Yet some others mentioned about writing their thoughts down, they mention that the logic is that most of our thoughts are repetitive thoughts and many times they are negative. We are wired to look at the worst case scenarios all the time. Respondent also mentioned about the current context where there is lack of family support systems and thereby putting things on paper provides more clarity
- Interestingly another respondent spoke about sanity tools and common sense tools. The advise this coach has been giving and practicing for self is to look at the real macro picture. Seeing our position in the macro sense viz, our place in the country, planet, solar system, we are a small speck and to keep this in perspective of everything we think and act. The subject also spoke about devising some sanity tools which have a bearing on the emotions, thinking style. Also balancing this by use of common sense tools that help debias and aid in better sense making.

- Another respondent spoke about self-introspection while creating any Metacognition strategy. They mentioned they are not looking for new tools as many of the tools were being consistent. The respondent merely wanted to introspect on:
 - Who is this person (self), perception of who they really are
 - Impact of who they are to those around them
 - Feedback from other people, credible sources, refining and applying the strategy
 - Simple strategies that are consistent and not complex to practice
- Another respondent mentioned that it is important for us to create our own tool like CliftonStrengths and reflect on the following:
 - What are the things you like
 - What are the things you dislike
- Also along with the what, the why is important, why did they dislike what is the pattern are kinds of questions that would serve respondents well to create their own Metacognition strategies.

Metacognition Strategies involving CliftonStrengths

- There were also responses from subjects about how they would follow the insights from CliftonStrengths and how the combination of Strengths would work for them.
- While talking about CliftonStrengths, respondent also mentioned about which CliftonStrengths should be used at which point of time in life. Also there were lot of emphasis laid on the combination of CliftonStrengths and the benefit they bring. The secret ingredient is knowing which CliftonStrength combination could be used for which situation. Due to infinite variation in each of our CliftonStrengths, mastering this and embedding into the core is a work of a lifetime.
- Further some subjects spoke about how we can dig for emotional impact and the satisfaction one would get from using CliftonStrengths. If we are able to articulate this,

then there could be better utilization of CliftonStrengths and better Metacognitive strategies



*Figure 4.12
Metacognition Strategies by respondents (authors' own representation)*

4.3 Summary of Findings

Responses to above Research Questions were solicited through Qualitative Research using Phenomenological approach. Active Bracketing technique was practiced while analyzing the information. From the above responses, following can be inferred:

4.3.1 Awareness of Metacognition

- With respect to Awareness and consciousness of problem solving, it can be said that the awareness of their own style is quite high, however the same cannot be said about the consciousness
- With respect to Awareness and consciousness of learning style, both are high for respondents
- Learning style evoked more positive emotions like 'Happiness/Joy', Elation, Curiosity, Excitement. However, problem solving evoked mixed emotions like Anxiety/Worry at one end and Excitement, Intrigue and calm/relaxed emotions.

- Association of thinking and learning style to automobile is fascinating – throws up myriad range of automobiles in their mind for variety of reasons.

4.3.2 Metacognitive Strategies

- Taglines of what their top CliftonStrengths yielded was very interesting. This not only shows the infinite variation in the brain of subjects but also some level of introspection on their behavior and thinking patterns.
- Awareness of CliftonStrengths high among most, however Mixed bag with respect to current usage. Future usage too was mixed bag and there were respondents on both extremes with some in the middle
- There are many barriers to Metacognition, some of them are intrinsic and some of them are extrinsic.
- Some devised their own strategies that work to increase Cognition. They range from simple techniques to more complex ones.
- These strategies include watching motivational videos to boost self-motivation at a generic level and it goes right upto perspective reframing and self-introspection techniques.
- Many mentioned about following CliftonStrengths nudges and understanding combination of their CliftonStrengths so as to formulate their Metacognition techniques.
- Understanding the thinking behind the thinking that is Metacognition is often made difficult due to several reasons. Some of them are extrinsic and some of them are intrinsic in nature.

4.4 Conclusion

From the research, while it is heartening to note that there is a fair degree of awareness with respect to one's own thinking and learning style, it is also quite obvious that we have a lot of ground to cover in terms of devising Metacognition Strategies to reach the stage of Epistemic Metacognition.

Being aware of Metacognition and crafting strategies to move from metacognition to Epistemic cognition are new concepts for many and can be hard to absorb and sometimes even intimidating, yet to some others, it could be seen as a pointless exercise. The only way to make this available to create a simple framework that will be easy to absorb and digest and does not become a burden for subjects to follow. Therefore, it is important to create a:

- Structured approach that can be easy to follow and absorb for the subjects irrespective of where they are in the journey
- Framework that seamlessly transitions from one level to another and the subjects understand from one glance where they are without aid of any special measurement
- Easy to create strategies, tips and tricks from the framework that makes it more sustainable and stands the true test of time and not as a flavour of the month
- Structure lending itself to gamification for absorption across a large section of population

CHAPTER V: DISCUSSION

5.1 Discussion of Results

From the summary above, it is apparent that Metacognition awareness is fairly high but the conscious way that subjects are going about it, must improve significantly in order to create effective Metacognition strategies.

Similarly, subjects should be aware of the barriers of Metacognition in order to devise meaningful strategies. While it seems like a daunting task, it can be made to work if this is seen in a structured, mature and sustained manner. For this purpose, it is imperative that we create a Maturity Model for Metacognition.

