Advanced Level
Agile Test Leadership at Scale
(CTAL-ATLaS)
Syllabus

v1.0

International Software Testing Qualifications Board

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Revision History

Version	Date	Remarks
v1.0	2022/05/13	Release version

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Acknowledgments

0   Introduction

0.1   Purpose of this Syllabus

This syllabus forms the basis for the International Software Testing Qualification Board for Agile Test Leadership at Scale at the Advanced Level. The ISTQB® provides this syllabus as follows:

1.   To Member Boards, to translate into their local language and to accredit training providers. Member Boards may adapt the syllabus to their particular language needs and modify the references to adapt to their local publications.

2.   To certification bodies, to derive examination questions in their local language adapted to the learning objectives for this syllabus.

3.   To training providers, to produce courseware and determine appropriate teaching methods.

4.   To certification candidates, to prepare for the certification exam (either as part of a training course or independently).

5.   To the international software and systems engineering community, to advance the profession of software and systems testing, and as a basis for books and articles.

0.2   The Agile Test Leadership at Scale Certification

The Advanced Level Agile Test Leadership at Scale (ATLaS) qualification is aimed at people who work in an organization that is pursuing agility at scale or business agility and already have a basic understanding of agile and agile testing.

This includes people in roles such as test manager, head of testing, quality coach, test analyst, technical test analyst, test automation engineer, quality engineer, quality assurance, member of an agile team, member of a leader group of multiple agile teams, IT director, project manager, release train engineer, scrum master, product owner, and management consultant.

0.2.1   Connection to Other Certifications in the ISTQB® Scheme

The Advanced Level Agile Test Leadership at Scale builds on the qualifications in Foundation Level Certified Tester and Foundation Level Agile Tester. Certified Tester provides the basic knowledge and competencies in software testing. Agile Tester expands on Certified Tester and explains how testing in an agile team is performed.

As Agile Test Leadership at Scale focuses on the organizational level, it supplements the Advanced Level Agile Technical Tester focusing on technical practices. It also supplements Advanced Level Test Management, which focuses on projects and not on organizational aspects. In addition, Advanced Level Test Management covers traditional approaches and hybrid approaches.

0.3   Examinable Learning Objectives and Cognitive Level of Knowledge

Learning objectives (LOs) support the business outcomes and are used to create the Advanced Level Agile Test Leadership at Scale exams.

In general, all contents of this syllabus are examinable at a K1 level, except for the Introduction and Appendices. That is, the candidate may be asked to recognize, remember, or recall a keyword or

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concept mentioned in any of the chapters. The specific LOs levels are shown at the beginning of each chapter, and classified as follows:

- • K1: Remember

- • K2: Understand

- • K3: Apply

- • K4: Analyze

Further details about cognitive level of knowledge are given in **Appendix A**.

All terms listed as keywords just below chapter headings shall be remembered (K1), even if not explicitly mentioned in the learning objectives.

0.4   Hands-On Objectives

LOs and hands-on objectives (HOs) focus on practical skills and competencies. However, HOs are not examined by the multiple-choice exam questions. It is expected that HOs are covered either as part of an accredited training or as self-study.

The specific HOs levels are shown at the beginning of each chapter, and classified as follows:

- • H0: This can include a live demo of an exercise or recorded video. Since this is not performed by the trainee, it is not strictly an exercise.

- • H1: Guided exercise. The trainees follow a sequence of steps performed by the trainer.

- • H2: Exercise with hints. The trainee is given an exercise with relevant hints to enable the exercise to be solved within the given timeframe.

- • H3: Unguided exercises without hints.

Training material owners and people who self-study can find additional guidance on how to include practical elements to fulfill HOs in the ATLaS Accreditation Guidelines.

0.5   The Advanced Level Agile Test Leadership at Scale Certification Exam

The Agile Test Leadership at Scale certification is created and made available on the ISTQB® website incrementally. The contents can be used for training and learning as it is published.

From v1.0 MVP it is also possible to take an exam and get certified. See ISTQB® website for details about the ATLaS v1.0 exam.

The Advanced Level Agile Test Leadership at Scale Certificate exam will be based on this syllabus and the Advanced Level Agile Test Leadership at Scale body of knowledge (BOK). Answers to exam questions may require the use of material based on more than one section of this syllabus and body of knowledge. Standards and books are included as references, but their content is not examinable, beyond what is summarized in the syllabus or body of knowledge from such standards and books.

Entry Requirement Note: The ISTQB® Foundation Level certificate and Foundation Level Agile Tester shall be obtained before taking the Advanced Level Agile Test Leadership at Scale certification exam.

