

SmartQA Wisdom

ON

SMART

UNDERSTANDING



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STAG Software

Wisdom on Smart Understanding is an insightful exploration of the principles of deep comprehension and intelligent testing. The book presents a fresh perspective on learning, problem-solving, and structured inquiry, integrating lessons from real-world experiences and philosophical anecdotes.

Core Themes & Insights

The book weaves together ancient wisdom and modern methodologies to illustrate the importance of understanding over mere knowledge accumulation. Through engaging stories such as *The Parable of the Half-Empty Teacup* and *A Tale of a Doctor's Diagnosis*, it emphasises the necessity of keeping an open mind, deferring unnecessary details, and focusing on what truly matters in the moment.

It introduces systematic approaches to comprehension, such as:

- **Landscaping:** A method for breaking down complex systems to see the bigger picture.
- **Deep Diving:** A technique to probe into finer details for thorough understanding.
- **The Google Earth Analogy:** Demonstrating how different levels of focus yield different insights, much like adjusting eye altitude in mapping software.

Application to SmartQA & Testing

At its core, *Wisdom on Smart Understanding* serves as a guiding philosophy for SmartQA (Smart Quality Assurance). The book introduces HyBIST (Hypothesis-Based Immersive Session Testing), a revolutionary framework that enables efficient and intelligent testing through structured questioning, hypothesis-driven evaluation, and contextual analysis.

By integrating cognitive science with software quality assurance, it encourages professionals to develop an inquisitive mindset—one that sees beyond specifications to grasp the essence of systems and their interactions. It highlights the importance of asking the right questions at the right time to uncover flaws, ensure reliability, and build resilient digital solutions.

A Journey to Smarter Understanding

Wisdom on Smart Understanding offers a transformative approach to thinking with clarity, questioning with purpose, and making informed decisions. With a blend of storytelling, practical methodologies, and strategic frameworks, it offers valuable insights for those seeking clarity and efficiency in problem-solving and decision-making.

About the author

Thiruvengadam Ashok is the CEO of STAG Software Private Limited & Co-Founder of Pivotrics, based in Bengaluru, India. Ashok has dedicated his career to the pursuit of quality assurance in software, continuously evolving his approaches to match the needs of modern systems. He is the creator of HyBIST, an innovative approach to SmartQA that has revolutionised how teams approach hypothesis-driven testing.

Ashok's professional life is deeply intertwined with his personal philosophy. A passionate ultra-distance runner and long-distance cyclist, he applies the principles of endurance and exploration to his work, constantly seeking out new ways to improve software quality. He is also an avid wordsmith, using his love of language to weave both poetry and technical innovation into his life's work.

He holds an M.S. in Computer Science from the Illinois Institute of Technology, a Bachelor's degree in Electronics and Communication Engineering from the College of Engineering, Guindy, and a Postgraduate Diploma in Environmental Law from the National Law School of India University, Bangalore. His life maxim—"Love what you do & Do only what you love"—is reflected in everything he undertakes, from professional projects to personal passions.

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THE PARABLE OF HALF EMPTY TEACUP

The essence of understanding

Good understanding isn't about knowing everything in detail; it's about discerning what's truly necessary and learning to discard or defer what isn't required at the moment. Let me share a beautiful story about Buddha that illustrates this wisdom.

The learned man's quest

Once upon a time, there lived a wise and learned man who had mastered numerous languages, philosophies, and religions. Proud of his vast knowledge yet eager to learn more, he heard of a man named Buddha, renowned for his extraordinary wisdom. Driven by his desire to enhance his knowledge, he embarked on a journey to meet Buddha.

When he arrived, he introduced himself as a scholar well-versed in various philosophies and expressed his wish to learn from Buddha. Humbly, he requested Buddha to teach him.

The wait and the growing frustration

Buddha welcomed him and kindly asked him to sit in a corner of the room. Hours passed as Buddha went about his work, and the learned man grew increasingly restless. As the sun began to set, Buddha suggested they resume the next day.

After a night's rest, the scholar returned promptly in the morning. Once again, Buddha requested him to sit down and wait. The hours dragged on, and by evening, the man was thoroughly exasperated. Frustrated, he approached Buddha and said, "Sir, I am deeply upset that you are ignoring me. I hope you understand that I, too, am a man of considerable knowledge."

The tea lesson

Buddha smiled serenely and said, "Come, my dear friend, let us have a cup of tea." He took a teapot and began pouring tea into the man's cup. The tea filled the cup to the brim, but Buddha continued pouring, and the tea began to spill onto the floor.