Why is a Maturity model important: Maturity models in general represent theories about how organizational capabilities evolve in a stage-by-stage manner along an anticipated, desired or logical maturation path (Gottschalk 2009, Kazanjian and Drazin 1989, cited in Pöppelbuß Maximilian Röglinger, 2011)

According to Pöppelbuß Maximilian Röglinger, (2011) basic use of any Maturity Model is to describe stages and maturation paths. For their application, maturity models are expected to disclose current and desirable maturity levels and to include respective improvement measures (Pöppelbuß Maximilian Röglinger, 2011).

Typically, application-specific purposes of use are different (Becker et al. 2009, de Bruin et al. 2005, Iversen et al. 1999, Maier et al. 2009, cited in Pöppelbuß Maximilian Röglinger, 2011) and can be classified into Descriptive, Prescriptive and Comparative

A deep dive into Maturity model is not embarked on, in this paper, as this is not the primary scope of the study.

5.2 Metacognition Maturity Model

The whole Metacognition awareness and strategy can be seen as a mountain climbing exercise. Unpacking the Metacognition Maturity Model yields three levels: At the Base camp is whole piece about ‘Recognize’, Mid Camp is about ‘Reflect’ and the Summit is really about ‘Realize’

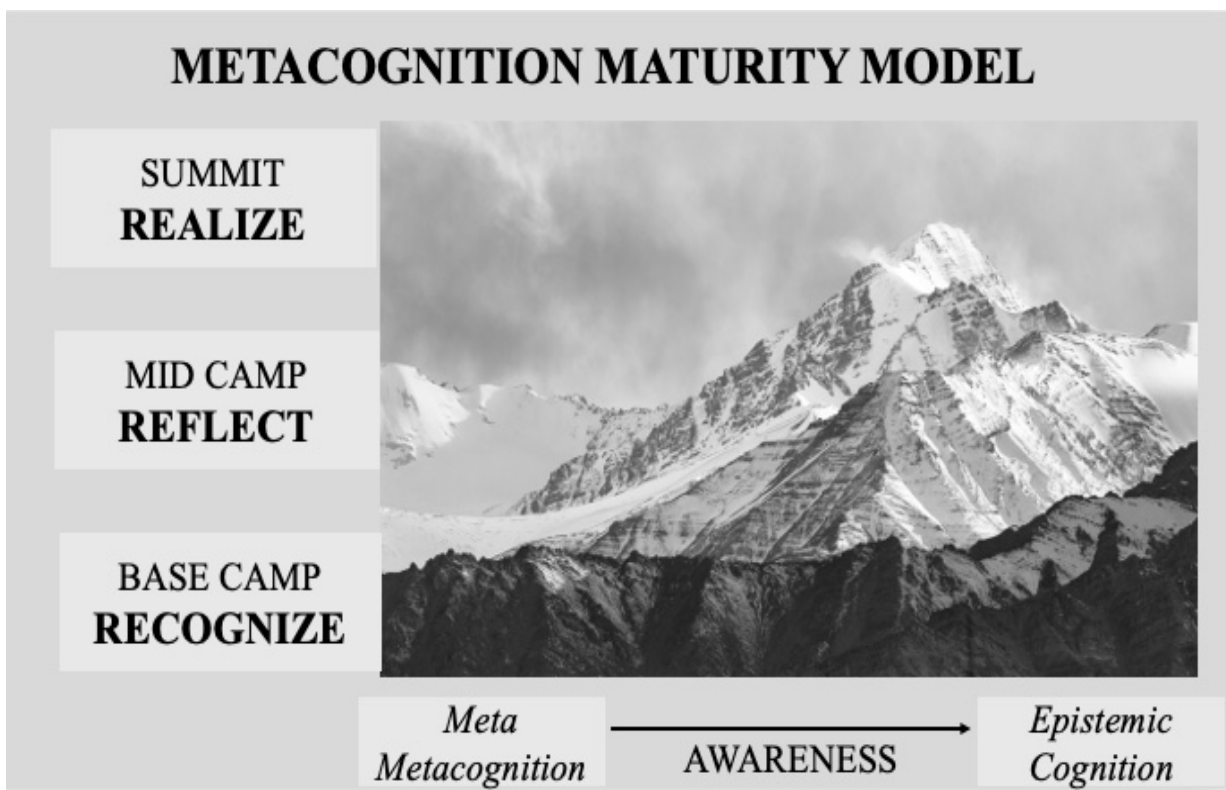


Figure 5.1
Metacognition Maturity Model (authors' own representation)

5.2.1 Base Camp - Recognize

At the very base is ‘Recognition’ of Metacognition. Even understanding that a concept called Metacognition exists is a starting point in this journey. Some of the characteristics of Base Camp point are:

- This can be a Defining moment, a time when the subject gets an epiphany or an ‘aha’ moment.
- There is a basic interest in understanding Metacognition, that is in self’s thinking or learning style. Would begin understanding self’s style mostly with the help of a structured assessment or tool
- There could be peaks and troughs in the journey leading to inconsistencies in the approach to assimilate and absorb the learnings.
- Usually, the trigger could be through an external point - a push or a mandate to understand the style either as a work requirement or as a project assigned etc.
- There could be periods of ‘flavour of the month’ situations where there could be overwhelming amount of activity followed by a period of passiveness similar to the peak and trough observation
- It could also have got initiated as part of a requirement for a talent management action which could result in benefits for the subject. In the absence of a positive reinforcement, it is possible that the subject may not pursue their interest in the space, thereby explaining the peak and trough.
- Metacognitive Strategy would include simple techniques done on an ad hoc basis. This may be agnostic of the emotional, mental and physical states.
- Those who are initiating the journey could exhibit anxiety at the starting point of the journey. This could have a profound effect if there is no psychological safety in the ecosystem.

