

# How to teach your resident in the OR

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**Active Learning** - Active learning are environments where the learner has to interact with the teacher or peers, or spend time thinking about the information, to consolidate, critically think, or perform a task

Ie. small group discussion, case-based learning, questions from a quiz bank, teaching others, pimping

**Passive Learning** - essentially a lecture, where the learner just sits and listens

## Active vs. Passive Learning

- More engagement
  - Better performance on testing and behaviors
  - Learner thinks they falsely thinks they learn better with passive learning
- \*Caveat - the amount of material covered is less in active learning, so not efficient if just looking at topics covered, but more efficient when looking at performance of the learner on the topic

**Haidet et al. 2004** - 82 Baylor residents in 6 specialties learning statistics

- 60 min lecture vs. active learning + 30 min lecture
- 80% vs. 72% on post test, 74% vs. 71% on 1m after

**Freeman 2014** - meta-analysis of 225 studies

- avg. performance increase 0.47 SD
- risk ratio 1.5 of failing in traditional group vs. active group
- trend to larger effect size with smaller classrooms (Hedge's g = .6 for <50 students)

**Perez-sabater et al. 2011** - 32 foreign students learning English

- looking at long-term retention
- 8m later, 70.6% vs. 54.2% in active cohort

**Kvam 2000** - 38 Engineering students learning statistics

- Looking at long-term retention
- 8m later, stronger correlation coefficient for 1st vs. 2nd exam
- Active teacher received lower ratings scores

**Psychological Safety** - team members or learner feels safe to take risks and be vulnerable in front of others

- Better team performance
- More trust in formative assessments

**Edmonson 1999** - Office Design Incorporated 5000 employees, 53 teams

- better team performance

**Google** - Internal review of 180 google teams looking at 250 attributes

- psychological safety discovered as most important factor for team performance

**Leroy et al. 2012** - 54 nursing teams assessing reported errors in environments where there is a

low or high priority for safety

- found more reported errors in high psychologically safe groups, which reduced when there was a high priority for safety

**Theobald et al. 2017** - 776 ugrad biology students

- higher course grade with groups that did not have a dominator present

**Forgetting Curve** - discovered 100 years ago by Ebbinghaus (1885), he found that we have rapid decay of new information learned. This was found to have a slower and slower decay each time information was reviewed.

**Spaced Learning** - uses the forgetting curve to identify stronger retention in the learner. This is well documented to have better performance from the learner even though the learner often thinks it's better to have massed learning. This especially applies to retention over time.

**Massed Learning** - is a block of learning in contrast to spaced amounts of material

**Retrieval Practice** = Testing as a form of learning -

**Roediger and Karpicke 2006** - 120 undergrad students, with 250 word texts

→ a study, test, test, test sequence demonstrated the best performance vs. study, study, study

**Smith and Karpicke 2014** - 90 undergrad students 4 texts, with final test 1 week later

→ all forms of MCQ, short answer, hybrids found similar effect on final performance  
→ control group with no retrieval practice had poor performance

**Butler and Roediger 2008** - 72 undergrad students, with practice test and given immediate feedback after test question, or delayed feedback after whole test

→ best performance was with delayed feedback after full practice test was written

**Spaced Repetition** - is a way of combining the spacing effect and retrieval practice, to efficiently test yourself on topics that are likely on faster 'decay' curves for forgetting. This is used by SuperMemo algorithm, and is incorporated in many quizbanks including Anki

**Bloom's Taxonomy** - Bloom and 33 university professors mapped out performance on types of questions based on different skill, and found that there was a hierarchy where students performed worse the higher order the skill type:

**Create** - produce original work

**Evaluate** - justify a stand of decision

**Analyze** - draw connections among ideas

**Apply** - use information in new situations

**Understand** - explain ideas or concepts

**Remember** - recall facts and basic concepts

**Self-Determination Theory** - we move along a spectrum from amotivation, forms of extrinsic motivation, to intrinsic motivation. The more intrinsic motivation a learner has, the better their performance in that area. 3 factors identify supporting more intrinsic motivation in a learner:

**Relatedness** - how much the learner identifies with the teacher, and feels psychologically safe

**Competence** - how much prior knowledge the learner has in the area or topic

**Autonomy** - the feeling that they have control over their activities

**Circle of Learning** - we move from:

1. Unconsciously incompetent
2. Consciously incompetent
3. Consciously competent
4. Unconsciously competent

**Dunning Kruger Effect** - unconsciously incompetent learners don't know that they lack knowledge and self-assess themselves as higher performing than they actually are

**How to implement with your resident**

**Pre-reading** - assign something to discuss the day before. This helps with the idea of spaced repetition on the subject. Topics aren't read once and learned, but rather re-read/discussed multiple times before it is solidified. This should also be:

**Specific** - a chapter, article, video, or search for the answer to a specific set of questions. The more junior the learner, the more you need to specify the source. Early learners don't know where to find their resources and end up reading irrelevant literature that's off track, too detailed, or too superficial

**Palatable** - if it's not doable in a 30-60 min, then it won't be done, and both you and the learner will be disengage

**Follow-up** - make sure you prioritize part of the day to actually discuss it. It's not good enough that they read it if they don't get to discuss it. If you don't discuss the concept, it breeds distrust in the learner

#### In the OR

**Ask them** - asking is a form of 'active learning'. Another option is to have them teach you

**Formative** - the point of asking them is to identify gaps, and teach around it. Not summative, to assess their knowledge

**Make it Application** - consider Bloom's taxonomy, to make the discussion about synthesis and application, not regurgitation of facts and definitions, but how to apply those facts to clinical decision making

**Give them Graduated Autonomy** - based on Self-Determination Theory - the learner will be more engaged and motivated when they can do procedures/decision making themselves (keeping in mind graduated autonomy to ensure patient safety)

**Be Nice** - learners need to feel psychologically safe, which means they shouldn't feel like they are being 'judged' when teaching or asking them questions. If they do, they won't clarify or ask 'dumb' questions and will never grow as a learner