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SIDE LINES

THE THEORY



Allan Paivio

Paivio devised this theory in 1971 and kept testing it right up to his death in 2016. He found that we have two separate channels with which we receive information from the world. This allows us to double our working memory capacity if we communicate with both words and images.

THE RESEARCH



Richard E Mayer

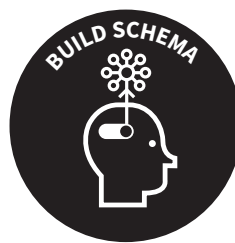
For over 40 years, Mayer has researched the use of words and images for teaching and learning. He collected his work in his Cambridge Handbook of Multimedia Learning.

THE APPLICATION



Logan Fiorella

In his book *Learning As A Generative Activity* with Mayer, Fiorella explored two forms of dual coding: drawing and mapping. The latter was divided into concept, knowledge and graphic organisers.



THE PROBLEM WITH WORDS

In the foreword to *Organise Ideas*, Mary Myatt writes: “...*the written word is dense and the spoken word is transient*”. Therein lies the problem with assuming teachers’ words — however wise and engaging — will be remembered. And that the complexity of grammar clarifies rather than obscures meaning for many students. Not surprisingly, then, we learn that Richard E Mayer concludes his decades of research by saying “*People learn better from graphics and bywords than from words alone*”.

THE BENEFITS OF WORDS + IMAGES

Ruth Clark and Chopeta Lyons’ colossal 2004 *Graphics for Learning* survey of the research points out that including visuals in teaching helps:

- direct attention | by highlighting important connections
- trigger prior knowledge | by simplifying critical patterns of knowledge
- manage cognitive load | by using both channels for information input
- build schema | by presenting new information in a non-linear fashion
- transfer long-term memory into working memory | by providing an easy-to-access organisation of facts and ideas
- motivate learners | by avoiding the dread of facing a *wall of words*.

PITFALL 1: WRONG VISUAL

Such benefits, however, aren’t realised if an inappropriate visual is used. Selection is critical and not based on personal preference. The visual tool should be aligned with the nature of the content and the questions posed.

For graphic organisers, use this model:

- Chunk | for whole-part relationships
- Compare | for contrasting several items
- Sequence | for putting events in order
- Cause & Effect | for analysing causation.

PITFALL 2: OVERLOAD

Enthusiasm can sometimes be costly. This happens when a too-complex diagram of new information is presented to students. Instead of clarifying, the visual confuses and overwhelms. So while the research shows diagrams can reduce cognitive load, poorly used, they can significantly increase it too.

By thinking of nested knowledge, you will understand how to present either a part of a larger diagram, or a simplified version, to avoid this danger.

PITFALL 3: VISUALS IGNORED

There are often two-sides to any practice. Diagrams have what psychologists call *computational advantage* over text — they get the points over more easily. However, this advantage can turn into a disadvantage when it becomes too easy.

For as Dan Willingham reminds us: “*Whatever you think about, that’s what you remember*”. So simply showing your students a well-formed diagram won’t necessarily result in learning. You must follow up with questions and activities to stretch your students’ thinking.

PITFALL 4: POOR EXECUTION

Even if you address all the points raised thus far, you can still reduce success by poor execution of a visual design. Follow these four simple graphic guides to ensure effective execution.

- Cut | most documents and slides have too much content. Split it up.
- Chunk | as meaning is mostly created by grouping, clearly organise and label the information.
- Align | viewers are always searching for order — so provide graphic order by aligning everything to a background grid.
- Restrain | reduce the number and type of fonts as well as the range of colours.