0.6   Accreditation

An ISTQB® Member Board or its agent may accredit training providers whose course material follows this syllabus and the body of knowledge. Training providers should obtain accreditation guidelines from the Member Board or its agent that performs the accreditation. An accredited course is recognized as conforming to this syllabus and the body of knowledge, and is allowed to have an ISTQB® exam as part of the course.

Training providers are encouraged to use the contents of this certification in other contexts and to build the training material incrementally. Feedback from such activities will be considered before the full certification is released.

The accreditation guidelines for Advanced Level Agile Test Leadership at Scale follow the general Accreditation Guidelines published by the Processes Management and Compliance Working Group.

0.7   Level of Detail

The level of detail in this syllabus allows internationally consistent courses and exams. In order to achieve this goal, the syllabus consists of:

- *General instructional objectives* describing the intention of the Advanced Level Agile Test Leadership at Scale Level

- *A list of keywords* that students must be able to recall

- LOs for each knowledge area, describing the cognitive learning outcome to be achieved

- A description of the key concepts, including references to sources such as accepted literature or standards

The syllabus content is not a description of the entire knowledge area of testing in agile organizations; it reflects the level of detail to be covered in Advanced Level Agile Test Leadership at Scale training courses.

0.8   How this Syllabus is Organized

There are currently five *planned* chapters with examinable content. The top-level heading for each chapter specifies the time for the chapter; timing is not provided below chapter level. For accredited training courses the first three chapters require a minimum of 5.5 hours of instruction. The five planned chapters are:

- Chapter 1: 60 minutes, Quality Assistance

- Chapter 2: 120 minutes, Improve Quality and Flow in a Value-Driven Organization

- Chapter 3: 150 minutes, Continuous Improvement of Quality and Testing

- Chapter 4: x minutes, Agile Test Strategy at Scale (draft title)

- Chapter 5: x minutes, Agile Test Process at Scale (draft title)

0.9   Business Context

Organizations strive to improve their business agility to provide valuable products and services in a changing world. A key way to improve business agility is to transform the culture and mindset by using different principles, frameworks, disciplines, and methodologies such as agile, lean, and DevOps, which we here cover with the term "business agility." One common principle in these frameworks and disciplines is the focus on delivering value with the quality that customers demand, i.e., customer-focused. Therefore, the term value-driven is used to describe organizations that strive to achieve business agility regardless of their various ways of working.

Agile started as a way to improve how software was delivered iteratively. It focused on a small delivery team that could release software in shorter iterations than the traditional software development lifecycles. As the popularity of the agile methods grew, it became apparent that at times there was a need for several delivery teams to collaborate in order to develop larger and more complex systems. Therefore, new frameworks were created in order to scale agile from individual agile delivery teams to multiple delivery teams contributing to the value of the solution. Delivery teams often consist of people from different organizations that work together to provide the overall solution. This move from focusing on individual delivery teams to multiple teams is called "agile at scale" or "scaled agile." This also requires that testing approaches are scaled.

Scaling agile is not necessarily the same as business agility, which includes the entire enterprise, but in order to achieve business agility an organization could benefit from adopting agile at scale.

With business agility there is an even greater need for accelerated quality. This is not achievable if all responsibility for quality remains in the individual teams or specific roles such as testers. Therefore, test management moves to quality management and organizations need to adopt quality assistance across the organization as well as within delivery teams. This changes the role of quality assurance and test professionals to be closer to agile test leadership and to fostering a quality culture and mindset.

0.10   Business Outcome

The business outcome (BO) describes the benefit that a certified person should be able to deliver using the knowledge and competencies covered in the syllabus. The knowledge and competencies are described in the LOs for each chapter.

0.10.1   BO 1 Foster a Value-Driven Quality Mindset and Culture

A person who has gained the qualifications in this syllabus can build and sustain a quality and testing culture in a value-driven organization or in an organization transitioning to a value-driven culture.

An example of a measurable key result for the business outcome is:

- Provide quality assistance to **x** colleagues, who do not have a background in testing or other quality management activities

(replace x with your own target).

1   Quality Assistance – 60 minutes

Keywords

Agile test leader, Agile test team leader, Built-in quality, Quality assistance, Quality assurance, Quality coaching, Quality control, Quality management, Test management

Learning Objectives for Chapter 1:

1.1 What Is Quality Assistance?

ATLaS-1.1.1   (K2) Understand quality assistance as an approach to quality and test management

1.2 Skills for Quality Assistance

ATLaS-1.2.1   (K2) Give examples of the change leadership, quality coaching, facilitation, and training skills required for quality assistance

ATLaS-HO-1.2.1   (H2) Given a quality-related problem, provide quality assistance using one or more of the four important skills (change leadership, quality coaching, facilitation, and training)

1.1　What is Quality Assistance?

Quality assistance is an approach to quality management that is crucial to developing and sustaining a value-driven organization.