Alarmed, the man exclaimed, "Stop! The cup is full. It cannot hold any more!"

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Buddha stopped pouring, looked at him, and said gently, “My friend, your mind is like this cup—already full of knowledge, with no space left to receive anything new. Empty it, and you will be ready to learn.”

In that moment, the scholar realised his folly.

The parallel to testing practices

As a test practitioner, understanding a complex system is often fascinating. However, the real challenge arises when passionate people attempt to explain the system in exhaustive detail. That’s when I must firmly say, “STOP. I don’t need to know this right now. I’ll ask when it becomes relevant.”

The wisdom of deferring

Good understanding is like the tea cup—partially full. It’s about deferring what isn’t needed now to a later time. Trying to grasp everything at once only leads to overwhelm.

Smart testing: agile minds and clear vision

Smart testing stems from clear understanding, which comes from actively questioning with an agile mind—not passively absorbing and becoming weighed down by unnecessary details. By lightening your mental load, your mind becomes like a nimble goat, capable of scaling the mountain of complexity. From the peak, you gain a clear view of the entire system, and the issues naturally stand out.

The HyBIST approach

Hypothesis Based Immersive Session Testing (HyBIST) is built on this principle of deferring unnecessary information and actively questioning to understand complex systems quickly and test smartly.

A TALE OF DOCTOR'S DIAGNOSIS

The weight of uncertainty

After a long day at work, Joe returned to his apartment, exhausted. As he stepped inside, a groan in the darkness startled him. Flicking on the light, he found his roommate David curled up on the sofa, moaning in pain.

"Sorry, mate," David said weakly. "Feels like I'm in labour."

"Let's go to the doctor," Joe urged. But David refused, saying the pain had eased slightly, and he preferred to wait until morning. Concerned, Joe went to bed. Yet, his thoughts shifted uneasily between worry for David and his own struggles to understand a complex project at work.

The challenge of clarity

Joe was lost in his new project, which lacked documentation and had key contributors in another continent. His manager's advice—"be creative and ask good questions"—felt unhelpful as he struggled to connect the dots. The application remained an unsolved puzzle, its pieces scattered without clear connections.

The lesson of connection

In the middle of the night, Joe woke to find David pale and drained, finally agreeing to see a doctor. At GoodLife Hospital, Dr Holmes greeted them warmly and, after observing David, deduced his symptoms with precision.

Joe watched as the doctor's structured yet adaptive questioning unraveled David's condition. Questions about lifestyle, symptoms, and habits weren't random—they were deliberate, linking small details to paint a larger picture. Joe realised that this approach mirrored what he needed at work: gather meaningful fragments, connect them, and uncover the system's structure through thoughtful inquiry.

The power of understanding

"Do you have any questions, David?" the doctor asked.

"YES!" said Joe emphatically, thumping the doctor's desk as his reverie broke. Realising his faux pas, he sheepishly glanced at a confused David and an amused Dr Holmes.

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“Guess you solved the problem. Good understanding requires an open mind and connecting the dots,” said Dr Holmes, surprising Joe.

“Wow, you’re a mind reader!” Joe exclaimed. “Guess you really are Sherlock Holmes!”

Dr Holmes smiled and replied, “Good understanding is like mind reading. Good day, gentlemen.”

Joe escorted a bewildered David out of the doctor’s office. As they passed the reception, he cheerfully called out, “Have a great day!” to the pretty receptionist, even winking at an elderly lady seated nearby.

LANDSCAPING – A SYSTEMATIC APPROACH TO UNDERSTANDING

Joe left the doctor's office with a newfound clarity. Watching Dr Holmes diagnose David's illness had given him an epiphany—understanding an application wasn't about knowing every detail upfront but about asking the right questions. The doctor hadn't just thrown random questions at David; he had systematically uncovered connections between symptoms, habits, and history to reach a diagnosis.

Joe realised he needed to adopt the same structured approach at work. Instead of blindly exploring the application, he needed to break it down, understand its elements, and methodically piece it together. This was his way forward.

From diagnosis symptoms to understanding systems

Good questions matter more than the availability of answers. It's not about what you know; it's about knowing what you don't.

Joe's frustration with understanding a new application mirrored his experience at the doctor's office. Just as Dr Holmes decomposed David's symptoms into smaller elements—lifestyle, diet, work routine, past medical history—Joe realised he had to do the same with his application. Decomposing the system into its key elements and mapping their connections would allow him to ask meaningful questions and develop a structured understanding.

