Diseñando Multimedios para Utilizarse en Educación a Distancia

Consejos de la Teoría de la Carga Cognitiva

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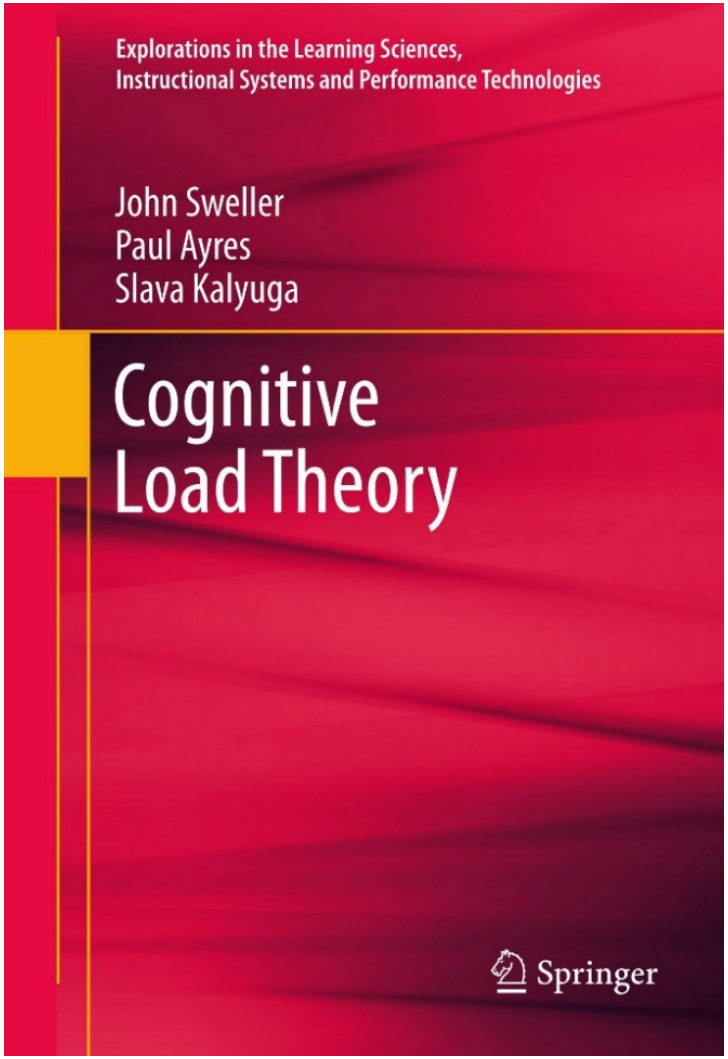
La mejor teoría de psicología educativa sobre el aprendizaje multimedia

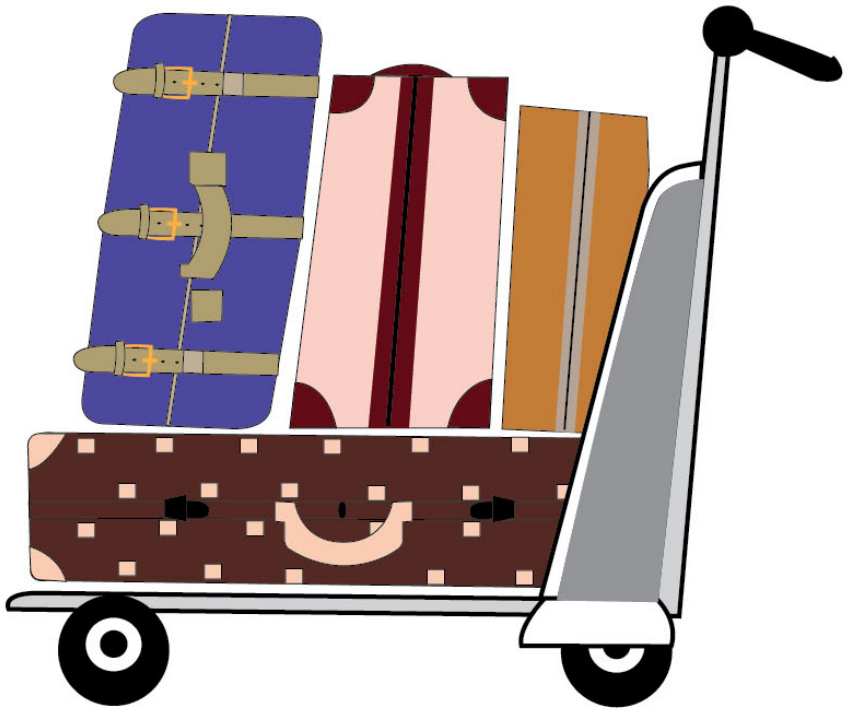
Memoria de trabajo limitada ante información nueva

