

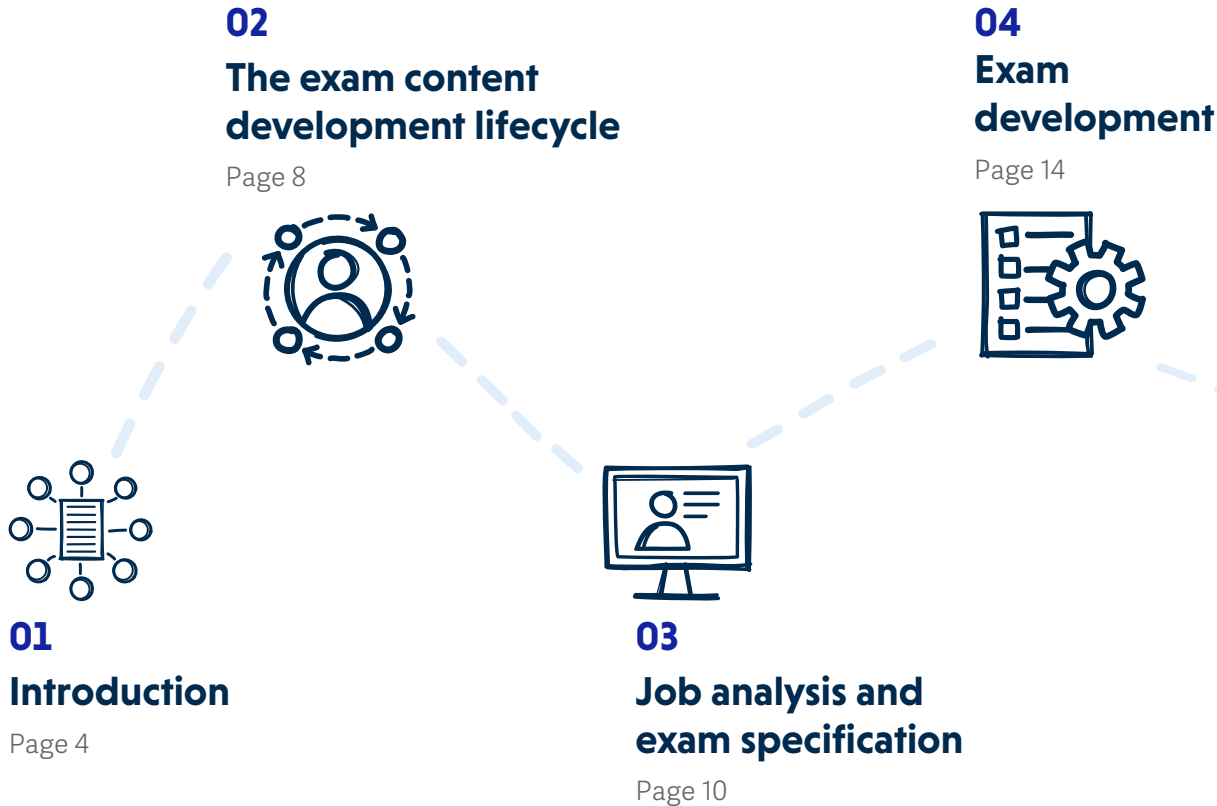


Tell me more about...

How to develop licensure exam content



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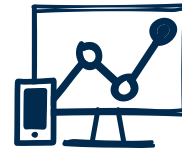
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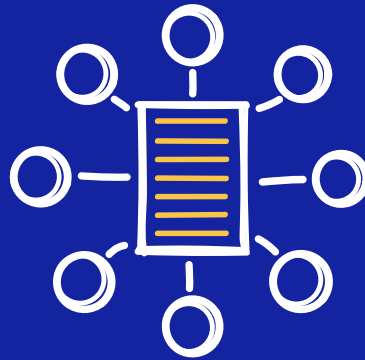
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Introduction

Why is exam content so important?

The primary purpose of any licensure exam program is protection. To protect the public from physical, mental or economic harm that might be caused by practitioners. In professions where people are at risk, we must maintain the standards by restricting practice to qualified individuals.