The certification covers how quality assistance as an approach fits with known software testing concepts such as test management, quality control, and quality assurance.

Quality assistance is the approach test management should embrace to help in adopting and fostering a transformation to business agility. A quality assistance approach to test management is significantly different from a traditional mindset and traditional approach (Gartner, 2018). Some important differences are as follows:

- Optimizes for flow and value delivery
- Focuses on prevention, automation, and observability
- Encourages built-in quality practices continuously
- Supports self-empowered teams by enabling others to take responsibility for quality- and testing-related activities
- Embeds testing throughout the organization instead of sustaining testing silos
- Requires agile test leaders and agile test team leaders that serve, rather than test managers that control
- Has agile test leaders and agile test team leaders helping everyone in the organization collaborate through community of practice events

It is important to understand that test management as a discipline is still needed as part of quality assistance in value-driven organizations.

1.2　Skills for Quality Assistance

One of the important aspects of quality assistance is to enable everyone in the organization to contribute to and take a shared responsibility for quality. The certification introduces change leadership, quality coaching, facilitation, and training as important skills for agile test leaders and agile test team leaders to succeed with quality assistance.

Change leadership is crucial to successful organizational change. It is important that quality assistance aligns with the change programs in an organization, especially programs to improve business agility. Change leadership includes human aspects, which affects people's capacity to deal with change as well as fostering a culture of continuous improvement.

Quality coaching is a skill using a set of activities focused on helping the agile organization deal with quality-related topics. It is a collaborative dialog that promotes reflection in teams or with a single person. Conditions for effective quality coaching are also covered as part of this certification.

Facilitation is a skill in quality assistance that encourages people to use their knowledge and skills to reach a desired outcome. Facilitation is important to engage everyone and to build a shared responsibility for quality.

Training is a skill to help people build their skills. A variety of methods are introduced to cater for different needs and purposes. In order to scale the training it is important to engage the relevant organizational departments that support employees' skill growth and career development.

Since each of the above skills are disciplines in their own right, it is important to see them as part of a continuous learning pathway. There are other skills that can be used to serve the organization, such as mentoring or consulting, but these are out of scope for this certification.

How to use the four skills is elaborated in future chapters (see syllabus outline in **section 0.8, How this Syllabus is Organized**).

2 Improve Quality and Flow in a Value-Driven Organization – 120 minutes

Keywords

Effectiveness, Efficiency

Learning Objectives for Chapter 2:

2.1 Facilitate Value Stream Mapping

ATLaS-2.1.1   (K2) Understand value stream as a concept

ATLaS-2.1.2   (K3) Apply value stream mapping as an agile test leader to understand and visualize working flows

2.2 Analyze a Value Stream from a Quality and Testing Perspective

ATLaS-2.2.1   (K4) Analyze a value stream to identify waste and other quality and testing issues using basic metrics

2.1   Facilitate Value Stream Mapping

Agile test leaders and agile test team leaders will need to be able to facilitate and contribute to value stream mapping (VSM) activities. Their focus is to optimize quality and testing processes to improve flow and realize value for the customers in a more effective and efficient way.

2.1.1   What is a Value Stream?

A value stream is a concept that originates in lean. Value streams are groups or collections of working steps, including the people and systems that they operate, as well as the information and the materials used in the working steps. In value-driven organizations, quality and testing roles help to optimize the whole value stream, not just testing.

There are two typical types of value streams: operational and development. Operational value streams are all the steps and people required to bring a product from order to delivery (Lean Enterprise Institute, 2014). Development value streams take a product from concept to market launch (Lean Enterprise Institute, 2014). Key aspects of value streams are to understand the lean concepts of flow (which resonates with stream) and waste (non-value-adding activities).

2.1.2   Value Stream Mapping

Value stream mapping is a technique for visualizing and analyzing the steps in a value stream. Mapping a value stream can give a shared understanding of how, how much, and how fast the value stream is able to deliver value in order to fulfill customer demand. This certification covers basic visualization techniques, typical steps in value stream mapping, and practical examples where value stream mapping could be used to map the current state of operation (current state map). A current state map can evolve to a desired state (future state map) if fostered by quality management approaches.

It is also important to understand typical challenges when introducing value stream mapping in an organization.

2.2   Analyze a Value Stream from a Quality and Testing Perspective

Optimizing a value stream focuses on the flow of value and on quality. Therefore, value stream analysis can be a powerful tool for anyone who takes a quality assistance approach to quality and testing.

