

## Interleaved practice

What is Interleaved practice? Researchers distinguish between two forms of practice. The most common is “blocked practice” which involves focusing on one skill, one concept, or one type of problem until it is learned with some degree of fluency or proficiency, and then moving on to a different skill or type of problem. Textbooks are typically organized on this principle. Students learn one type of problem in a chapter and practice by working examples of that problem before moving on to a new type of problem in the next chapter, and so forth. In contrast, “interleaved practice” involves working on multiple types of problems in one practice session. For example, if there are four types of problems in a unit, interleaved practice involves working on all four, e.g., working on a Type 1 problem then a Type 4 then a Type 2 then type 3, then another Type 2 and so on. The order is unpredictable.

Research indicates that interleaving the problem types can produce better learning than blocked practice (Dunlosky, Rawson, Marsh, Nathan & Willingham, 2013; Carpenter, 2014). For example, in one study college students learned about the painting styles of 12 artists through either blocked or interleaved practice. In the blocked condition, they saw multiple paintings from the same artist and then moved on to multiple paintings by another artist. In the interleaved condition, the paintings from different artists were interspersed, e.g., they saw a painting from artist X, then one by artist Y and so forth. To assess their knowledge of painting styles, students were shown paintings they had not yet seen and were asked to identify the artists. Students who had the interleaved practice were much better able to identify the artists and artistic styles than students in blocked practice (Kornell & Bjork, 2008).

How and why interleaving supports learning: Interleaving helps you differentiate among concepts and improves your ability to retrieve concepts and information relevant to the problem at hand. Think of it this way, if you practice the same problem type over and over, you will probably become more fluent in solving it. However, when confronted with that type of problem in a new situation, you may not be able to differentiate it from other similar problems. Interleaved practice helps you recognize the similarities and differences among concepts, skills and problems, and to remember what knowledge is relevant for each one.

When and why to use interleaving: Interleaving is a good strategy in areas where you need to combine specific concepts or skills into your performance. For example, research with collegiate baseball players used interleaved practice vs. blocked practice for extra batting practice sessions. For two extra batting practice sessions each week, the blocked practice players saw 45 pitches in sequence, 15 fast balls, then 15 curve balls, and then 15 change ups. The interleaved practice players saw 45 pitches in randomized order, e.g., curve, change up, curve, fast ball, etc. After six weeks of practice the interleaved practice players improved by 57% compared to 25% for the blocked practice group (Hall, Domingues, & Cavazos, 1994). The interleaved practice better prepared players for batting in an actual game. (An example of interleaved practice from music, [\*Why the Progress You Make in the Practice Room Seems to Disappear Overnight\*](#))

### Blocked vs. Interleaved Batting Practice

	Order of Pitches	Improvement in Hitting
Blocked	15 fast balls, 15 curve balls, 15 change ups	25%
Interleaved	45 fast balls, curve balls, change ups in random order	57%

How to use interleaving effectively:

- The positive effects of interleaving have been well documented in mathematics and a number of skill areas such as music and athletics. However, there is relatively little research on interleaving outside these areas.
- Interleaving may work best in situations where you need to compare and contrast concepts to determine similarities and differences, as in the example above involving painting styles.
- It is important to recognize that in the learning phase, progress and accuracy, are slower for interleaved than for blocked practice. It feels like you don't learn as much or as well. However, eventually you learn more and it lasts longer with interleaved practice.

### References

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