

Blueprint for an Intentionally Designed Educational System

Purpose of the Blueprint v 1.0

The Mission Statement establishes the philosophy of intentional educational design. The Blueprint translates that philosophy into the design of complete educational experiences.

The purpose of this document is to guide the design of educational modules that are **intentional, efficient, and evidence-informed**. Every module should be grounded in the science of learning and thoughtfully designed to promote meaningful, durable learning while respecting the limited time of both residents and faculty.

Principles of Intentional Educational Design v 1.0

Each component of a learning module should have a clearly defined purpose. Components should not be included simply because they are familiar or easy to create. Instead, each should contribute meaningfully to learning, durable retention, or clinical reasoning.

Every minute should have a purpose. Residency education occurs within significant time constraints for both residents and faculty. Educational activities should be designed to maximize the educational value of time invested. Time should be viewed as a limited educational resource and used intentionally.

Educational modules should be designed as integrated learning experiences rather than collections of independent activities. Preparation, independent learning, in-person instruction, retrieval practice, assessment, and longitudinal reinforcement should work together to support meaningful, durable learning. Decisions made during the design of one component should complement and strengthen the others.

Throughout this Blueprint, every component is accompanied by a brief explanation of the educational principles that support it. Understanding why a component is included in a learning module or designed in a particular way is as important as understanding how to design and implement the curriculum.

The module designer assumes responsibility for the work of educational design. By designing educational modules before implementation, the module designer enables faculty to focus on teaching and coaching, and residents to focus on learning. Thoughtful educational design creates a more consistent, efficient, and effective educational experience for everyone involved.

The Learning Module v1.0

The learning module is the educational unit within this methodology. Each module is intentionally designed around a specific topic or educational objective and integrates multiple educational components into one cohesive learning experience that is intentional, efficient, and evidence-informed.

Each learning module progresses through three educational phases: **Preparation**, **Application**, and **Reinforcement**. These phases provide a consistent framework for educational design while allowing the specific learning activities and resources to be tailored to each topic.

- **Preparation** establishes foundational knowledge and prepares residents for active participation through intentional engagement with the assigned learning materials.
- **Application** uses faculty-guided discussion, clinical cases, and other learning activities to deepen understanding, develop clinical reasoning, and apply foundational knowledge.
- **Reinforcement** strengthens long-term retention through retrieval practice, spaced review, reflection, and other evidence-informed learning strategies.

Together, these components promote meaningful, durable learning.

Every learning module follows the same overall framework. This consistency allows residents and faculty to develop clear expectations for how learning occurs while providing module designers with a standardized structure for educational design. Although the educational materials and learning activities vary according to the topic (tailored to the educational needs of each topic), the underlying framework remains consistent across all modules.

The following chapters describe each component of the learning module, its educational purpose, the science supporting its inclusion, design considerations, and practical guidance for implementation.

Using AI as a Curriculum Design Partner

Designing a high-quality learning module requires thoughtful educational decisions, creativity, and significant time. While curriculum designers remain responsible for the educational vision, clinical accuracy, and final learning experience, artificial intelligence (AI) can substantially improve the efficiency of the design process.

Many aspects of instructional design are repetitive and time-consuming. Drafting learning objectives, organizing content, brainstorming educational activities, generating comparison tables, refining explanations, generating flashcards, and creating practice questions all require substantial effort. AI can accelerate many of these tasks, allowing designers to spend less time producing initial drafts and more time evaluating educational quality, ensuring clinical accuracy, and creating meaningful learning experiences.

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Only use the approved American Academy of Ophthalmology's GPT when pulling information from the BCSC.

Learning Insights/Standardized Educational Explanations

Every educational strategy included within a learning module should be accompanied by a brief explanation of its educational purpose. These standardized explanations help residents understand not only *what* they are being asked to do, but *why* the activity supports learning. By making the educational science visible, the methodology helps residents develop evidence-informed learning habits that extend beyond a single module.

To ensure consistency across the curriculum, the standardized explanations below should be used verbatim whenever the corresponding educational strategy is incorporated into a learning module. Module designers should copy and paste these explanations rather than rewriting them. While the educational content of each module is unique, the learning science underlying these educational strategies remains the same. Consistent explanations reinforce a shared educational philosophy, establish a common language for learning, and ensure that residents receive the same educational experience regardless of the topic or module designer.