Tips to improve Metacognitive Strategies for those in the ‘Base Camp - Recognize’ point of the journey:

- The initiation of the long journey towards unravelling the ‘thinking about thinking’ or Metacognition begins with ‘Recognition of simple truths. Recognition of the truth that they need to understand more about themselves, recognition of the truth that others’ thoughts about the subject can really show them the mirror of who they really are vs. who they think they are. This calls for a mature mindset shift. Once this is accomplished the rest of the journey is easy.
- Power of conversations: One of the tips is that participants should discuss about their own style with key stakeholders which could include family, colleagues whom they work with closely. Doing so will reveal the blind spots and areas that are unknown to themselves.
- Subjects should make a start by devising simple methods that work for them to improve their cognitive abilities. Such devices however rudimentary would serve their purpose as this is the starting point of the journey
- Identifying and participating in a specific tool that they can relate to and have trust in. One of the mature tools is the CliftonStrengths which gives a good understanding of the ‘Talents’ or top CliftonStrengths of the participants.
- CliftonStrengths identifies what is right about people rather than fixating what is wrong with them (Buckingham and Clifton, 2001; Rath, 2007)
- It is important for the participants to understand their report in entirety and the nuances associated with it. It is highly recommended that they discuss this report with their friends, family and trusted colleagues
- While focusing on the CliftonStrengths, they should formulate their Strategy around the top 5 as research says it will take a lifetime to hone even the top 5 to perfection.

Going after all of the themes will be a waste of time and it goes against the grain of Strengths philosophy (Buckingham and Clifton, 2001; Rath, 2007)

5.2.2 Mid Camp – Reflect

The next logical progression in the journey is to cover substantial ground to get to Mid Camp which is all about Reflection point of the journey. This is characterized by the following aspects:

- This is the ‘Evolving’ point of the journey and a pivotal one at that. Reaching this point is a significant progression in the journey.
- There is a very keen interest in knowing and progressing subject’s Metacognition due to the fact that they did not fall off the Metacognition journey and have been tenaciously working on it.
- While the triggers for doing so could be many fold, it could stem from event-based actions and there is significant amount of self-interest that is evident at this stage.
- Similarly, there is evidence of subject’s grasp of self’s Metacognition awareness and intent to strategize. This transcends beyond mere dependency on assessment report into gaining insights through discussions with others
- Subject is keenly aware how the social intelligence impacts cognitive style and is able to embrace their emotional, physical and mental state into the cognitive style.
- Subject embarking on Strengths philosophy would be able to articulate clearly their Strengths, Non Strengths and weaknesses. They would be aware of the CliftonStrengths playing out in various situations.
- At this point in the journey the subject’s strategy would involve acting on nudges based on their CliftonStrengths
- The emotion exhibited by subjects at this point is being ‘Intrigued’

- Subjects are also able to effectively utilise and progress awareness and strategize beyond sporadic flavour of the month into their larger gameplan. Subjects leverage their top CliftonStrengths while taking large decisions.
- Subjects may be able to relate to the impact that deep Science (like Neuroscience) may have on one's own cognitive ability

Tips to improve Metacognitive Strategies for those in the 'Mid Camp – REFLECT'

point of the journey:

- This is an interesting phase as most subjects may fall off the journey at this point, hence continued Reflection of themselves in their own eyes and in the eyes of key stakeholders is important. This Camp is in the middle of the journey and is neither the starting point nor close to the top camp, epiphany that there is ground to cover is an important facet.
- Subjects could embark on evolved conversations with trusted advisors, key stakeholders around their Metacognition style. This is an important mirror that would reflect aspects about themselves that they may not have, they could use this inputs to start picking cues of their metacognitive style
- They identify mentors or coaches who will give expert advice and share wisdom and goodness based on their lived experience and based on the context.
- For subjects who have embarked on CliftonStrengths journey, this would mean knowing their top CliftonStrengths really well and knowing how it plays out in various situations.
- They are able to appreciate and balance their CliftonStrengths in a holistic fashion and effectively leverage the nudges.
- Good understanding and appreciation of combination of CliftonStrengths so as to not lean only on few CliftonStrengths at any point is required. Also, from a lifecycle

standpoint, knowing which Strength would take them to the next level is important and would go a long way in creating effective Metacognition Strategies

- Subjects can embark on scientific aspects of Neuroscience to move the needle towards the Summit stage.

5.2.3 Summit – Realize (Epistemic Metacognition)

This is the pinnacle in the Metacognition journey – Epistemic Metacognition point. Reaching the summit can appear like a daunting task, however it need not be so. For some it may take the work of a lifetime, however for some it may happen with sustained rigor and discipline to reach the summit stage. The points of journey will be different for each one due to our unique and differing styles.

Also, once one reaches the summit, they don't just stay there, depending on where they are in their lifecycle and if there are any major event milestones in their life or if they have experienced life altering moments, then they may move to other stages of Metacognition maturity model and they continue their journey to the summit.

One can glean how 'Summit - REALIZATION' stage will look like, from the characteristics highlighted here:

- Subjects at this stage will be at a point of 'transformational point' in their life journey.
- They will have highly evolved understanding of Metacognition and exhibit deep commitment to their Metacognition strategies.
- The triggers are usually from within the subject themselves – it is mostly intrinsic, deeply embedded into their core.
- There is strong and consistent evidence of Metacognitive awareness, and it shows up in everything they think or do, and it happens at the superconscious state.
- Subjects constantly look for ways of identifying strategies to improve their Metacognition.