He now related to the powerful technique called Landscaping, a core concept in Hypothesis-Based Immersive Based Testing (HyBIST). Landscaping is a systematic way to generate questions that help testers understand the end users, the application, and the context in which it operates. It is based on a simple principle:

“Good questions matter more than answers. Even if questions do not yield immediate answers, it is valuable to know what you don't know.”

Joe now had a roadmap for tackling his problem. He wasn't going to aimlessly explore the system; he was going to landscape it.

Understanding the end-users

Joe knew that the first step was not diving straight into the application's features but understanding its users. After all, the goal of testing is to ensure the product meets the expectations of end users. But how could he truly understand those expectations?

Dr Holmes had started from external factors—David's lifestyle and habits—before focusing on internal symptoms. Joe realised he had to do the same.

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1. Start from the outside: Begin with the marketplace—who are the customers? What are the different types of customers who will use this application?
2. Identify end users: Within each customer type, who are the different user types (or actors)?
3. Define use cases: What are the key requirements and use cases for each type of user? What do they expect from the system?
4. Map to technical features: Which features of the application fulfil these user needs?
5. Focus on attributes: Viewing each feature from the user's perspective, Joe needed to identify the key attributes that mattered—performance, security, usability, reliability—and ensure they were testable.

Joe realised that without answering these questions, any attempt at testing would be like diagnosing an illness without knowing the patient's history.

Moving inwards

Once Joe understood who the users were and what they needed, he had to move deeper—towards the application's internal workings.

1. Understand the deployment environment: Just as a person's health is affected by their surroundings, an application's behaviour depends on its deployment environment—hardware, cloud infrastructure, integrations, and constraints.
2. Analyse the architecture: Just like the body has different systems (nervous, digestive, circulatory), an application has different architectural layers—databases, APIs, front-end, back-end—and Joe needed to understand how they interacted.
3. Feature profiling: Who uses which feature? How frequently? What's the business priority of each feature?
4. Feature interactions: Features don't exist in isolation. Just as medication can have side effects, features influence one another. Joe had to map dependencies and interactions between them.
5. Feature states: Finally, was a feature new, modified, or unchanged? This would help prioritise where to focus testing efforts.

Joe saw that Dr Holmes had followed the same principle—starting broadly and narrowing down. He had examined David's external symptoms, considered his history, then tested for internal causes. Joe's job as a tester was no different.

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The power of landscaping

Joe now understood that Landscaping was his way forward. It wasn't about randomly exploring the application but about methodically identifying key elements and their relationships to generate meaningful questions.

Dr Holmes had solved David's problem by asking the right questions, in the right sequence, at the right time. Joe realised that testing was no different. Understanding a system wasn't about memorising every detail—it was about connecting the dots.

As he walked into the office the next morning, Joe felt a sense of purpose. He finally had the clarity he had been missing. He wasn't just going to explore the system; he was going to landscape it.

And in doing so, he was going to ask the right questions and find the right answers—just as a good doctor would.

LEARNINGS FROM GOOGLE EARTH

The question of focus

Recently, I was chatting with my colleagues about the topic of ‘focus’. I posed a seemingly simple question: “Are we focused enough in our business?” The answers I received were surprisingly varied.

I had assumed the question was straightforward, leaving no room for confusion. This unexpected variation set me thinking. Personally, I believed we were sharply focused on what we do—and that this was largely true. So why did the responses differ so much?

A matter of perspective

To explore this further, let me share an analogy. Imagine viewing Bangalore from an altitude of 40,000 feet (courtesy of Google Earth). At this height, what do we see? We observe clusters of buildings and green-coloured water bodies that mark the lakes. The view is expansive but lacks detail. Now, let us zoom in to an altitude of 4,000 feet. What appears? Suddenly, specific landmarks like the indoor stadium and the nearby velodrome come into view. We notice more greenery around the stadium. But here’s the catch—this is only a part of Bangalore, not the entire city. At this lower altitude, the eye sees only a small section of the whole.

Lessons from altitude

What does this little Google Earth experiment teach us?

What we see depends on the ‘eye altitude’. The expanse we observe is influenced by the ‘eye altitude’. The level of detail we perceive changes with the ‘eye altitude’. The inferences we draw rely on the clarity of data, which is, in turn, dependent on the ‘eye altitude’.