Memoria de trabajo ilimitada ante información conocida



Sweller, J., Ayres, P., & Kalyuga, S. (2011). *Cognitive load theory*. Springer. https://doi.org/10.1007/978-1-4419-8126-4

La memoria de trabajo es limitada y sólo puede procesar ~4 elementos



La memoria de trabajo es prácticamente ilimitada con elementos conocidos

Debe buscarse un balance entre aprendizaje generativo (expertos) y carga cognitiva (novatos)

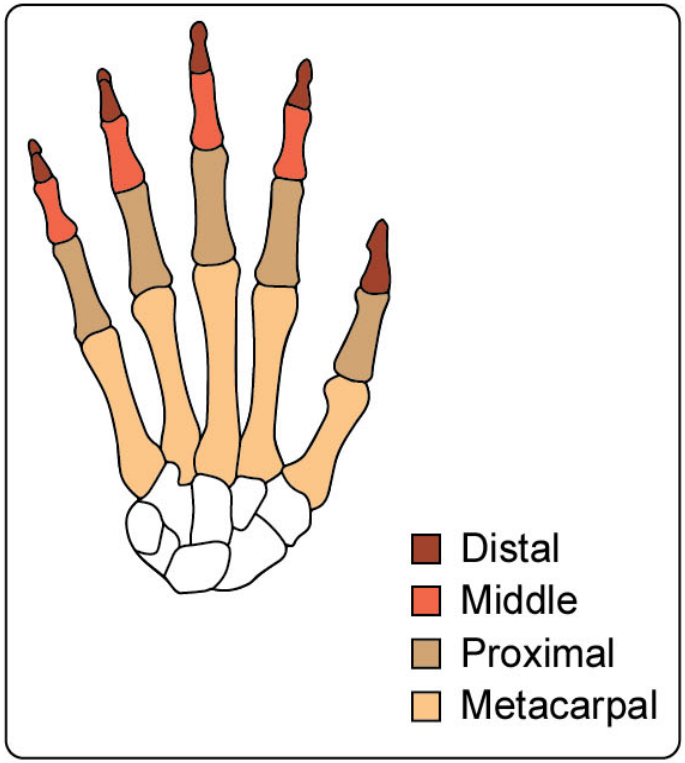
Perspectiva	Estudiante	Profesor
Aprendizaje Generativo	✓	✗

Conocimientos previos

Colliot, T., & Jamet, É. (2018). How does adding versus self-generating a hierarchical outline while learning from a multimedia document influence students' performances? *Computers in Human Behavior*, *80*, 354-361. https://doi.org/10.1016/j.chb.2017.11.037