- Subjects at the Summit stage are also highly aware of the synchrony of physical, mental and emotional states and there is a strong balance of feeling and thinking.
- Usually, diverse inputs about self from other key stakeholders in the organization and there is heightened cognizance of who they are and what they bring to the table.
- They are constantly looking for ways to work on Metacognitive strategies, so much so it is part of the core, their habits. One subject spoke of it as a chore like brushing the teeth every day, it is so much ingrained into your everyday, it is habit forming.

Tips to improve Metacognitive Strategies for those in the ‘Summit - REALIZE’ point of the journey:

- Since the subjects have traversed the basic and Mid Camp states to reach this stage, the nudges are of advanced nature.
- At this point, subjects usually rely on mature, hyper personalised nudges that factor in multiple states including physical, mental and emotion state of the subject
- In addition, there is a lot of Self-realization on the past events so learning from the past and from mistakes is an integral part of the event itself and is not stand-alone.
- This could be advanced Artificial Intelligence backed nudges that factor various dimensions of the subject along with the physical, emotional and mental state. These could be proactive Nudges or post event dashboards.

Advanced tools at ‘Summit - Realization’

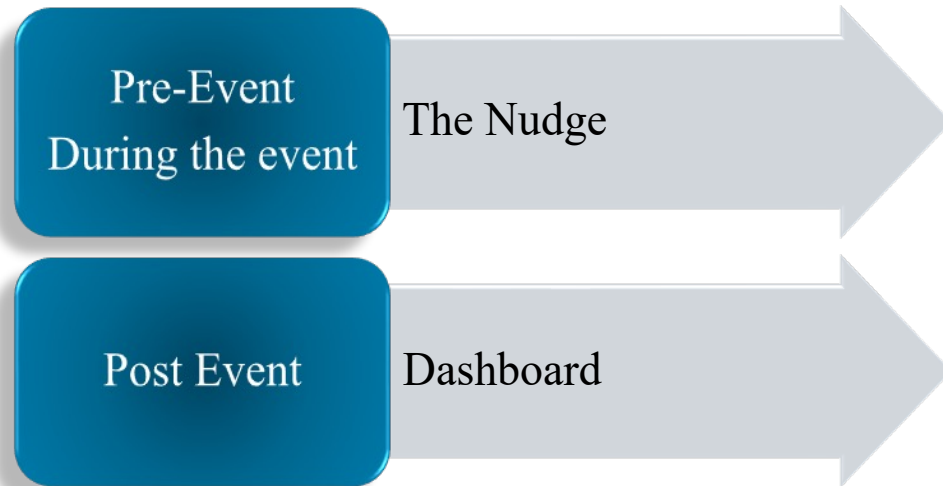


Figure 5.2
Advanced tools at ‘Summit’ stage (authors’ own representation)

5.2.4 Advanced tools at Summit stage

One of the pivotal moments in the Summit stage would be creation of advanced tools that can help subjects with deep holistic insights created through multi-faceted data points and laser focused inputs. The main highlights of this would be following:

- **Hyper personalized insights:** These insights should not be off the shelf or canned. It has to be customized as what may work for one person may or may not work for another.
- **Multi-faceted insights:** These nudges should not be built based on one particular aspect. From the study, we saw that even the best of the assessment tools may not incorporate some aspects of us. So, a robust 360degree insight with multiple data points and laser focused inputs would make it robust
- **Psychological safety:** For any subject to act on feedback or advise, there has to be a psychological safety net created. These insights and inputs need to come in a way and manner that is palatable for subjects to absorb and act, this cannot happen if the tools are created and function in a threatening environment. There needs to be sufficient

cover or cushion to create a psychological safety net for these tools to be absorbed and acted

- Real time: most psychometric assessments have reliability checks built into their assessments, over a period of time, the tools create sufficient checks and balances to ensure the test-retest validity is high – this ensures the results are not based off a particular emotion or point in time data but are fairly broad based. However, it's not possible to expect these psychometric tools to be hyper customized or work in a real time environment. There is a need to create real time tools that can give hyper personalized insights which are useful real time and are not generic in nature.

Pre-Event and During the Event - The Nudge

An example of Artificial Intelligence backed Neuroscience and CliftonStrengths based nudge incorporating physical, emotional and mental states would look like this: If we were to build an app that has inputs from subject's CliftonStrengths and their physical, emotional reading at any given point in time probably through an app, then the app would also use Neuroscience AI to provide constant hyper customized nudges to the subject. Details are given below:

Situation: Subject has top CliftonStrengths of Responsibility, Relator, Input, Belief and Connectedness and is in a neutral physical and emotional state. Subject is working on a critical assignment and must influence key stakeholders about a breakthrough idea.

The Nudge: Neuroscience and CliftonStrengths backed AI tool, or app would provide a hyper personalized nudge that factors in the CliftonStrengths and the physical/emotional state the subject is in. It would probably provide following timely advice:

- Considering the subject is in a neutral emotional state, its first nudge would be to reinforce positivity and increase conviction of the idea in the subject's mind itself. If the subject does not believe in the idea, we cannot expect others to believe in it. So,

Nudge #1 would look like this: Strengthening the Belief of the subject and increase the conviction of their idea so as to reinforce positivity