Valid, reliable and fair exam content is central to upholding these standards. And this can only be achieved through a rigorous exam development process. One that involves numerous steps, plus the engagement of multiple subject matter experts (SMEs) and psychometric and exam development specialists.

This guide outlines the key steps and experts who need to be included in the development of licensure exam content. As well as top tips, advice and best practice examples. All based on our decades of experience developing licensure exams that measure what is important and protect everyone involved – the public, the professional and importantly, your organization.



"The consequences of poorly designed licensure exam content are potentially serious. Licensing programs need to be able to rely on the validity of exam results. That is why the exam content we develop is always based on proven assessment science and psychometric principles. To deliver a valid, reliable and fair outcome, every time."

Isabelle Gonthier

Senior Vice President of Content Science, PSI

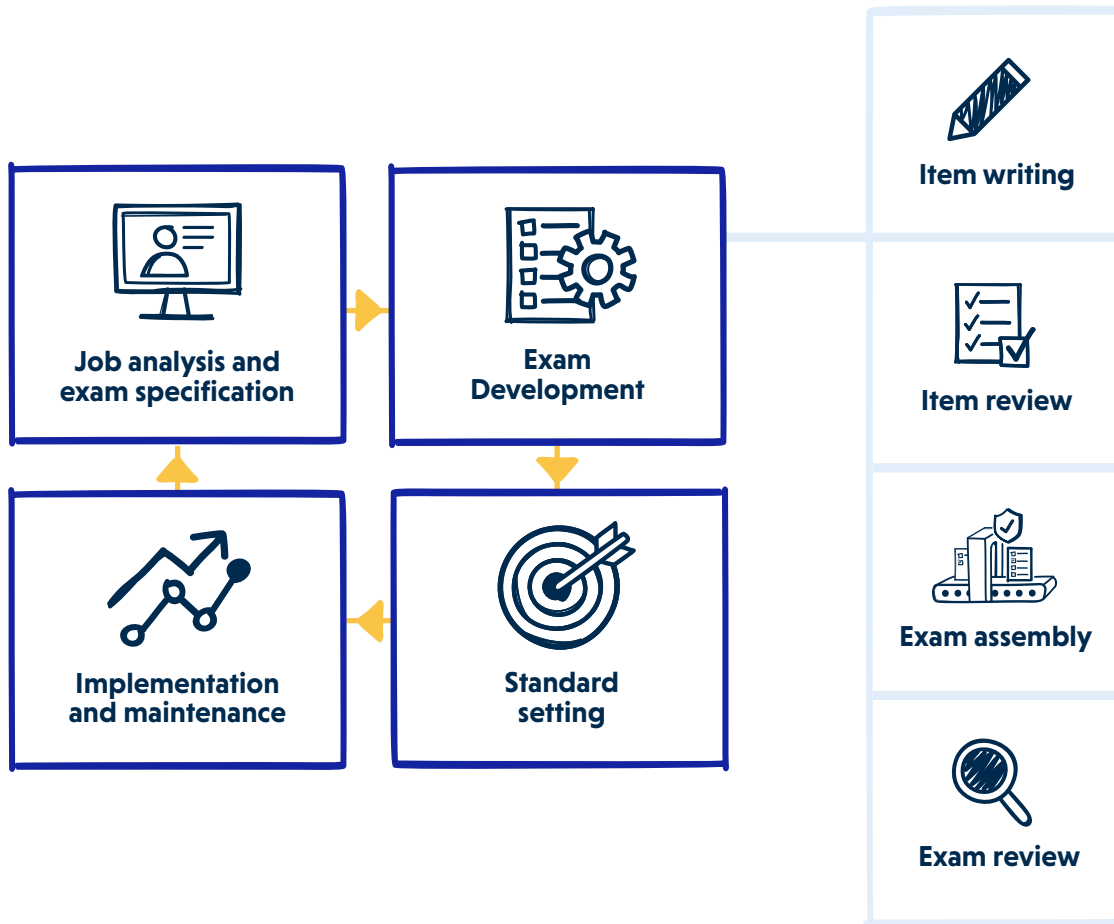


High quality licensure exam content must be...