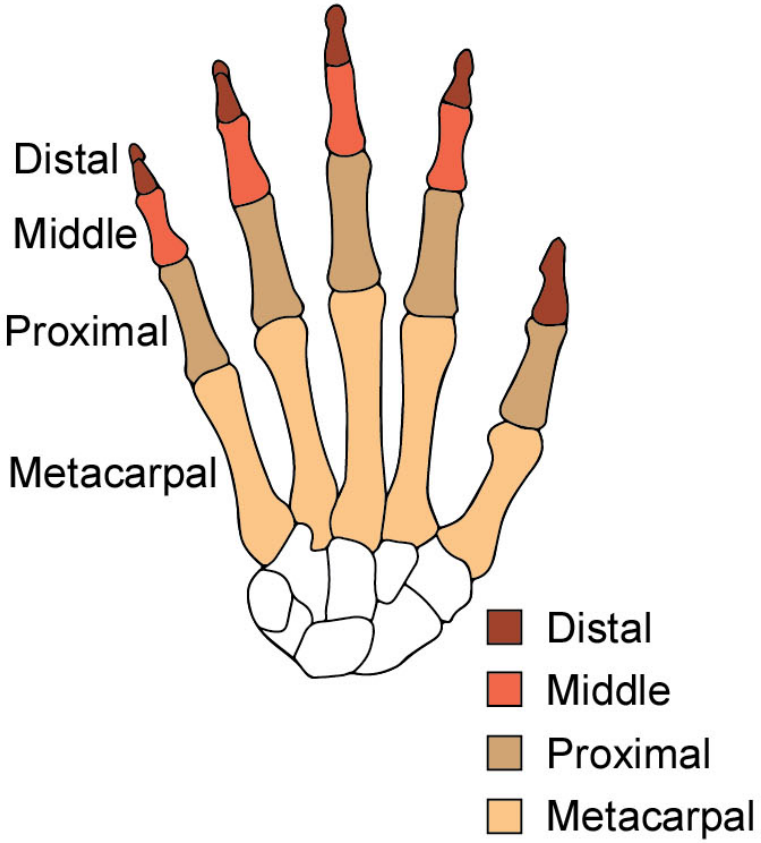
Chen, O., Kalyuga, S., & Sweller, J. (2017). The expertise reversal effect is a variant of the more general element interactivity effect. *Educational Psychology Review*, *29*(2), 393-405. https://doi.org/10.1007/s10648-016-9359-1

El **efecto de la modalidad** promueve narraciones sobre texto escrito



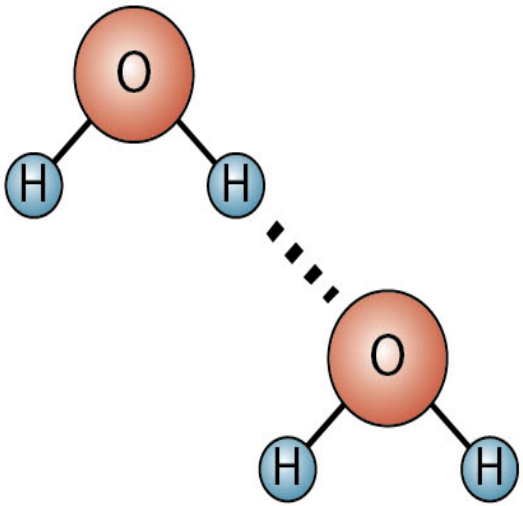
Low, R., & Sweller, J. (2014). The modality principle in multimedia learning. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (2nd ed., pp. 227-246). Cambridge University Press. https://doi.org/10.1017/CBO9781139547369.012

El **efecto de la redundancia** promueve evitar repetir información o agregar adornos



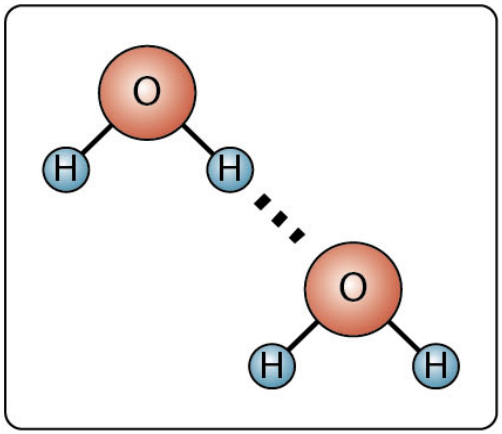
Kalyuga, S., & Sweller, J. (2014). The redundancy principle in multimedia learning. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (2nd ed., pp. 247-262). Cambridge University Press. https://doi.org/10.1017/CBO9781139547369.013