- Neuroscience emphasises a lot of importance on storytelling and brain synchrony in order to build trust, transparency among audience. Since this is a critical presentation to enhance the effectiveness, it is important for the subject to connect at all levels with the audience – intellectually and emotionally. Since subject does not have empathy in the top 5, nudge #2 may focus on the subject to combine Belief and their Connectedness to socially relate to the audience and remind them about the power of storytelling in Neuroscience.
- Further Nudge #3 would urge the subject to dial down Relator if the audience is large or amp up Relator and combine it with other top 5 theme of Input to ‘read the room’. With high Input the subject can read the micro signs of the audience even the subtle clues like lifting of the eyebrows or audience connection through nodding of the head etc. this will help subject to stay the course or change the course during the pitch to reach out to more members in the audience.
- All of these would work when emotional state is neutral. If subject is stressed and there is a tendency of subject to freeze on account of nay sayers in the audience, then the nudge would be very different.
- In terms of scenario planning, forecasting of freeze would be helpful if there is a history attached to it. Then the nudge would be like this: Amp up Responsibility, Input and Connectedness and watch out for blind spots on Belief. In this case, the subject happens to have Deliberative and Strategic as #6 and #8 CliftonStrengths which they need to leverage.
- Increasing Cortisol release: The app is aware that the subject is a pet parent who adores their furry children, and the app could store these pics. During stressful moments, while

the app is sending Nudges, it could also include some pictures of the furry children so that brain could reduce Cortisol and release more dopamine to reduce stress and improve happy feeling.

These offerings can be available either before the event (pre-event) during preparation phase or during the event itself as downloadable cue cards that one can access easily so as to not get distracted during the event.

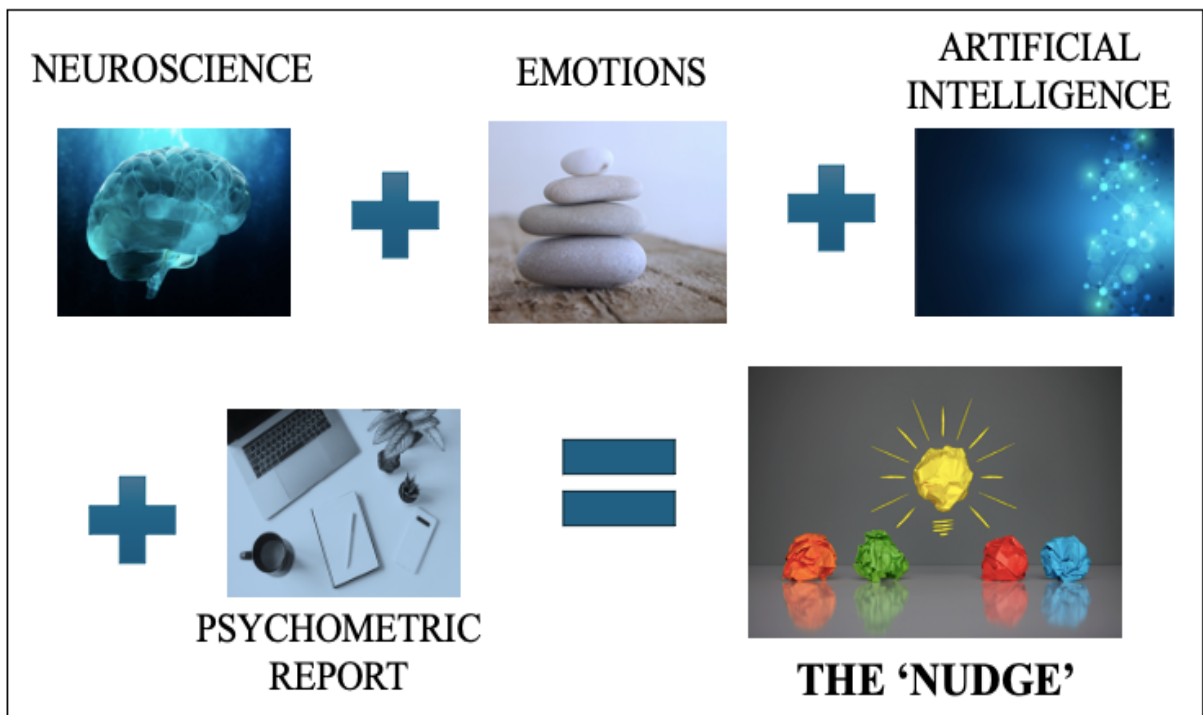


Figure 5.3
The Nudge' pre and during the event (authors' own representation)

Post-event: Dashboard

Post the event, the subject is able to compare situations and how different situations played out and what was the approach taken by the subject during the situations. This helps the subject to understand and course correct for similar situations and learn from the mistakes in a psychologically safe environment.

For instance, if a similar set of CliftonStrengths was used in multiple situations under similar test conditions then the dashboard showcases both situations together so the subject can understand and learn from both situations

Similarly, there could be gamified options available that help subjects to alter various reactions of the subject and see where that would have landed. Answers to hypothetical questions would be answered like ‘Would it have been better for them to react in a particular way and would it have impacted the outcome better’ can be made available.

Epistemic Metacognition strategies are highly evolved and sometimes can look like a scene from Science Fiction movie. However, the day is not far when subjects have a hyper personalized nudges in their fingertips, which will create a heightened awareness and power transformational strategies on Metacognition.

Though the power of such a creation could be intimidating, it is in no way an attempt to control the human brain and is only to be seen as an enabler that would result in higher order awareness and strategy for the subject. This is a stellar opportunity for humans to push the capability of how their brains work constantly and be aware and conscious of the same.

These tools are hyper personalized and operate in a safe environment since they are made available only to the subjects. In addition, the two modes of proactive nudge and reactive nudge brings an element of real time insights rather than wait for a delayed introspection.