Reflecting on this, I realised the root of the differing responses to my question on focus. My analysis of focus—“what we see”—was based on a certain perspective or ‘eye altitude’ (40,000 feet). From this high-level view, I saw the whole picture, understood the overall context, and then zoomed in on specific businesses.

In contrast, my colleagues were looking from a lower ‘eye altitude’ (4,000 feet). They saw only the stadium and its surroundings, missing the rest of Bangalore. Based on their limited view, they concluded that my focus wasn’t sharp enough.

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Defining focus

For me, focus is about setting the context at the right ‘eye altitude’, determining the size of the canvas, and capturing the image within it. If what we do fits into this canvas, we are focused enough. If it doesn’t, then perhaps we are digressing.

As a software testing professional, focus is vital. With limited time to test software, I must ensure it meets release criteria. Thorough testing would be ideal, but it’s often impractical given time constraints. Hence, I focus on what’s most important—what matters most to the customer and which features are most frequently used.

By setting the right context and adjusting my ‘eye altitude’, I ensure my efforts are directed where they are most needed, delivering quality and efficiency in equal measure.

ACHIEVING DEPTH IN UNDERSTANDING: THE DEEP DIVE APPROACH

The need for deep understanding

To test effectively and efficiently, a solid understanding of the entity under scrutiny is critical—whether it's a small component or a complex requirement. Relying solely on provided specifications can be risky, as they may be incomplete. With time as a limiting factor, how can the necessary depth of understanding be gained for thorough validation? The answer lies in performing a Deep Dive.

What is a Deep Dive?

A Deep Dive is characterised by focused techniques, agility, speed, and a 360-degree perspective. Much like diving into the depths of an ocean, where time is limited and visibility fades, asking the right questions is essential to illuminate the entity's functionality and purpose. This involves examining available specs, leveraging past experiences, and gaining a comprehensive understanding of the entity.

Key steps to performing a Deep Dive

1. Describe succinctly

Summarise the entity's purpose and expected behaviour in the fewest possible words. This exercise forces clarity and sharpens focus, making it easier to identify gaps in understanding. Start with reading, exploring, and crafting a concise description of what the entity is meant to do.

2. Understand inputs and outcomes

- Identify what the entity requires as inputs and what it produces as outputs.
- For smaller components, inputs might be granular, while larger flows might involve complex data.
- Go beyond obvious or stated outputs—explore unintended behaviours to ensure comprehensive validation.

3. Understand attributes

- Non-functional attributes play a significant role in modern systems.
- Consider aspects like performance, usability, security, and scalability.
- Empathy for the end user and a broader perspective of the system's goals help identify critical attributes that must be prioritised.

4. Understand behaviour conditions and criteria

- Delve into the conditions governing functional behaviour.
- Establishing a behavioural model enables robust test design.

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- Conditions derive from inputs, while criteria stem from intended outcomes.
- Iterating between these perspectives refines understanding and ensures thorough coverage.

5. Understand structural aspects

Move beyond a black-box perspective and investigate how the entity is built:

- What's new or modified in the code?
- What are the interfaces, layers, and connections?
- What challenges or constraints are imposed by the environment or technology?
Understanding structural details helps refine scenarios, improve testability, and streamline automation.

6. Hypothesise potential issues

- Use logic and experience to identify potential issues.
- This mindset sharpens focus by exploring what might go wrong:
 - Use behaviour conditions to devise scenarios from a forward perspective.
 - Use acceptance criteria to craft scenarios from a backward perspective.
 - Use hypothesised faults to approach scenarios from the middle.

7. Understand who the end users are

- Consider the end users—human or machine—to gain a broader perspective on the entity's criticality and usage.
- This step is especially vital for high-level requirements and workflows, ensuring alignment with real-world scenarios and user needs.

8. Understand interactions

No entity operates in isolation. Study its dependencies and interactions:

- How does the entity rely on others?
- Is the entity robust against external influences?
- Does it function as a “good citizen” in the system, avoiding adverse impacts on other entities?

The dynamic and iterative nature of deep diving

These steps are not rigidly sequential but form part of a dynamic process. Revisiting, revising, and clarifying as new information emerges is essential for developing a deeper understanding and designing minimal yet sufficient test scenarios.

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A Deep Dive is not a superficial splash—it is a disciplined and strategic approach that ensures comprehensive understanding. By systematically addressing each of these facets, a holistic perspective of the entity under test can be achieved, leading to effective test case design and high-quality automation.