Part 1: Preparation Phase

Educational Purpose

The **Preparation** phase establishes the foundation for meaningful learning by engaging residents with the assigned content before the in-person learning session. Within this methodology, Preparation is centered on the assigned BCSC reading and is intentionally designed to transform reading from a passive activity into an active learning experience.

Preparation serves two complementary purposes. First, it develops foundational knowledge that allows residents to participate meaningfully in the Application phase. Second, it teaches residents how to engage more effectively with educational materials through evidence-informed learning strategies.

Educational Science

The Preparation phase is grounded in educational principles demonstrating that learning is enhanced when learners actively engage with material before formal instruction. Strategies such as generation, self-assessment, and active reading promote deeper processing, identify knowledge gaps, and prepare learners to integrate new information more effectively during subsequent instruction.

Generation is the process of attempting to recall or predict information before it is presented. Learners first activate prior knowledge by answering questions, making predictions, or organizing existing understanding. The effort to generate information improves subsequent learning and retention.

Self-assessment is the process of evaluating one's current understanding in order to identify strengths, misconceptions, and areas requiring additional study. It also informs faculty which concepts need focus and clarification.

Active reading is the intentional engagement with educational material through questioning, organizing, summarizing, annotating, or connecting new information with existing knowledge.

Preparation reduces the cognitive burden of encountering unfamiliar concepts for the first time during the in-person session, allowing faculty time to focus on clarification, application, and clinical reasoning rather than initial content delivery.

Design Considerations

The Preparation phase should be intentionally designed to prepare residents for meaningful participation in the Application phase while developing effective lifelong learning habits. The following design principles should guide the development of preparatory educational activities and resources.

The BCSC is the Curriculum. Within this methodology, the BCSC serves as the foundational curricular resource for resident learning. The Preparation phase is intentionally designed to help residents maximize the educational value of the BCSC rather than replace it with alternative educational materials. When a subject does not align with a BCSC chapter, create a meaningful preparation activity that engages the learner and primes them for the application phase during in-person learning.

Promote Active Reading. The role of the module designer is to design educational resources that facilitate active reading. Thoughtfully designed activities encourage residents to engage with the material, organize their thinking, identify knowledge gaps, and connect new concepts with existing understanding. These resources are intended to increase the educational value of the time or reading.

Design Resources for Continued Use. Educational resources should be designed with the entire learning experience in mind. Resources developed during the Preparation phase will continue to provide educational value during the Application and Reinforcement phases whenever appropriate. Well-designed resources should also remain useful as residents revisit topics throughout residency, allowing the same educational resource to support learners with increasing depth and sophistication as their knowledge and clinical experience grow.

Design for Progressive Learning. Preparation activities should provide educational value for residents at every stage of training. A PGY-2 and a PGY>2 may engage with the same educational resource, yet each should derive value appropriate to their level of knowledge and clinical experience. Well-designed resources allow junior residents to build foundational understanding while simultaneously challenging more senior residents to refine clinical reasoning, recognize nuances, and integrate prior experience.

Explain the Educational Purpose. Residents should understand why they are being asked to complete each educational activity. Brief explanations of the learning science behind these activities help residents engage more intentionally and develop effective learning habits that extend beyond a single module. These explanations are standardized across the curriculum.

Respect Resident Time. Preparation activities should be intentional, efficient, and aligned with the educational objectives of the module. Every preparatory activity should have a clearly defined purpose and justify the time required to complete it. The goal is to maximize educational value—not educational workload.

Designer Workflow/Practical Guidance

When designing the Preparation phase, begin by considering what residents should know before entering the Application phase. Then develop educational resources that prepare them for that experience while promoting active engagement with the assigned BCSC (or other) reading.

Include the appropriate standardized educational explanation wherever a defined learning strategy is introduced.

Step 1. Define the Educational Objectives (required)

Begin by identifying the knowledge, concepts, and clinical reasoning skills residents should possess before entering the Application phase. These objectives should align with the overall goals of the learning module and guide every subsequent design decision.

The educational objectives should answer a simple question:

What foundational understanding should residents bring to the in-person learning session?

Step 2. Review the Assigned BCSC Chapter

Read the assigned BCSC chapter from the perspective of the module designer. Consider where residents are most likely to struggle, which concepts are foundational, what misconceptions commonly occur, and where additional educational resources may improve understanding.