These tools help forge deep connection and relatability of subjects to the concept of Metacognition making it real and in keeping this top of mind while navigating various situations.

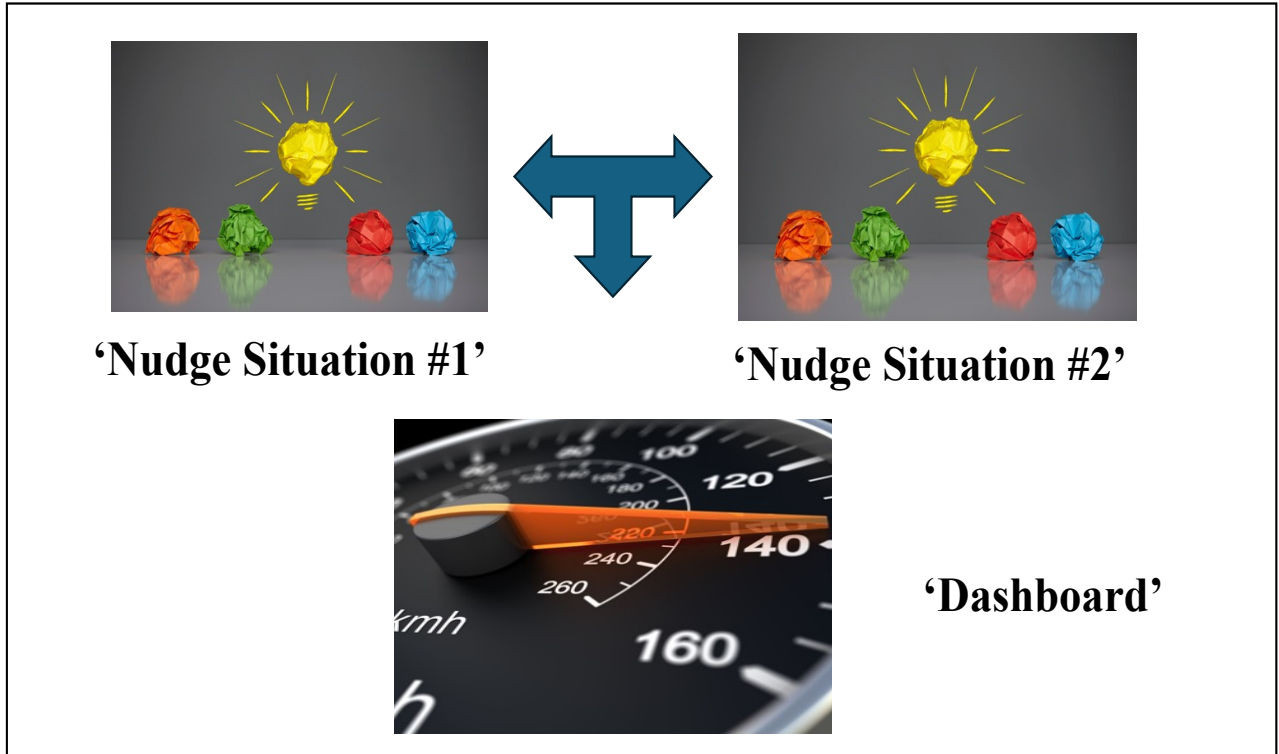


Figure 5.4
Elements of post-event 'Dashboard' (authors' own representation)

CHAPTER VI:

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

6.1 Summary

This research sought to assess the awareness levels of Metacognition and to arrive at simple framework that can be used to increase Metacognition strategies. Some of the main highlights of the study are as follows:

6.1.1 From Literature Review

- Gain deeper understanding of the concept of Metacognition in the corporate world among adults
- The study deep dived into various elements of Metacognition by taking a closer look at the definition, its elements and the imperatives
- Gain greater appreciation as to why Metacognition is an important concept by deep diving into the Future of work imperatives and the concept of Intersectionality, both of which are critical for survival of humankind
- Understanding concept of Meta Metacognition or Epistemic Cognition and how to transcend from Metacognition state to Epistemic Cognition

6.1.2 From the Research

- Through an approach of Phenomenology, the study unearthed key aspects about Metacognition awareness in terms of thinking, problem solving and learning styles
- Study also assessed the emotions and association that accompanies thinking, problem solving and learning styles.
- Focus was also given to unearth Barriers to Metacognition so as to suggest strategies to break the barriers
- Metacognitive strategies employed by respondents was captured to better understand the transition from Metacognition to Epistemic Cognition

Key highlights of the study are given below:

- With respect to Awareness and consciousness of problem solving, it can be said that the awareness of their own style is quite high, however the same cannot be said about the consciousness
- With respect to Awareness and consciousness of learning style, both are high for respondents
- Learning style evoked more positive emotions like ‘Happiness/Joy’, Elation, Curiosity, Excitement. However, problem solving evoked mixed emotions like Anxiety/Worry at one end and Excitement, Intrigue and calm/relaxed emotions.
- Association of thinking and learning style to automobile is fascinating – throws up myriad range of automobiles in their mind for variety of reasons.
- Taglines of what their top CliftonStrengths yielded was very interesting. This not only shows the infinite variation in the brain of subjects but also some level of introspection on their behavior and thinking patterns.
- Awareness of CliftonStrengths high among most, however Mixed bag with respect to current usage. Similar sentiment in terms of future usage.
- There are many barriers to Metacognition, some of them are intrinsic and some of them are extrinsic.
- Some devised their own strategies that work to increase Cognition. They range from simple techniques to more complex ones.
- These strategies include watching motivational videos to boost self-motivation at a generic level and it goes right upto perspective reframing and self-introspection techniques.

