Exam 3 Review: Advanced Motor Learning Strategies

KIN 377 - Motor Learning and Control

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1 Overview

Welcome to the Exam 3 Review! This document will guide you through the essential concepts you need to master for success in your exam. We'll explore:

- **Chapter 15:** Augmented Feedback — How external feedback enhances motor learning
- **Chapter 16:** Practice Variability — Structuring practice for optimal skill development
- **Chapter 17:** Amount & Distribution of Practice — Optimal practice scheduling
- **Chapter 18:** Whole and Part-Practice — Approaches to breaking down complex skills

2 Exam Format

Case Study: Advanced Motor Learning Application Project

You will act as a motor learning consultant for a sport or rehabilitation setting of your choice. The exam has **two required parts** and **one optional extra credit section**:

Section	Points	Notes
Part 1: Feedback System Design	40 pts	Required
Part 2: Practice Schedule Optimization	60 pts	Required
Part 3: Applied Problem-Solving	10 pts	Optional extra credit
Total	**100 pts**	EC cannot raise score above 100

Format reminders:

- You may use bullet points or short paragraphs — your choice
- Submit as a **single PDF** file
- File name: `LastName_FirstName_Exam3.pdf`

3 Part 1: Feedback System Design (40 points)

In this section, you'll design a **comprehensive** feedback system for a learner in your chosen setting — from early to advanced stages. Your response must be organized into **three separate, clearly labeled sections**:

- **Feedback types across learning stages:** Which types (KR, KP) are used early, intermediate, and advanced? Why?
- **Feedback scheduling progression:** How do frequency, timing, and precision change as the learner develops?
- **Technology integration & dependency prevention:** What tool do you use? How do you prevent over-reliance?

> **!** Important
>
> You must address these components in separate sections as specified in the prompt. This helps ensure you cover all necessary theoretical justifications for each part of your system.

Key Concepts to Review:

- Knowledge of Results (KR) vs. Knowledge of Performance (KP)
- Feedback frequency effects on learning (high vs. low frequency)
- Feedback timing: immediate vs. delayed
- Bandwidth, summary, faded, and self-controlled feedback
- Guidance effect and feedback dependency (Chapter 15)

4 Chapter 15: Augmented Feedback — Key Points

- **Types of Augmented Feedback:**
  - *Knowledge of Results (KR):* Information about the outcome/result (e.g., "you missed by 3 inches")
  - *Knowledge of Performance (KP):* Information about movement quality/pattern (e.g., "your elbow dropped on follow-through")
- **Feedback Scheduling:**
  - *Frequency:* High frequency helps beginners; lower frequency forces internal error detection in advanced learners
  - *Timing:* Immediate feedback supports acquisition; delayed feedback supports retention
  - *Precision:* Bandwidth feedback — only given when error exceeds an acceptable threshold

- **Advanced Techniques:**
  - *Summary feedback:* Provided after a set of trials (not after each one)
  - *Self-controlled feedback:* Learner requests feedback when they feel they need it
  - *Faded schedule:* Feedback frequency is systematically reduced over time
- **Guidance Effect:**
  - Over-reliance on frequent, immediate feedback creates good practice performance but poor retention when feedback is removed
  - Prevention: fading, self-controlled schedules, self-assessment before receiving feedback

5 Part 2: Practice Schedule Optimization (60 points)

In this section, you'll develop a **3-session practice plan** (beginning, middle, and end of the week). For **each session**, you must provide a detailed response with **separate sub-headings** for:

- **Practice variability** (blocked, serial, random) and why it fits this learning stage
- **Practice amount and distribution** (session length, work-rest structure, massed vs. distributed)
- **Whole/part practice methods** (fractionization, segmentation, simplification) and when used
- **How feedback from Part 1 connects** to this specific session

> Tip
>
> Each session is worth **20 points** (5 points per component). Make sure to justify your decisions using the specific motor learning principles discussed in the textbook for each sub-section.

Key Concepts to Review:

- Contextual interference effect and its application across sessions
- Massed vs. distributed practice — when is each appropriate?
- Work-to-rest ratios and their effect on skill acquisition
- Whole vs. part practice decision framework (complexity × organization)
- How practice variability interacts with feedback scheduling

6 Chapter 16: Practice Variability — Key Points

- **Types of Practice Schedules:**
  - *Blocked:* One variation practiced repeatedly → good for early learning, lower retention
  - *Serial:* Variations practiced in a consistent sequence → bridge between blocked and random
  - *Random:* Multiple variations in unpredictable order → harder, but better retention and transfer
- **Contextual Interference Effect:**
  - Higher interference (random practice) leads to worse immediate performance but **better long-term learning and transfer**
  - Lower interference (blocked practice) is better for beginners who need to build confidence and a basic movement pattern
- **Application Considerations:**
  - Learner's skill level (beginners → blocked; advanced → random)
  - Skill complexity and organization
  - Learning goals (performance during practice vs. long-term retention)