Step 3. Design the Generation Activity (required)

Every Preparation phase should begin with a brief generation activity completed before residents begin reading the assigned BCSC chapter. Generation activities encourage residents to activate prior knowledge, identify misconceptions, and begin thinking about the topic before encountering new information. The objective is to prepare the brain for learning.

Include the standard explanation describing its educational purpose. This explanation helps residents understand why the activity is being completed *before* reading and how it supports learning.

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Why Am I Doing This? (Generation)

Before learning something new, it helps to first think about what you already know. This activity activates your existing knowledge, reveals misconceptions, and prepares your brain to learn more effectively as you read.

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Step 4. Design Educational Resources

Educational resources should be designed to advance the educational objectives of the module while providing value throughout the learning experience. Consider how each resource can support multiple educational purposes during Preparation, Application, and Reinforcement.

Examples include comparison tables, concept maps, annotated figures, algorithms, mnemonics, visual diagrams, memory palaces, guided notes, or other educational resources designed to improve learning. The specific format is less important than the educational purpose it serves.

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Why Am I Doing This? (Active Reading)

Learning is more effective when you actively engage with the material rather than simply reading it. This activity is designed to help you think about, organize, and connect new information as you work through the chapter, leading to deeper understanding and better long-term retention.

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Step 5. Incorporate Self-Assessments (required)

Provide residents a brief self-assessment to help learners identify strengths, recognize misconceptions, and focus subsequent study on areas requiring additional attention. The purpose is for residents to monitor their own understanding before reading and before the application phase; it also provides information to faculty about residents' knowledge gaps.

Self-assessments will include a brief pre-quiz with confidence ratings. Whenever possible, provide immediate feedback to reinforce correct understanding and address misconceptions before the in-person learning session.

Like all educational activities within the methodology, self-assessments should state the educational purpose:

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Why Am I Doing This? (Self-Assessment)

This activity is designed to help you monitor your understanding and identify areas that need additional review. The goal is not to earn a score, but to recognize what you know well and where you should focus your continued learning.

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AI Toolkit (optional)

AI can generate self-assessment activities, including multiple-choice questions with confidence-rating prompts that are aligned with the educational objectives.

Example Prompt:

Create 5 self-assessment questions in multiple choice format (with confidence rankings), modeled after the Ophthalmic Knowledge Assessment Program (OKAP) and ophthalmology board test based on BCSC Book X, Chapter Y. The questions should help residents identify strengths and misconceptions before the Application phase. Include brief explanations for the correct answers.

Step 6. Review the Preparation Phase as an Integrated Experience

Before finalizing the Preparation phase, review it as a complete educational experience.

Designer Reflection

Before finalizing the Preparation phase, reflect on the overall educational experience. Every component should have a clear educational purpose and work together to prepare residents for meaningful participation in the Application phase.

Consider the following questions:

- Does the Preparation phase build upon, rather than replace, the assigned BCSC reading?
- Have I designed activities that promote active engagement with the material rather than passive reading?
- Are the educational resources intentionally designed to support multiple educational purposes and continue providing value throughout the Application and Reinforcement phases?
- Do the educational resources accommodate residents at different stages of training while remaining valuable as learners progress through residency?
- Have I included appropriate opportunities for residents to assess their understanding before the in-person learning session?
- Have I incorporated the appropriate standardized “Why Am I Doing This?” explanations for each educational strategy?
- Does every educational activity have a clearly defined purpose that justifies the time required to complete it?
- Will residents arrive prepared to actively participate in the Application phase?

Part 2: Application Phase

Educational Purpose

The Application phase transforms foundational knowledge into meaningful understanding through faculty-guided learning. After residents have independently developed foundational knowledge during the Preparation phase, the in-person learning session provides opportunities to clarify difficult concepts, develop clinical reasoning, apply knowledge to clinical situations, and benefit from the experience and judgment of faculty educators.

Application shifts the educational focus from **What do I know?** to **How do I use what I know?**

Faculty guide residents in connecting knowledge with patient care by exploring clinical decision making, recognizing diagnostic patterns, discussing uncertainty, and reasoning through clinical problems. Residents should actively participate by asking questions, defending clinical decisions, explaining their reasoning, and learning collaboratively with both faculty and peers.

The Application phase also provides opportunities for faculty to identify misconceptions, address knowledge gaps, and adapt instruction to the needs of the learners.