- ▶ **Valid** – does an exam assess the knowledge and skills it is supposed to measure?
- ▶ **Reliable** – does an exam consistently assess the required knowledge and skills?
- ▶ **Fair** – does an exam assess the required knowledge and skills without unfairly disadvantaging any individual or group of test takers?

The exam content development *lifecycle*





Job analysis and exam *specification*



The exam development process starts by defining what needs to be assessed and how – the content outline or exam specification. This is achieved through a job analysis and in-depth consultation with subject matter experts (SMEs).

For any exam, including licensure exams, this stage of the process identifies:

- ▶ The tasks an individual must perform in their job.
- ▶ What they need to know to perform these tasks.

SMEs assemble

The first step in a licensure job analysis is the involvement of SMEs to create a list of the knowledge and tasks required to perform a job safely. The best practice approach to developing this list is a survey, distributed to as many SMEs working in your profession as possible. The exam specification is then created from the results of the survey.

The exam specification is also included in the test taker information bulletin, to provide the topics and subtopics that are covered in the exam.



***Involve* the right SMEs**

Ensuring the right perspectives are counted is critical to the validity of your exam content. When identifying your SMEs, the first step is to determine your target population – the pool of individuals your SMEs should come from.

Individual SMEs should be able to provide insights into the target job role or areas of knowledge required, so they should always:

- ▶ Hold the target license or a related credential with similar requirements.
- ▶ Have work experience in the profession within the past 6 to 12 months.

In addition, a group of SMEs should be reflective of the target population's demographic characteristics. For instance, this includes:

- | | |
|-----------------------|----------------------|
| ▶ Years of experience | ▶ Gender |
| ▶ Level of education | ▶ Race and ethnicity |
| ▶ Geographic location | ▶ Specialty |

Recruiting SMEs who have previous experience with exam development can be useful. But to be representative, your group should also include first-time contributors.

***Tips* for SME recruitment**

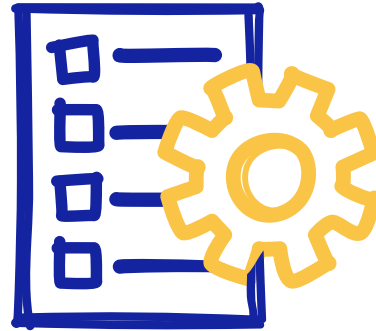
SMEs are usually involved on an unpaid basis and the PSI team has extensive experience of recruiting volunteer SMEs for our clients. Some of the successful recruitment tactics we have used include:

- ▶ An incentive, such as a nominal honorarium in return for their service.
- ▶ Referrals from existing SMEs or connections within your industry.
- ▶ Offer of Continuing Education (CE) credits.
- ▶ Publicizing on relevant social media channels, in industry publications and via industry bodies and events.

Treat the recruitment of your SMEs as you would a paid position. Request cover letters, resumes, and/or curriculum vitae, and then interview those who appear promising. It's a good idea to target more potential SMEs than you need, as some may not be able to complete the process.

Be clear about expectations and what's involved. Potential SMEs may be initially eager but some may not realize the amount of time required and resign midway through – or won't provide the level of involvement you need. So ensure you help SMEs stay engaged with regular communications, providing group reviews so SMEs can learn from each other, and by breaking down assignments into manageable chunks.

Exam *development*



When you have assembled and trained your Subject Matter Experts (SMEs), it's time to put them to work and create your licensure exam.

In this next stage of the process, new exam items are created that map back to the exam specification. Exam items are then reviewed and assembled into equivalent exam forms. With thorough checks at every step for validity, reliability and fairness. Always led and facilitated by experienced psychometricians and testing experts.

The time and effort involved with managing the exam development process should not be underestimated. Frequent communication with your SMEs is vital, to maintain engagement and momentum – and avoid resignations. Regular contact with your SMEs as a group also means they will learn from each other.

