EFFECTS OF VISUAL, VERBAL, AND KINESTHETIC INSTRUCTION ON LEARNING

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A study by Farahat, Ille, and Thon (2004) compared visual and kinesthetic instruction on learning how to draw a picture on a computer.

Method: 4 conditions; visual and visual imagery, kinesthetic and kinesthetic imagery, visual alone, and kinesthetic alone.

Results:
1) groups performed equally well on pretest
2) no differences in post-test scores for imagery groups
3) no differences in post-test scores for non-imagery groups
4) imagery groups performed significantly better than non-imagery groups
5) the visual and visual imagery group performed better than the kinesthetic and kinesthetic imagery group in the week-after test.
Glaser and Schwan (2005) studied how verbal cues influence processing of learning material.

**Method:** 2 experiments are presented that examine the multimedia effect for pictures with accompanying spoken text.

- Experiment 1: Examined whether learning is better with a multimedia presentation in which pictorial information is verbally referenced then without being referenced.
- Experiment 2: Examined eye-tracking whether the multimedia effect due to a shift of attention toward the elements presented multimodally and away from those presented unimodally.

Based on Glaser and Schwan (2005) findings they believed learners should benefit from a combination of picture and text referencing to the pictorial elements, compared to a picture accompanying text not addressing pictorial elements.
A study done by Ingram, Kraeutner, Solomon, Westwood, and Boe (2016) used an implicit sequence learning (ISL) task to probe whether motor imagery (MI - the mental rehearsal of movement) based skill acquisition can be attributed to perceptual or motor learning.

Method – 60 participants randomized to 4 groups were trained through MI or PP (physical practice), and were then tested in either perceptual (altering the sensory cue) or motor (switching the hand) transfer conditions.

Results –
• Participants who trained through physical practice demonstrated improved performance (had smaller RTs) compared with those training with motor imagery
• This suggests that MI-based skill acquisition relies more heavily on perceptual learning than physical practice based training.
All of this evidence leads us to our experiment, in which we manipulated the learning style of our participants. We defined the learning styles as such:

- **Visual**: being presented with a visual stimulus to study
- **Verbal**: being given verbal step by step instructions to complete a task
- **Kinesthetic**: being shown how to complete the task

**Hypotheses:**

- Participants in the kinesthetic condition will have higher closeness scores, complete in less time, and lift their pen off less than those in either the visual or verbal conditions.
- Participants in the verbal condition will perform better in these areas than those in the visual condition.
Participants
Participants were 25 females and 28 males with an age range from 18-43 years old. We eliminated one participant because the timer malfunctioned and therefore we did not have any time data for the person.

Materials
A blank sheet of paper
Pencil
Timer
Picture of a house

Procedure
To test which learning style is the most effective (verbal, visual, or kinesthetic), we tested participants using a PFC task.

The PFC task was to draw a picture of a house to the image or instructions as close as the participant can.
RESULTS

- Across conditions, the mean time of completion was 25.31 seconds (SD=22.09)
- Across conditions, the mean closeness rating of 3.4 (SD=.98)
- Only 5 participants lifted their pen off of the paper
- One-way ANOVA
  - no significant differences for time or likelihood of lifting pen off of paper
  - there was a significant difference in the means for closeness to the original picture; F(2,45)=8.40; p=.010
- Post hoc Fisher LSD comparisons
  - no significant differences between verbal and visual
  - significant differences between kinesthetic (M=3.89, SD=.88) and verbal (M=2.9, SD=.70)
  - significant differences between kinesthetic (M=3.89, SD=.88) and visual (M=3.2, SD=1.12)
Closeness by Learning Style

- Verbal
- Visual
- Kinesthetic
Based on our findings, we concluded that kinesthetic instruction had the most significant results in comparison to verbal and visual, which supports our original hypothesis.

There was no significant difference between verbal and visual learning styles.

Closeness was rated on a Likert-type scale from 1 to 5. Each experimenter rated pictures collected by a different experimenter in order to eliminate any chance of biases.

We did hypothesize that there would be a significant difference based on a time as well as closeness, but no significant differences based on time were detected.

Future studies could look at the effects of mental and physical practice or physically guiding participants through the task before letting them try it themselves (Farahat, Ille, & Thon, 2004)

Glasher and Schwan (2005) stated future studies could be done on written and spoken text and how it can complement pictorial information that will not be able to be visualized directly.

Ingram, Kraeutner, Solomon, Westwood, and and Boe (2016) stated that future studies could investigate the long-term effects related to motor imagery-based skill acquisition to provide insight regarding the utility of motor imagery for things such as sports training or rehabilitation.
Questions?