2.2.1   Metrics for Analyzing a Value Stream

To help analyze value streams, a few basic flow and quality metrics are introduced, such as:

- Lead time (LT)
- Wait time (sometimes called delay time)
- Processing time (PT)
- Flow efficiency (sometimes called process cycle efficiency or activity ratio)
- Percent complete and accurate (%C&A)
- Phase Containment Efficiency (PCE)

These metrics can be visualized in a value stream map. As data collection can be a challenge, it is important to observe the work being done and discuss with the people doing it what quality metrics can be collected.

2.2.2   Identify Non-Value-Adding Activities (Waste)

Agile test leaders and agile test team leaders should be able to identify non-value-adding activities, which in lean are categorized as eight different types of waste:

- Transport
- Inventory
- Motion
- Waiting
- Overproduction
- Over-processing
- Correction
- Non-utilized talent

Metrics can give a good indication of poor effectiveness and inefficiency and therefore where to look for waste.

Value stream mapping, analysis, and improvement is an iterative process. Value stream mapping relies on learning to see working flows and empowering people to act differently regarding quality issues. Therefore, agile test leaders and agile test team leaders can contribute in many different ways to achieve quality goals.

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3   Continuous Improvement of Quality and Testing – 150 minutes

Keywords

Root cause analysis, Agile test team lead, Causal loop diagram

Learning Objectives for Chapter 3:

3.1 Structured Problem-Solving Approach for Testing and Quality Activities

ATLaS-3.1.1   (K3) Apply a Plan-Do-Check-Act cycle to address a quality problem

ATLaS-3.1.2   (K2) Understand how to embed Plan-Do-Check-Act in the organization

3.2 Systems Thinking and Analysis of Root Causes

ATLaS-3.2.1   (K2) Understand how systems thinking and root cause analysis support a quality assistance approach

ATLaS-3.2.2   (K3) Apply causal loop diagram to identify root causes

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3.1 Structured Problem-Solving Approach for Testing and Quality Activities

Problem-solving in a value-driven organization may need to span multiple agile teams and sometimes even multiple value streams, as discussed in **Chapter 2**. This requires a problem-solving approach that both aligns with lean and agile practices and takes a holistic view. Therefore, agile test leaders and agile test team leaders need to be able to understand and use theories and techniques from systems thinking to identify root causes in complex environments.

3.1.1 Plan-Do-Check-Act Cycle

The Plan-Do-Check-Act (PDCA) cycle is a practical problem-solving and continuous improvement approach created by W. Edwards Deming. A fundamental principle of PDCA is iteration and seeing improvement efforts as experiments.

An agile test leader can foster the opportunities for improvements across agile teams by facilitating PDCA cycles. This usually starts with a gap analysis, e.g., implementing improvements to move toward a future state value stream map.

It is important to understand the benefits of PDCA cycles and to be able to conduct each step. This includes overcoming potential challenges of using PDCA.

There are other variations of PDCA (e.g., Plan-Do-Study-Act), and other improvement models (e.g., IDEAL). These variations are not covered in this certification. See ISTQB Expert Level Improving the Testing Process for more details on test process improvement (ISTQB®, 2011).

3.1.2 Embedding PDCA in the Organization

PDCA can be used for local experiments to improve as well as to broader improvement initiatives. Only doing improvements locally will not scale. It is therefore important that learnings and methods are shared in order to foster organizational learning.

Running PDCA in the context of business agility requires opportunities for shared understanding of problems. It can help if teams regularly identify opportunities, align identified opportunities and potential improvement experiments with other teams, realize improvement experiments, and signpost team findings for other teams (Béndek, 2018).

Based on the agile at scale frameworks, it is important to understand the typical organizational settings for running PDCA cycles for software development and testing.

To succeed with implementing and embedding PDCA in the organization, it is important to address potential challenges such as creating a secure environment where people feel safe to reveal failures. It is also important that people are open to put in place improvements based on shared ideas.

It is part of the management responsibility of an agile test leader to promote such behavior in a value-driven organization, and address root causes if such behavior does not happen.

3.2 Systems Thinking and Analysis of Root Causes

Systems thinking and root cause analysis are important disciplines that provide many different techniques to analyze complex problems. An agile test leader needs to participate in and facilitate analysis of complex problems to help the organization grow and optimize its value streams.

3.2.1 Systems Thinking

Some of the agile scaling frameworks include systems thinking as one of their key principles, therefore you need to understand some common characteristics of systems thinking (Stave & Hopper, 2007) and the techniques that can be used (The LeSS Company B.V., no date).