7 Chapter 17: Amount & Distribution of Practice — Key Points

- **Practice Duration Factors:**
  - Physical and mental fatigue diminish returns in extended sessions
  - Quality of practice matters as much as quantity
- **Distribution Patterns:**
  - *Massed practice:* Continuous work with minimal rest — useful for simple skills or performance contexts
  - *Distributed practice:* Work periods separated by rest — generally better for complex skill acquisition
  - *Spacing effect:* Distributing practice over multiple sessions enhances long-term retention
- **Rest Interval Considerations:**
  - Allows physical recovery and mental processing
  - Sleep consolidation strengthens motor memory between sessions
  - Rest is especially important in complex, cognitively demanding skills

8 Chapter 18: Whole and Part-Practice — Key Points

- **Skill Analysis Factors:**
  - *Complexity:* Number of components and information processing demands
  - *Organization:* How interdependent the components are (high organization = hard to separate)
- **Part-Practice Methods:**
  - *Fractionization:* Practicing simultaneously-occurring components separately (e.g., arms and legs of a breaststroke)
  - *Segmentation:* Progressive part method — practice part A, then add part B, then add part C
  - *Simplification:* Reducing difficulty while keeping the whole skill structure (e.g., slower speed, smaller target)
- **Decision Guidelines:**
  - Low complexity + High organization → Whole practice
  - High complexity + Low organization → Part practice
  - When in doubt: simplification often preserves whole-skill structure better than fractionization

9 Part 3: Applied Problem-Solving (Optional — 10 Extra Credit Points)

> **!** Important
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> This section is **optional**. A maximum of **10 extra credit points** may be earned. These points offset missed points in Parts 1 and 2 but **cannot raise your final score above 100 points**.

You'll address **two brief scenarios**:

1. A learner who shows **declining performance** when transitioning from blocked to random practice
2. A learner who becomes **overly dependent** on augmented feedback

For each scenario, you need to:

- Identify likely **causes** (citing the relevant chapter)
- Propose at least **two evidence-based interventions**

Key things to think about:

- Scenario 1 touches on the contextual interference effect (Ch. 16), practice distribution (Ch. 17), feedback guidance during transitions (Ch. 15), and simplification strategies (Ch. 18)
- Scenario 2 centers on the guidance effect (Ch. 15) and how variability (Ch. 16), distribution (Ch. 17), and practice structure (Ch. 18) can reduce dependency

10 Integrating Concepts Across Chapters

Success on this exam requires connecting ideas across all four chapters. Ask yourself:

- How should feedback **type and frequency** change when moving from blocked to random practice?
- How does **rest interval length** affect a learner's ability to benefit from feedback?
- When should you use **part practice** and how should feedback adjust accordingly?
- How does **practice distribution** across sessions reinforce what was learned with feedback?

11 Study Strategies

1. **Know your definitions** — KR vs. KP, blocked vs. random, massed vs. distributed, whole vs. part
2. **Apply concepts to a skill** — pick one skill and mentally walk through how you would design feedback and a 3-session plan
3. **Draw cross-chapter connections** — find at least one link between each pair of chapters (e.g., Ch. 15 + Ch. 16, Ch. 16 + Ch. 17, Ch. 17 + Ch. 18)
4. **Review the example** in Appendix B of the exam document — note how the golf putting example integrates all four chapters
5. **Practice writing integrated responses** — avoid bullet lists that just list facts; make sure each point is connected to a *reason*

12 Quick Reference: Key Terms

Term	Chapter	Brief Definition
Knowledge of Results (KR)	15	Feedback about movement outcome

Term	Chapter	Brief Definition
Knowledge of Performance (KP)	15	Feedback about movement pattern
Bandwidth feedback	15	Feedback only when error exceeds threshold
Guidance effect	15	Over-reliance on feedback harms retention
Contextual interference	16	Difficulty of random practice → better retention
Blocked practice	16	One variation repeated before switching
Random practice	16	Variations mixed unpredictably
Massed practice	17	Continuous work, minimal rest
Distributed practice	17	Work periods with rest intervals
Spacing effect	17	Spreading practice over time aids retention
Complexity	18	Number of components in a skill
Organization	18	Interdependence of skill components
Fractionization	18	Separate practice of simultaneous components
Segmentation	18	Progressive part method
Simplification	18	Reduce difficulty while keeping whole structure

13 Questions?

Review the course materials and post any questions on Canvas!

Remember: the exam tests your ability to **apply** and **integrate** these concepts in a realistic consulting scenario — not just recall definitions. Think like a practitioner backed by research.