Educational Science Supporting Its Inclusion

Learning is strengthened when foundational knowledge is actively applied rather than passively reviewed. Educational research demonstrates that understanding becomes more durable when learners explain concepts, solve problems, discuss clinical cases, receive feedback, and apply knowledge. Learning does not happen with residents having first exposure to material in lectures.

Several educational principles support the inclusion of an in-person Application phase.

Elaboration occurs when learners explain ideas, justify decisions, connect new information with existing knowledge, and discuss concepts with others.

Knowledge application promotes transfer of learning by requiring residents to use foundational knowledge in clinically relevant situations. Applying concepts through discussion and case-based learning helps learners recognize when and how knowledge should be used in future patient care.

Feedback allows misconceptions to be identified and corrected.

Social learning recognizes that learning is enhanced through interaction with faculty and peers. Asking questions, defending clinical decisions, hearing alternative perspectives, and



Source: National Training Laboratories, Bethel, Maine

collaboratively solving problems expose learners to different approaches while deepening understanding.

Finally, the Application phase reduces reliance on passive lectures by intentionally reserving in-person educational time for activities that benefit most from faculty expertise.

Design Considerations

The Application phase should intentionally use face-to-face educational time for learning experiences that cannot be replicated through independent study.

Do Not Repeat the Preparation Phase

Residents should arrive having completed the assigned Preparation activities. The Application phase should build upon that foundation instead of *reteaching* the assigned BCSC chapter.

Promote Active Participation

Residents should spend more time thinking than listening. Educational sessions should encourage learners to explain concepts, answer questions, solve problems, interpret clinical findings, and defend clinical decisions.

Use Authentic Clinical Problems

Whenever appropriate, organize discussion around realistic clinical cases rather than isolated factual review. Authentic problems help residents connect foundational knowledge with patient care while promoting clinical reasoning.

Encourage Psychological Safety

Residents should feel comfortable asking questions, acknowledging uncertainty, and making mistakes during discussion. Learning is strengthened when uncertainty becomes an opportunity for exploration rather than embarrassment.

Respect Faculty and Resident Time

Every in-person activity should justify the time required for both residents and faculty. If an activity can be completed independently with equal educational value, consider moving it to the Preparation or Reinforcement phase. Face-to-face educational time should be reserved for activities that benefit from interaction with experienced educators.

Design Reflection

Before finalizing the Application phase, review it as a complete educational experience rather than a scheduled lecture.

Consider the following questions:

- Does the Application phase build upon, rather than repeat, the Preparation phase?

- Have I intentionally reserved faculty time for activities that require their expertise?
- Will residents spend more time thinking, discussing, and reasoning than passively listening?
- Are authentic clinical problems used to promote meaningful application of knowledge?
- Have I anticipated common misconceptions and created opportunities to address them?
- Does every activity justify the use of valuable in-person educational time?
- Will residents leave the session with a deeper understanding than they could have achieved through independent study alone?
- Does the Application phase strengthen the educational connection between Preparation and Reinforcement?

Part 3. Reinforcement Phase

Educational Purpose

Design Question: *How do I make this learning last?*

Reinforcement recognizes that meaningful learning develops over time rather than during a single educational event. The Reinforcement phase intentionally extends learning beyond the classroom by revisiting important concepts over time through retrieval practice, spaced repetition, reflection, and continued application.

The Reinforcement phase also reinforces an important principle of this methodology: learning modules do not end when the in-person session concludes. Educational resources created during Preparation and used throughout the Application phase continue to support learning long afterward. Comparison tables, concept maps, annotated figures, algorithms, flashcards, and other educational resources become longitudinal learning tools.

Educational Science Supporting Its Inclusion

Learning naturally fades unless it is revisited. Educational research consistently demonstrates that long-term retention depends less on how learning is reinforced over time, but by repeated effortful retrieval over time.

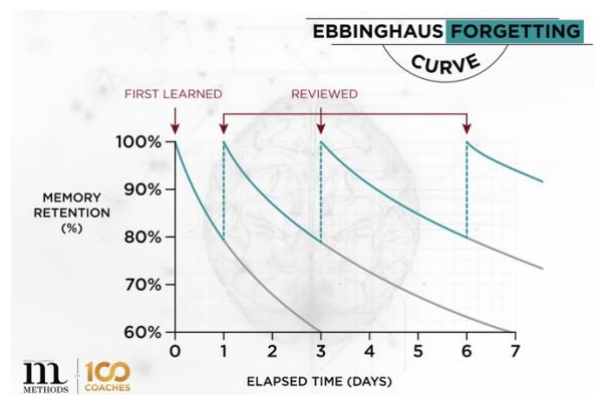
Several educational principles support the inclusion of a Reinforcement phase.