***Item* writing**

Item writing refers to the process of constructing the individual items or questions that are required for an exam. Multiple SMEs are usually involved as item writers.

Training in best practice and the required standards is essential for SMEs writing exam items. Some of your SMEs will be participating in item writing for the first time. Others may not have been involved in item writing for several years and will need a refresher.

Training takes place in a workshop, with a full guide to item writing circulated afterwards. This covers the key elements of item writing:

- ▶ Composing a stem or scenario – the section of an item that poses the problem.
- ▶ Selecting the appropriate item type – for example multiple choice, multiple select or drag and drop.
- ▶ Developing response templates – for multiple choice or multiple select items.

Exam security is vital during this stage of exam development. Your SMEs should always use a secure item authoring and banking platform to write and submit new items.

The PSI team has experience of running item writing workshops, in-person and remotely. Let us know if you need help with this or have questions about the technology needed to maintain exam security.



Item review

Content validation is essential before your exam items are finalized. Items should always be reviewed by either a second SME or a different group of SMEs. Group review can take place either in-person or remotely, where a group of SMEs go through every draft item and provide feedback.

The process can vary at this point, but items are usually updated in response to feedback before final sign off and pre-test analysis.



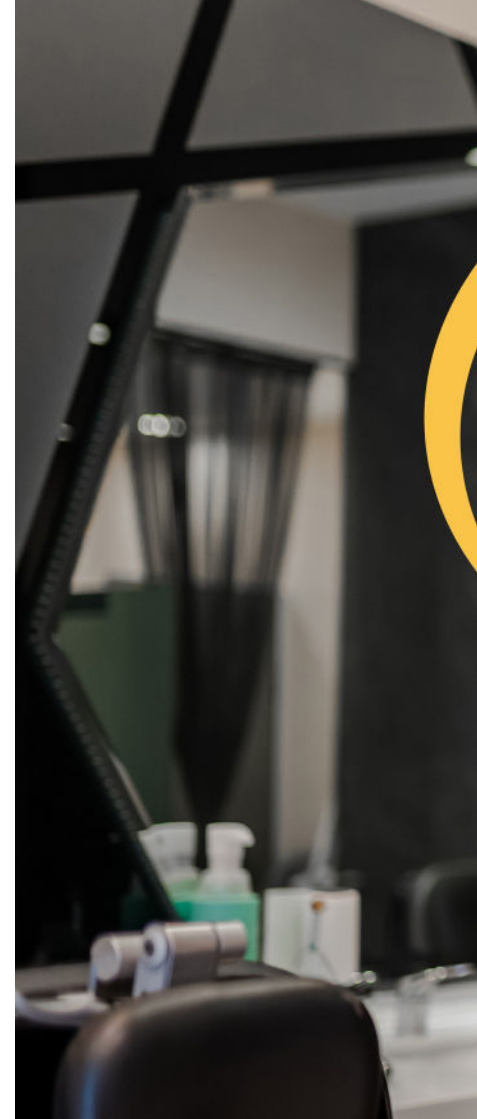
"Many licensure programs were forced to switch to remote SME meetings during the pandemic. After some initial concerns about SME dropout and exam content security, we were able to show them this new way of working is effective. We took additional steps to engage SMEs and maintain security around meetings. Now a lot of our clients plan to use a hybrid approach or even stay fully remote because it works for them and their SMEs."

Andrea Dominiack

Senior Director – Test Development & Psychometrics, PSI

Pre-test analysis

During pre-test analysis, brand new items are included in an exam as unscored items. This provides an opportunity to analyze item data before the item is added to your live item pool.





Exam assembly

Put simply, exam assembly involves putting the items your SMEs have written, reviewed and signed-off into exam forms. But it's not as simple as that. Any exam form must:

- ▶ Accurately reflect your exam specification (be valid)
- ▶ Be equivalent to any alternate exam forms (be reliable)
- ▶ Not unfairly disadvantage any test takers (be fair)

Licensure programs tend to use two options for exam form assembly, depending on the profession they represent, number of test takers and specific program needs:

1. **Fixed forms** – where all test takers see an identical exam form, or one of a small number of alternate and equivalent exam forms.
2. **Linear On The Fly Testing (LOFT)** – where every test taker sees a unique and equivalent exam form with slightly different items. These items are selected from a pre-approved pool of items that meet established content and psychometric parameters.

