TEACH BIG · THE RESEARCH BEHIND THE PRACTICE

Why Students Learn by Doing

The case for interactive workbooks, where students cut, fold, sort, build, and play their way to mastery

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A worksheet asks a student to sit still and take information in. An interactive workbook asks a student to do something with it, to cut a word apart and rebuild it, to sort evidence into piles, to fold a flap and quiz themselves, to move a game piece and defend the move. That difference is not decoration. A large body of research shows that learners who act on content understand and remember more than learners who only receive it. When we build workbooks that students manipulate, we are not making the work more fun for its own sake, we are putting the brain in the one posture that learning rewards, active rather than passive.

Doing beats watching

The clearest evidence comes from a landmark analysis of two hundred twenty five studies. When classrooms shifted from students listening to students doing, exam scores rose by about six percent, and students in traditional lecture classes were about one and a half times more likely to fail than students in active classes **(Freeman et al., 2014)**. The gains were large enough that the authors argued it would be hard to justify a return to lecture only teaching. The principle is simple and it holds across ages and subjects: the student who works the material learns it better than the student who watches someone else work it.

> Learning is not something that happens to a student. It is something a student does, and an interactive workbook is a page built to be done.

The hand teaches the mind

Young learners think with their hands. When abstract ideas are attached to objects a child can hold, turn, and arrange, the ideas become easier to grasp and to keep. A meta

analysis of fifty five studies covering more than seven thousand students found that teaching with concrete objects students could manipulate produced better learning than teaching with symbols alone, with the strongest benefit for holding on to what was learned **(Carbonneau, Marley, & Selig, 2013)**. This is why a student who builds a word from prefix, root, and suffix cards remembers how that word works, and why sorting sentences into piles teaches grammar in a way a fill in the blank cannot. The movement of the hand gives the mind something to hold onto.

Play is serious learning

Games get a bad name as a break from learning, but well designed learning games are learning. Two independent reviews make the point. A synthesis of the research found that students who learned through games outperformed those in non game lessons by a meaningful margin **(Clark, Tanner-Smith, & Killingsworth, 2016)**, and a separate analysis of seventy seven studies found that games produced better learning and, importantly, better retention than conventional instruction **(Wouters et al., 2013)**. The reason is not the novelty. A game asks the player to make choices, test them, and try again, which is exactly the cycle of attempt and feedback that builds skill. A sorting game, a board race, a card match, or a quest through a passage puts that cycle to work in the service of reading and writing.

Why it works: the brain keeps what it makes

Underneath all three findings is one idea. The brain remembers what it produces better than what it merely reads. Cutting, folding, sorting, classifying, building, and playing all force the student to generate the answer, to commit to a choice, and to see the result, and generated knowledge is stickier than received knowledge. Active work also carries its own attention and motivation, because a student who is making something is a student who is paying attention, and a student who succeeds at a small challenge wants the next one. Interactivity turns a page from a thing to finish into a thing to figure out.

> Cut it, fold it, sort it, build it, play it. Every one of those verbs is the brain doing the work, and the work is where the learning lives.

What this means for a Teach BIG workbook

This research is the reason our interactive workbooks are built around the hand and the game. When a student cuts apart a word to find its parts, sorts evidence by whether it connects to the prompt, folds a flap to self quiz a spelling pattern, or moves a piece to show a revision, that student is doing the exact kind of active, hands on, generative work the research rewards. The path runs from doing, to holding the idea in the hand, to the attempt and feedback of play, to knowledge the student built and therefore keeps. A workbook students take apart and put back together is not a worksheet with pictures. It is the most reliable classroom version of learning by doing, and that is why it belongs at the center of how we teach.

References

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