Retrieval practice strengthens memory by requiring learners to actively recall information rather than simply review it. Each successful retrieval reinforces learning, identifies knowledge gaps, and makes future recall more accurate and efficient.

Spaced repetition improves long-term retention by distributing learning across multiple encounters rather than concentrating it within a single study session. Revisiting information after increasing intervals strengthens memory and slows the natural process of forgetting.

Successive retrieval allows learners to recognize both what has been retained and what has been forgotten. Identifying forgotten concepts provides opportunities for focused review while preventing knowledge gaps from accumulating over time.

Transfer of learning is strengthened when previously learned concepts are revisited in new clinical contexts. Applying knowledge across different patient presentations promotes flexible understanding rather than memorization of isolated facts.



Design Considerations

The Reinforcement phase should be intentionally designed to promote durable learning while respecting the residents' limited time.

Design for Retrieval, Not Review: Residents should spend their time recalling information rather than rereading it.

Plan Reinforcement: Do not depend upon residents independently deciding to revisit material. Plan it. Reinforcement should be intentionally incorporated into the curriculum through planned retrieval opportunities distributed over time.

Integrate Reinforcement Throughout the Curriculum: Reinforcement should not exist as an isolated assignment at the end of a module. Important concepts should intentionally reappear in future in-person sessions. Consider scheduling 5–10-minute reinforcement time at the beginning of didactic sessions or schedule an entire didactic time to focus on reinforcement.

Respect Resident Time: Reinforcement should be efficient, focused, and sustainable. Short, meaningful retrieval opportunities are generally more effective than lengthy review sessions.

Practical Guidance (Designer Workflow)

When designing the Reinforcement phase, begin by considering what residents should still remember long after the learning module has concluded. Then intentionally design how those concepts will continue to be revisited throughout residency.

Step 1. Design Retrieval Activities (required)

Develop activities that require residents to retrieve previously learned information from memory rather than simply review it. Retrieval opportunities may include flashcards, short quizzes, image interpretation exercises, oral questioning, clinical scenarios, concept reconstruction, or other activities that strengthen recall.

Include the standardized explanation whenever retrieval activities are introduced.

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Why Am I Doing This? (Retrieval Practice)

Remembering information strengthens learning. By actively recalling concepts from memory rather than simply reviewing them, you strengthen long-term retention and make it easier to apply that knowledge in clinical practice.

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AI Toolkit (Optional)

Example Prompt:

Review the educational objectives for this learning module. Create a set of flashcards prioritizing active recollection and learning. Emphasize clinical application when possible.

Step 2. Design the Longitudinal Reinforcement Plan

Determine when and how residents will encounter these concepts again throughout the curriculum.

Identify opportunities to revisit important concepts through existing educational experiences such as future conferences, case discussions, board review sessions, image interpretation exercises, flashcard platforms, oral examinations, or subsequent learning modules.

Include the standardized explanation whenever spaced review is incorporated:

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Why Am I Doing This? (Spaced Repetition)

Learning fades over time unless it is revisited. Reviewing important concepts at increasing intervals strengthens long-term memory, making it more likely that you will remember and apply this knowledge months or even years from now.

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Step 3. Review the Reinforcement Phase as an Integrated Experience

Before finalizing the module, review how Reinforcement extends the learning experience beyond the in-person educational session.

Ask whether residents will have meaningful opportunities to retrieve, revisit, and continue applying important concepts throughout residency rather than only during the original learning module.

Design Reflection

Consider the following questions:

- Have I identified the concepts that residents should still know one year from now?
- Have I intentionally planned reinforcement/spaced repetition rather than assuming residents will review the material independently?
- Do reinforcement activities emphasize active retrieval rather than passive review?
- Does the Reinforcement phase strengthen durable learning while respecting resident and faculty time?
- Have I incorporated the appropriate standardized “Why Am I Doing This?” explanations for retrieval practice and spaced repetition?