▶ **Protect exam integrity with LOFT**

If test takers with item pre-knowledge pass your exam, public safety may be at risk. As well as the integrity of the exam and the value of your license.

With LOFT, an algorithm is used to create equivalent exam forms from a pool of items – for example 20 items from Domain A and 15 items from Domain B. This significantly reduces the likelihood of pre-knowledge. It not only provides assurance that every exam form is equivalent, but also that each test taker is fairly assessed on their knowledge.







Exam review

Exam review by a committee of SMEs is an important validation step for your item pools and exam forms.

With fixed forms, your SME committee will go through each exam form to check they are all valid, reliable and fair.

With LOFT, your committee reviews only the item pool, not each individual form. This saves the SMEs time, because they don't need to review the same item multiple times if it appears on multiple forms. Any items with content issues are removed from the LOFT pool at the exam review meeting, reducing the need for a third review after the meeting.

A bit more about working with SMEs

SME meetings can either be conducted remotely or in-person, depending on client preference and needs. SME meetings switched to fully remote during the pandemic, and many licensing programs are sticking with this way of working.

Either way, it's important to keep your SMEs engaged throughout the process. Setting clear expectations from the outset is important, as well as regular and clear communication throughout the process.

In early 2021, PSI was contracted by the California Department of Real Estate (DRE) to provide item review, gap analysis and item writing. As a result of the pandemic, the PSI and DRE teams needed to quickly pivot from in-person to completely virtual SME meetings almost overnight. During a challenging time, the team accomplished:

4,367
items
reviewed

72
meetings

1,862
items edited

17 **SMEs**
participated
in at least
one meeting



"We've learned that the virtual world doesn't have to be as intimidating as we thought – as long as you have the proper controls in place."

Jeff Oboyski

Assistant Commissioner, Licensing, California
Department of Real Estate



Standard *setting*



A cut score is the carefully chosen score on the scale of an exam that determines whether a test taker has passed or failed. Put another way, it is the minimum score a test taker must achieve to pass the exam.

A facilitated group of SMEs is usually involved to set the cut score of a licensing exam. Their decision is based on the definition of a minimally competent test taker and what they need to know.

During a committee meeting, SMEs use one of a variety of different standard setting methods to decide a cut score. The modified-Angoff Method is the most common. This is where SMEs assign every exam item a rating. These ratings are collated to determine the cut score.

A bit more about the Angoff Method

The Angoff Method of standard setting brings together a facilitated group of SMEs to rate the difficulty of each item, based on the minimally competent test taker.

1. The group is trained on the process and creating the definition of a minimally competent test taker, so all SMEs have a shared understanding of the test taker.
2. SMEs give every exam item an Angoff rating between 1 and 100. This rating is an estimate of how many minimally competent test takers would get the item correct.
3. Ratings are collated and tabulated, average ratings are calculated for each item, and the average of these values is the cut score.

If the group disagrees on a rating and there is a large discrepancy, the item will be the focus point of a group discussion until a consensus is reached.

Insert example table of the Angoff Method e.g.

Item #	Judges' Ratings (%)						Average Rating
	Judge 1	Judge 2	Judge 3	Judge 4	Judge 5	Judge 6	
1	65	70	65	65	70	65	67
2	85	70	60	80	70	80	74
3	70	65	85-75	70	45-50	70	67
4	75	60	65	70	75	70	69
				Overall Average Rating			69

Implementation and *maintenance*



After all the hard work you and your SMEs have put in, it's time to go live with your exam and deliver it to test takers. This is not a time to sit back and relax, however (although the moment might be worthy of a little celebration).