THE PATH TO SMART UNDERSTANDING

The concept of Smart Understanding revolves around the ability to break down complex systems, ask the right questions, and connect the dots for deeper insight. The parable of the half-empty teacup illustrated the importance of keeping an open mind, making space for learning rather than being weighed down by unnecessary details.

In the tale of the doctor's diagnosis, a structured approach to questioning was shown to be instrumental in unraveling complexity. This led to the concept of Landscaping, a methodical way to understand systems by decomposing them into meaningful elements. Google Earth's lessons on focus demonstrated how perspective influences understanding, and Diving Deep reinforced the need to go beyond surface-level exploration, examining details with precision and intent.

Two key concepts—the Landscaper and the Deep Diver—enable systematic exploration and deep analysis, ensuring SmartQA through structured inquiry.

Two key concepts for smart understanding

SmartQA is rooted in clarity—visualising what is intended, what is present, and what may be missing. The drive to seek this clarity results in meaningful questioning, leading to better understanding and, ultimately, more effective testing.

Testing extends beyond verification; it involves discovery—identifying:

- What should be there but isn't
- What is there but is incorrect
- What is present but should not be

It also requires understanding the impact of change, whether inside or outside the system. Achieving this understanding necessitates exploration from multiple perspectives, including end-user needs, system construction, technology, environment, development, and deployment.

To facilitate this, two tools of HyBIST support systematic inquiry: the Landscaper & Deep Diver.

Tool #1: Landscaper— Seeing the whole picture

When testing an entity—whether a small component, a business flow, or an entire system—the first step is to perform a landscape:

1. Start with the end users
 - Identify who the users are, what they interact with, and their expectations.

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- Determine the key business use cases that the system must fulfill.
2. Understand the deployment view
 - Analyse how the system is deployed and integrated with other components.
 3. Examine the system's construction
 - Identify what is newly built and what has been modified.
 4. Analyse system structure & interactions
 - Understand how entities interact, what dependencies exist, and what could be impacted by changes.
 5. Delve into architecture & technology

Via Landscaping, a structured understanding of the system is gained, ensuring that critical insights are not overlooked.

Tool #2: Deep diver – Examining the details

Once a holistic understanding is achieved, the next step is to dive deeper into individual components.

1. Understand inputs
 - Identify what inputs the entity receives, sources, formats, and variations.
2. Examine outputs
 - Determine the expected outputs under normal and error conditions.
 - Verify whether all possible outcomes have been considered.
3. Understand intended behaviour
 - Discover conditions that transform inputs into outputs.
 - Recognise if behaviour is input-driven or state-dependent.

By diving deep, hidden conditions, dependencies, and behavioural nuances become apparent, leading to improved test coverage and more effective issue detection.

The power of smart understanding

Understanding has been established as the foundation of SmartQA.

- The Parable of Teacup highlighted the importance of mental openness for effective learning.
- The Doctor's Diagnosis demonstrated the value of structured questioning.

SMARTQA WISDOM ON SMART UNDERSTANDING

- Landscaping provided a methodical way to explore and map systems.
- Lessons from Google Earth emphasised perspective and focus.
- Diving Deep reinforced the need to examine systems with precision.

With the Landscaper and the Deep Diver, a logical and structured method for decomposing systems, framing the right questions, and driving meaningful testing is established.

Smart Understanding is not merely about testing—it is about thinking, questioning, and discovering. Clarity, structured exploration, and deep inquiry lead to mastery.

These key HyBIST tools provide the framework for effective SmartQA, ensuring that every test effort is purpose-driven, efficient, and impactful.



"We are SmartQA evangelists. For over two decades we have transformed how individuals, teams and organisations have practised testing. We espouse methodology to test intelligently. Our mission - Elevate to high performance via SmartQA."
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The HyBIST Approach to SmartQA - MASTERCLASS

Testing is deep probing to seek clarity and in the process uncover, preempt issues rapidly. The HyBIST approach enables designing smart probes and probing the system smartly.

<https://smartqa.academy/courses/smartqa-using-hybist>



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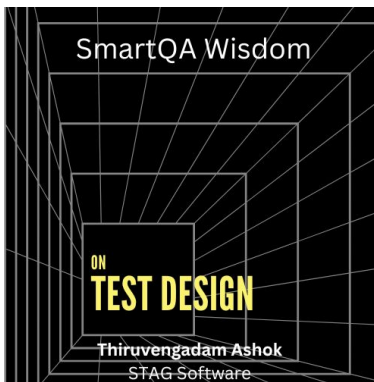


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