El **principio de la señalización** promueve utilizar indicaciones de la información visual importante



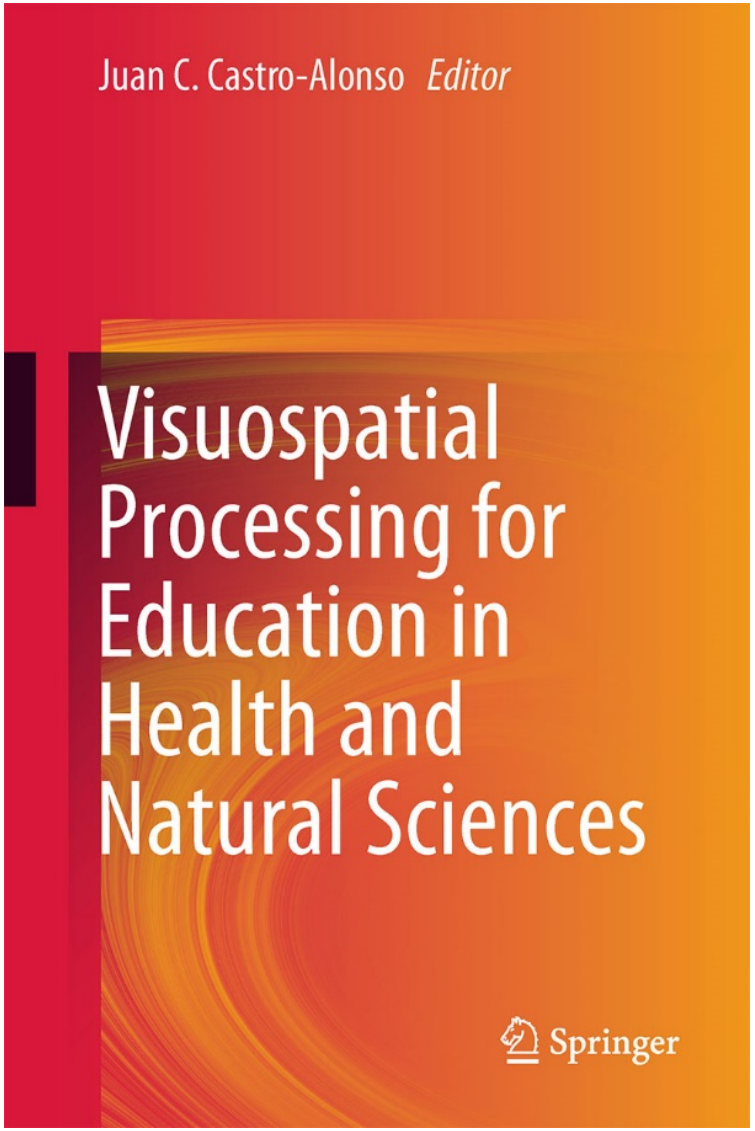
van Gog, T. (2014). The signaling (or cueing) principle in multimedia learning. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (2nd ed., pp. 263-278). Cambridge University Press. https://doi.org/10.1017/CBO9781139547369.014

El **efecto de la información transitoria** promueve incluir controles de velocidad o visualizaciones cortas



Castro-Alonso, J. C., Ayres, P., Wong, M., & Paas, F. (2018). Learning symbols from permanent and transient visual presentations: Don't overplay the hand. *Computers & Education*, *116*, 1-13. https://doi.org/10.1016/j.compedu.2017.08.011

Investigación que estamos desarrollando en Chile



Castro-Alonso, J. C. (Ed.). (2019). *Visuospatial processing for education in health and natural sciences*. Springer. https://doi.org/10.1007/978-3-030-20969-8