Ongoing *analysis*

Continued statistical analysis of your items and exams is important after your exam goes live. This gives you the information needed to make recommendations about items that must be updated, edited, put on hold, or removed from your item bank.

Examples of analysis after your exam goes live include:

- ▶ Item difficulty (referred to as the P-value). Are your items too difficult or too easy?
- ▶ Discrimination index (DI). Are items discriminatory? Do they correctly identify prepared and unprepared test takers?
- ▶ Reverse discrimination index. How do distractors perform i.e. the incorrect responses to a multiple-choice question?
- ▶ Pass rates. What are the pass rates for individual items?
- ▶ Feedback review. Of test taker comments, queries and concerns.
- ▶ Needs analysis. To show where further item development and writing is needed.

Ongoing analysis provides an opportunity to refresh your item pool, develop new content where needed, and enhance your exam.

Keep pace with *change*

New laws or regulation changes may trigger a review of the relevant area or subtopic in your item pool. This will ensure your items reflect the updated statutes. Changes to your exam may also be needed if new technologies or techniques are introduced to your profession.

It is good practice to undertake a full review every five to seven years. Starting from the beginning with a full job analysis and exam specification.



***A bit more* about PSI's national exams**

New laws or regulation changes may trigger a review of the relevant area or subtopic in your item pool. This will ensure your items reflect the updated statutes. Changes to your exam may also be needed if new technologies or techniques are introduced to your profession.

It is good practice to undertake a full review every five to seven years. Starting from the beginning with a full job analysis and exam specification.

- ▶ **Real Estate** – the PSI team is currently undertaking a full review and update of our national real estate exam. The national exam is currently used by over 30 States.
- ▶ **Barbering & Cosmetology** – the ground-breaking PSI National Barber and Cosmetology Program was launched in 2018. Exam development involves SMEs from all over the US.
- ▶ **Insurance** – a full review of the PSI national insurance exam, including job analysis and exam development, was recently completed.





"To maintain exam security, the continued use of a secure item authoring and banking platform continues to be essential throughout the entire test development process."



Conclusion

We have a wide array of tools, techniques and technology at our disposal to ensure licensure exam content is valid, reliable and fair.

By using the right tools and following the comprehensive processes outlined in this guide:

- ▶ **Test takers** will be assured the exam they are taking fairly assesses the skills and knowledge required in their chosen profession.
- ▶ **Members of the public** will be assured their health and safety are protected and that only individuals who are safe to practice will be granted a license.
- ▶ **Licensing programs** will be assured their exam content is fair, measures what's important, protects the public and is legally defensible.

The PSI team of psychometricians and testing experts are experienced in every stage of the exam development process. We are here to support you with your job analysis, SME training, ongoing statistical analysis and everything in between.

Your trusted **exam partner**

Every day our clients support millions of people to realize their dreams, reach their potential, and improve their life chances. They care about their test takers – and we share that responsibility.

Our unwavering focus is on maintaining exam security and integrity, while delivering frictionless and fair test taker experiences, through...

Secure exam delivery

- ▶ Authorized global **exam center** network.
- ▶ Secure and scalable **remote exams** with Live online proctoring.
- ▶ Flexible **multi-modal** exam delivery.
- ▶ Testing **windows or continuous testing**.

Rigorous exam development

- ▶ Legally defensible and **valid exam content**.
- ▶ Exam reviews to keep pace with regulatory and industry change.
- ▶ **Job analysis** and **exam** content specification.
- ▶ **Subject Matter Expert** (SME) recruitment, training and management.
- ▶ Secure **item authoring, banking and exam generation** software.

Expertise in testing science

- ▶ Experienced **psychometricians**.
- ▶ Specialist **exam developers**.
- ▶ **Data forensics** and web crawling.

Our willingness to listen and adapt means clients can either benefit from a full service, or access solutions at any stage of their testing journey.

Dreams deserve

We understand every exam is about more than the result. It's about a dream. A dream the test taker believes is worth striving for. And we believe that too. Their dreams deserve trusted science, technology and operational expertise. They deserve PSI.



Connect with an expert today.

psiexams.com 