- Many mentioned about following CliftonStrengths nudges and understanding combination of their CliftonStrengths so as to formulate their Metacognition techniques.
- Understanding the thinking behind the thinking that is Metacognition is often made difficult due to several reasons. Some of them are extrinsic and some of them are intrinsic in nature.

6.1.3 Proposed Recommendations from the Research

- A Metacognition Maturity Model was proposed in order to create awareness of Metacognition and devise strategies to improve the same. Three main levels of the Maturity Model involved:
 - Base Camp: Recognize. A defining moment
 - Mid Camp: Reflect. An evolving journey
 - The Summit: Realize. Transformational maturity
- The study transcends beyond theoretical concept into a practical solution by proposing advanced tools that subjects in the Summit stage can utilize. This makes the theoretical concept more relatable and repeatable among wider audience
- These advanced tools can be modeled as app-based nudges that would incorporate multiple elements like Neuroscience, emotions, backed by Artificial Intelligence and psychometric tool based which makes it holistic and multi-dimensional.
- These nudges could happen before or during key events in the life of the subject or it could be post key events, more as a debrief.

In sum, it can be said that in order to create Metacognitive awareness, consciousness and build Metacognition strategies, one must follow the Metacognition Maturity Model. Below table captured the key elements of Metacognition Maturity model in a nutshell.

| MATURITY LEVELS | Base Camp: RECOGNIZE | Mid Camp: REFLECT | Summit: REALIZE |
|--|--|---|--|
| Characteristic | DEFINING | EVOLVING | TRANSFORMING |
| Level of Understanding one's own Metacognition | Little / inconsistent awareness | Fair amount of awareness | Very good understanding |
| Trigger | Mostly extrinsic triggers: Flavor of month / as needed | Combination of extrinsic and intrinsic triggers Event Based. | Mostly intrinsic triggers Deeply embedded into the core |
| Evidence | Negligible | Evident in large or event-based transactions | Visible and consistent evidence present |
| Strategy | Simple techniques done on ad hoc basis | Nudge based / customized techniques Basic Neuroscience understanding | Mature, hyper personalized techniques like Neuroscience based, AI backed stimuli |
| Integration of Approaches | Does not factor for physical, emotional states | Considerable integration into physical or emotional state | High synchrony between physical, emotional, mental states |
| Possible emotions | Anxious | Intrigued | Deeply committed |

*Table 6.1
Snapshot of Metacognition Maturity Model (authors' own representation)*

6.2 Implications

This study has wide reaching implications as Metacognition gains more and more prominence in today's complex world. Our race has evolved by utilizing and pushing the boundaries of our capability consistently over the millennia. The first and foremost way to evolve our human brain is to understand the thinking about thinking or metacognition.

Understanding the thinking about thinking or metacognition and creating metacognitive strategies has following benefits:

- Profound impact of Metacognition on Future of work and concept of Intersectionality has been established, thereby making Metacognition an imperative which has direct linkages to hard core business outcomes
- Study focused on understanding the process of 'thinking about thinking' or Metacognition among subjects by going into the process along with the emotions and associations related to the same. Specific focus was on the emotions associated which will make it more real and relatable and something that can be understood and replicated widely.
- Anchoring on a maturity model - Metacognition Maturity Model, helps understand the Metacognitive journey better and helps subjects self-realize where they stand and how they can move further in the journey. This serves as a checklist for subjects in a psychologically safe environment.
- Advanced tools can be leveraged to further the transition from Metacognition to Epistemic Cognition. Recommendation of practical tips, techniques make this study more pragmatic and ensures this transcends from being a mere theoretical concept.
- These tools are hyper personalized, are based on multi-faceted insights, available real time and help entrench concept of Metacognition deeply and make it top of mind. Since

these are available to the subjects alone, there is a psychological safety net available, and this enormously helps the subjects absorb and act on the feedback.

- Understanding and appreciation of both the concept of Metacognition maturity model and the utilization of advanced tools are important. One without the other would not be effective and will not be sustainable in the long run if it's not used in conjunction with one another. It is important subjects understand where they stand in the maturity model and are also able to benefit from the availability of tools.
- Being aware of Metacognition and creating strategies by using these tools helps subjects to unlock their potential which helps them to not merely survive in a complex world but actually push boundaries beyond the realms of imagination which is required to thrive in today's complex and ambiguous world.

6.3 Recommendations for Future Research

This study barely scratches the surface of a very vast and nuanced topic like Metacognition. Metacognition stands at the intersection of many fields of study which makes it extremely fascinating as a research topic.

There is a lot of ground to cover in terms of research that it would probably be overwhelming to even list them here, however some of them are given below:

Further research is required to deeply forge the concept of Neuroscience to help create Metacognitive strategies. There is a lot of research happening in the field of Neuroscience and measurement of brain activity which is highly beneficial to our race in furthering the capabilities. Applying the knowledge of Neuroscience to create metacognitive strategies is a great opportunity for further research.

In addition, there should be good measurement techniques that help assess the impact before applying Metacognitive strategy and post application which shows the effectiveness and efficiency of the Metacognitive strategies.

Another research opportunity would be to assess the impact of Metacognition in a team construct. This is an opportunity area that needs to be tapped into, and it will be worthwhile for further research to be done in this space. Since Metacognition has a significant impact on Cognitive Diversity, it will be important to understand how the complementarity of Strengths in a team will have a bearing on team construct and therefore on the hardcore business outcomes.