Investigación que estamos desarrollando en Chile

Educational Psychology Review (2019) 31:361–387
https://doi.org/10.1007/s10648-019-09469-1

META-ANALYSIS

Gender Imbalance in Instructional Dynamic Versus Static Visualizations: a Meta-analysis

Juan C. Castro-Alonso[1] · Mona Wong[2] · Olusola O. Adesope[3] · Paul Ayres[4] · Fred Paas[5,6]

Published online: 21 January 2019

Abstract
Studies comparing the instructional effectiveness of dynamic versus static visualizations have produced mixed results. In this work, we investigated whether gender imbalance in the participant samples of these studies may have contributed to the mixed results. We conducted a meta-analysis of randomized experiments in which groups of students learning through dynamic visualizations were compared to groups receiving static visualizations. Our sample focused on tasks that could be categorized as either biologically secondary tasks (science, technology, engineering, and mathematics: STEM) or biologically primary tasks (manipulative–procedural). The meta-analysis of 46 studies (82 effect sizes and 5474 participants) revealed an overall small-sized effect ($g+ = 0.23$) showing that dynamic visualizations were more effective than static visualizations. Regarding potential moderators, we observed that *gender* was influential: the dynamic visualizations were more effective on samples with less females and more males ($g+ = 0.36$). We also observed that *educational level*, *learning domain*, *media compared*, and *reporting reliability measures* moderated the results. We concluded that because many visualization studies have used samples with a gender imbalance, this may be a significant factor in explaining why instructional dynamic and static visualizations seem to vary in their effectiveness. Our findings also support considering the gender variable in research about cognitive load theory and instructional visualizations.

Keywords Dynamic and static visualization · Gender and spatial ability · STEM and manipulative–procedural tasks · Cognitive load theory · Meta-analysis

Educational Psychology Review
https://doi.org/10.1007/s10648-020-09564-8

REVIEW ARTICLE

Visuospatial Processing Decline Due to Cannabis Consumption in Nondependent High School Students

Rodrigo Goycolea[1] · Juan C. Castro-Alonso[2] · Anneliese Dörr[3]

Published online: 14 August 2020

Abstract
Using cannabis (e.g., smoking marijuana) is becoming popular, partly due to a legalization trend across different countries. This tendency has resulted in cannabis consumption being accepted by society as if it were harmless. However, evidence shows that the use of this drug has detrimental effects on cognitive, academic, and professional performance, which tend to be larger in younger users (e.g., high school students). In this review article, we focus on the decline of visuospatial processing associated with cannabis consumption in nondependent or nonclinical high school students. We start by providing evidence of the pivotal role of visuospatial processing for learning. Next, we review experimental and correlational evidence of declines in visuospatial processing related to cannabis use. Three types of correlational studies are considered: (a) comparisons of declines between visuospatial processing and other cognitive tasks, (b) studies comparing declines between high school students and adult participants, and (c) stringent correlational studies (e.g., large samples, longitudinal data, twin studies). We also include evidence in abstinent cannabis conditions. We conclude that using cannabis may moderately impair visuospatial processing and learning in nondependent high school students, although the effects could disappear under abstinence and tend to be lower than on other cognitive functions. Instructional implications for educators and future research directions are discussed.

Keywords Visuospatial working memory processing · Spatial ability · Non dependent or non clinical high school adolescent student · Cannabis · Marijuana and marihuana

Castro-Alonso, J. C., Wong, M., Adesope, O. O., Ayres, P., & Paas, F. (2019). Gender imbalance in instructional dynamic versus static visualizations: A meta-analysis. *Educational Psychology Review*, *31*(2), 361-387. https://doi.org/10.1007/s10648-019-09469-1

Goycolea, R., Castro-Alonso, J. C., & Dörr, A. (2020). Visuospatial processing decline due to cannabis consumption in nondependent high school students. *Educational Psychology Review*. https://doi.org/10.1007/s10648-020-09564-8

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