3.2.2 Root Causes

When multiple agile teams need to collaborate in order to implement a system or a solution, some of the quality assurance (QA) and testing activities will span multiple teams and the responsibility for delivering a working solution is shared between the teams. If a single team tries to fix a problem the solution may cause new problems for the other agile teams.

In a value stream, bottlenecks are a root cause for waste. Some typical bottlenecks in development value streams are:

- Environment creation
- Code deployment
- System testing
- Software architecture

It requires a flexible set of root cause analysis techniques to discover many potentially relevant root causes using systems thinking. If not used, there is a risk of concluding too quickly that there is just one single root cause. A basic root cause analysis technique in lean is "Five Whys." Causal loop diagram (CLD) is a method that can help if the feedback structure of human interaction or of the technical system needs to be identified.

3.2.3 Causal Loop Diagram

The benefit of a CLD is that it can reveal the non-obvious causes and effects and their interconnectedness in a broader system.

A CLD consists of four basic elements: variables; the causal links between variables; a plus or minus sign on the links; and loop markers. There are different notations used in CLDs. This certification covers a basic notation.

To create a CLD it is important to have a group of people with different perspectives of the problem or system at hand. The main steps that are repeated as the discussion evolves are:

1. Define variables.
2. Define causal relationships between variables.
3. Describe what effect one variable has on another.
4. Add other factors that affect the system (e.g., delays and goals).
5. Identify and describe reinforcing and balancing causal loops.
6. Identify possible interventions to resolve the problem.

4 References

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5   Further Reading

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6   Appendix A – Cognitive Levels of Knowledge

The following describes what each cognitive level means.

Level 1: Remember (K1)

The candidate will recognize, remember, and recall a term or concept.

Keywords: Identify, Remember, Retrieve, Recall, Recognize, Know

Level 2: Understand (K2)

The candidate can select the reasons or explanations for statements related to the topic, and can summarize, compare, classify, categorize, and give examples for the testing concept.

Keywords: Summarize, Generalize, Abstract, Classify, Compare, Map, Contrast, Exemplify, Interpret, Translate, Represent, Infer, Conclude, Categorize, Construct models

Level 3: Apply (K3)

The candidate can select the correct application of a concept or technique and apply it to a given context.

Keywords: Implement, Execute, Use, Follow a procedure, Apply a procedure

Level 4: Analyze (K4)

The candidate can separate information related to a procedure or technique into its constituent parts for better understanding, and can distinguish between facts and inferences. Typical application is to analyze a document, software, or project situation and propose appropriate actions to solve a problem or task.

Keywords: Analyze, Organize, Find coherence, Integrate, Outline, Parse, Structure, Attribute, Deconstruct, Differentiate, Discriminate, Distinguish, Focus, Select

Reference

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7 Appendix B – Glossary

7.1 General Terms

Term Name	Definition
business agility	The ability to compete and thrive by quickly responding to market changes and emerging opportunities with innovative business solutions to deliver value to customers.
change leadership	The ability to positively influence and motivate others to engage in the organizational change through the leader's own personal advocacy and drive.
change management	A structured approach to implementing change in an organization. This may encompass addressing training needs, appointing change agents, providing support for people across the organization, and setting specific success criteria.
delivery team	Agile team or scrum team responsible for defining, building, testing, and releasing systems.
flow	The way value is delivered to the customer.
infrastructure-as-code	A practice that codifies and manages technical infrastructure allowing automatic monitoring, provisioning, and versioning of resources.
kata	A pattern of behavior that can be practiced to develop a skill to the point where it becomes habit; continuous improvement to mastery.
observability	A measure of how well internal states of a system can be inferred from knowledge of its external outputs.
shift left	An approach to ensure built-in quality as early as possible in the development lifecycle process.
swarming	A behavior whereby team members with available capacity and appropriate skills collectively work on an item to finish what has already been started before moving ahead to begin work on new items.
value-driven	An approach that strives to optimize the value delivered to customers by constantly learning and improving and thereby remaining relevant and competitive.
value stream	All the steps (both value add and non-value add) in processes essential to the main flows that the customer is willing to pay for in order to produce a product or service.
value stream mapping	A technique to visualize, understand, analyze, and optimize a value stream.
working step	An activity needed to move along the value stream toward a new increment of the solution.

For common agile terms, we have relied on the following well-accepted Internet resources, which provide definitions.

https://www.scaledagileframework.com/glossary/

https://less.works/less/framework/index

https://www.scrum.org/resources/what-is-scrum

http://www.scrumalliance.org/

We encourage readers to check these sites if they find unfamiliar agile-related terms in this document. These links were active at the time of release of this document.