With Artificial Intelligence being a favorite topic, it will be interesting to see how to leverage AI for creating hyper personalized nudges. Study focusing on understanding how AI can help us be more aware of ourselves could be a good starting point. This would help in channelizing AI more positively and contribute meaningfully to furthering human race

Further research is also required on unearthing used cases of subjects who have devised their own metacognitive strategies. This will give more teeth to the research and help convert a theoretical concept into practical and usable one.

6.4 Conclusion

The fundamental premise of this study is to equip and enable humans to be more aware of themselves and appreciate the value they bring so as to help them thrive in the future world. With the world getting more complex due to changes in technological advancements and the increased nuance of a diverse world order, it is imperative for humans to push their boundaries in a way that has not even been imagined previously.

This volatility, ambiguity and complexity is going to continue and get more intense. While there is little or no control of these external factors, what is actually controllable is the way in which humans lead the change that is entirely within the ambit of the subjects. This calls for an approach where humans need to thrive and not merely succeed, this is almost like adjusting the vector of wind and not merely adjusting the sails.

This study helps in all of the above through the following means:

1. Establishing the importance of Metacognition and an urgent need to create widespread awareness of the concept and create strategies
2. Conceptualization of Metacognition Maturity Model which provides self-awareness and realization of where the subject is in the journey of Metacognition
3. Creation of advanced tools that aid in creating Metacognition strategies which makes the concept more practical and relatable. These tools are hyper-personalized, based on multiple insights and are real time.

In closing it can be said that through this study, we have just begun the journey of Metacognition, there are still many more milestones left to be conquered in this journey. In the midst of all of the change and uncertainty, there is hope in our heart for the future. A future made possible through understanding and appreciation of the beautiful mosaic that humans are made of. A future made possible by embracing the concept of Metacognition and creating strategies that help us thrive in the new world order as the sustenance of human race may well, depend on it.

At this juncture, the lines in the poem 'Stopping by Woods on a Snowy Evening' by Robert Frost seem very apt: The woods are lovely dark and deep, But I have promises to keep, and miles to go before I sleep, and miles to go before I sleep (Robert Frost, 1995)

APPENDIX A
SURVEY COVER LETTER

Hello

Thank you for agreeing to spend your valuable time with me today. Like I mentioned earlier, I would like to have an in-depth discussion around the topic of Cognition and CliftonStrengths with you for purpose of my Doctoral research. This discussion may take around 45 minutes to an hour.

I would like to assure you that our discussions will be confidential and will be used strictly for academic purposes and will not be shared at an individual level.

Please let me know if you have any questions, else we can begin our discussions.

Thank you again!

APPENDIX B
INTERVIEW GUIDE

Part A – Understanding Cognition / Meta Cognition

We as human beings are very different in the way we approach things. Can you let me know your cognitive style

1. Talking about your thinking style.... Can you please describe how you normally think?
How do you approach problem solving for instance?
2. What are the emotions that come to you when you have to think about a problem that needs solving? Why do you think you feel that way?
3. If you were to think of your thinking style to a car, which one would it be (E.g.: Would it be a race car / vintage car etc)? Why do you say so?
4. I wish to understand your learning style. How do you learn / assimilate information? What are the modes and methods you adopt to learn a new concept / skill?
5. What are the emotions that come to you when you have to learn a new concept / skill / topic? Why do you think you feel that way?
6. If you were to think of your learning style to a famous personality, who would come to your mind (It could be anyone)? Why do you say so?
7. Do you spend much time thinking about how you learn or how you think? Do you think that is important at all?
8. After giving it some thought, would you do this any differently?
9. Think of a close family member / friend, how do you think they learn / think? Are there any differences between your style and theirs?

Part B - Understanding your CliftonStrengths / CliftonStrengths usage:

10. You have recently done your CliftonStrengths assessment, what are your top five CliftonStrengths in the same order?
11. Do you remember your CliftonStrengths #6 to #10?
12. What were some emotions you went through when you received your report? Why do you think you felt that way?
13. Did the top 5/10 themes resonate with you? Which ones surprised you and why?
14. If you were to think of your top 10 themes and come up with a tagline or a sentence or a quote, what would it be?
15. From the time you did your CliftonStrengths assessment and now, how have you used your CliftonStrengths in your everyday professional life? Which of the statement is true?
 - Use it one or more times a day
 - Use it once a week
 - Used it once in last month
 - Used it less frequently than a month
 - I have not used it at all

If option 1, 2 or 3 answered, ask this question:

16. You mentioned you have used CliftonStrengths once a month or more frequently (as per response earlier), Can you please describe the situation where and when you used? Also, please let me know how this has helped you in your professional journey

Part C – Metacognitive Strategies:

17. In the next 12 months, do you plan to use your CliftonStrengths to advance your professional career?

Yes / No

If yes to above question

18. Do you have any plan / strategy on how you will use the CliftonStrengths in your professional life? Can you please describe this in detail?

19. Do you see any advantage that you wield over others due to your awareness and usage of your CliftonStrengths? Why do you say so?

20. Finally, can you think of any other strategies (apart from CliftonStrengths) that you will be using to improve your Cognitive Style for advancing your career – this could be from your experience or through experience of others? ...

Anything else?

Thank the respondent, reiterate confidentiality and close the interview

Additional questions:

To be asked as relevant basis on the discussions

According to you what are the barriers to Metacognition, why is this so difficult for people to follow?

Anything else you wish to share, about your coaching experience and from your experience on other tools (DISC/MBTI/Emergenetics etc.)

Thank you for your time, really appreciate your valuable insights. I will share my thesis with you once it is done.

Good day!

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