Chapter 10

Fostering Skill Development Outcomes

Alexander Romiszowski

Editors' Foreword

Preconditions (when to use the theory)
Content
- All kinds of skills: reproductive skills, productive skills, abilities, competencies
Learners
- All learners, including all k-12, corporate, higher education and others
Learning environments
- All environments, as long as there is appropriate space and equipment for practicing skills
Instructional development constraints
- All levels of resource availability

Values (opinions about what is important
about ends (learning goals)
- It is important to ensure that all parts of the skills-cycle have been learned (receive signal, perceive and interpret, decide on action, take action).
about priorities (criteria for successful instruction)
- Effectiveness and efficiency are typically valued most for this kind of instruction, but increasingly appeal is recognized as important.
about means (instructional methods)
- Decisions about methods should be made based on what works (research), rather than on philosophy (ideology).
about power (to make decisions about the previous three)
- The teacher should be in control.

Universal Methods
1. Stages of development of skill (descriptive model of learning)
   a. Acquire knowledge of what should be done
   b. Execute actions step-by-step
   c. Transfer control from eyes to other senses
   d. Automatize the skill
   e. Generalize the skill
2. Basic steps in instructional strategy for skills development (design theory of instruction)
   a. Impart basic knowledge content
   b. Impart basic skill
   c. Develop proficiency

Situational Principles
for imparting essential information
- If the task is simple, with limited background knowledge, demonstrate and explain as illustrated narrative.
- If the task is simple, with little or no new knowledge, just demonstrate it.
- If the task is complex with relationships among components and a lot of new knowledge but little new skill, use exploratory activity with outline notes or a physical model.

- If the task is simple and involves a sequence of consecutive steps, allow the student to observe before attempting to execute it.
- If the objective is mastery of a procedure, demonstrate it from the viewpoint of the performer.

for providing for practice
- If the objective is to learn integrated and coordinated activities, use the "whole task" method.
- If the task is a sequence of independent actions, use the "progressive parts" method.
- If prerequisite subskills are initially below "minimum threshold levels," develop them prior to practice of the whole task.
- For highly coordinated and "productive" tasks, provide continuous practice.
- For repetitive and high-speed "reproductive" tasks, use spaced practice.
- If the task involves heuristically based productive skills, use mental rehearsal strategies and reflection-in-action.
- If task is a sequential procedure that mainly involves reproductive skills, supply verbal coding, or cueing, with model demonstration.
- For high-speed tasks, use forced pacing for more rapid mastery.

for giving feedback
- If the objective is to develop simple sensori-motor skills, use "learning feedback" (results information), not "action feedback" (control information).
- If the objective is to develop complex skills, feedback should include information about the process as well as the product.
- When teaching "productive" skills, supply knowledge of performance through a process of "debriefing" or "reflection-in-action."

for promoting transfer
- If the task is a productive skill, vary practice.
- If the task is reproductive, no need for variety in practice.
- When teaching for transfer, practice should define or refine motor concepts and a motor schema in the learner's mind.
- If the task is reproductive, use over-learning.
- If the task is productive, use debriefing to promote reflection-in/on-action.

— CMR & ACC