Dr Cris Castro (Juan Cristóbal Castro-Alonso)

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Skills Summary

- Experience in educational research about cognitive psychology, science and STEM education, and multimedia learning
- Proven record in quantitative experimental design, data processing and analysis, and statistical measurement
- Ability to report quantitative data findings to general and technical audiences, both in written and spoken forms
- Capacity to lead and work collaboratively in educational and multimedia projects
- Qualification and experience in design, production, and evaluation of instructional multimedia
- Background in biology, chemistry, and communications
- Proven English proficiency
- Understanding of professional ethics, rigor, methodology, and planning

Education

Doctor of Philosophy (PhD) in Education 2010-2013
University of New South Wales, Australia
Supervisors: Paul Ayres & Fred Paas

Master in Communication and Education 2004-2006
Pontificia Universidad Católica de Chile
Universidad Autónoma de Barcelona, Spain
Supervisor: Álvaro Sylleros

Postgraduate Diploma in Audiovisual Documentary Writing 2003
Pontificia Universidad Católica de Chile

Diploma in Appreciation of Films 1998
Pontificia Universidad Católica de Chile

Minor in Universal Literature 1997-2002
Pontificia Universidad Católica de Chile

Bachelor of Biochemistry 1996-2002
Pontificia Universidad Católica de Chile
Supervisor: Guido Mora

Research Grants as Principal Investigator

Conicyt Fondecyt 11180255 (USD 97,000) 2018-2021
STEM Multimedia Learning: Effects of Cognitive Load, Visuospatial Abilities, and Gender

Conicyt PAI 82140021 (USD 120,000) 2015-2017
Potential of Educational Multimedia to Enhance Spatial Ability and Learning in STEM Activities

Awards and Distinctions

Project Conicyt Fondecyt Iniciacion ranked 1 of 96 in Education 2018

Top 1% of reviewers in 2017-2018 (Social Sciences, General) 2018
Publons™ Peer Review Awards 2018

Doctorate degree granted with the highest reviewers' grades 2013
University of New South Wales, Australia

University International Postgraduate Award Scholarship 2010-2013
University of New South Wales, Australia

Professional Experience

Researcher, Associate Researcher 2015-Present
Center for Advanced Research in Education, Universidad de Chile

I am currently investigating the effects of visuospatial ability, gender, and design of instructional visualizations on science (STEM) learning. We conduct experiments and analyze quantitative data, author articles and literature reviews, and publish in high-standard peer-reviewed journals. I am cowriting and editing a book on visuospatial ability.

Postdoctoral Research Fellow 2014
School of Education, University of New South Wales, Australia

As part of the Educational Psychology Research Group, I investigated the effects of manipulation and gestures on learning through the different visualizations that we designed and produced

Data Analyst 2013
Educational Assessment Australia (EAA)

I worked in the data analysis team, on a casual basis. We processed large datasets of educational tests and measurements, on which we conducted advanced statistical analyses, particularly Rasch models

Doctorate Researcher / Teaching Assistant 2010-2013
School of Education, University of New South Wales, Australia

I collaborated in the Cognitive and Educational Psychology Research Group, in the field of multimedia learning and cognitive load theory. We investigated different media properties to help learning manipulative and non-manipulative tasks.
I also prepared some of the lecture slides for the course Educational Psychology

Professional Experience (cont.)

Project Coordinator 2008-2009
Pontificia Universidad Católica de Chile, FONDEDOC

I coordinated a team to design and produce the educational material "*Biological Laboratory Activities*, DVDs about laboratory activities in biological sciences, narrated and subtitled in English"

Biology Consultant 2008
EducarChile (Fundación Chile) & Núcleo Educativo

I oversaw the biology team of consultants for the educational project Universal Curriculum for Chile in the website yTeach.com.

Project Coordinator 2007-2009
Pontificia Universidad Católica de Chile, FONDEDOC

I coordinated a team to design and produce the educational material "GAMA, web site of multimedia educational resources with a search engine, for the professors of the School of Biological Sciences"

Director of the Audiovisual Unit 2004-2009
School of Biological Sciences,
Pontificia Universidad Católica de Chile

I cocreated and directed the Audiovisual Unit, which, by the coordinated efforts of students, designers and professors, produced multimedia educational resources about biology and biochemistry

Microbiology Undergraduate Researcher 2000-2002
School of Biological Sciences,
Pontificia Universidad Católica de Chile

As part of the Unit of Microbiology, we investigated and generated bacteria with mutations, which could be controlled in order to be securely employed as vaccines or protein carriers

Publications: Refereed Journals

1. 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. doi: 10.1007/s10648-019-09469-1 [4.80]
2. 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. doi: 10.1016/j.compedu.2017.08.011 [3.82]
3. Chen, O., Castro-Alonso, J. C., Paas, F., & Sweller, J. (2018). Extending cognitive load theory to incorporate working memory resource depletion: Evidence from the spacing effect. *Educational Psychology Review*, *30*(2), 483-501. doi: 10.1007/s10648-017-9426-2 [4.33]
4. Chen, O., Castro-Alonso, J. C., Paas, F., & Sweller, J. (2018). Undesirable difficulty effects in the learning of high-element interactivity materials. *Frontiers in Psychology*, *9*(1483), 1-7. doi: 10.3389/fpsyg.2018.01483 [2.09]
5. Wong, M., Castro-Alonso, J. C., Ayres, P., & Paas, F. (2018). Investigating gender and spatial measurements in instructional animation research. *Computers in Human Behavior*, *89*, 446-456. doi: 10.1016/j.chb.2018.02.017 [3.54]

Publications: Refereed Journals (cont.)

6. Castro-Alonso, J. C., Ayres, P., & Paas, F. (2016). Comparing apples and oranges? A critical look at research on learning from statics versus animations. *Computers & Education*, *102*, 234-243. doi: 10.1016/j.compedu.2016.09.004 [2.88]
7. Castro-Alonso, J. C., Ayres, P., & Paas, F. (2015). Animations showing Lego manipulative tasks: Three potential moderators of effectiveness. *Computers & Education*, *85*, 1-13. doi: 10.1016/j.compedu.2014.12.022 [2.88]
8. Wong, M., Castro-Alonso, J. C., Ayres, P., & Paas, F. (2015). *Gender effects when learning manipulative tasks from instructional animations and static presentations*. *Educational Technology & Society, 18*(4), 37-52. [1.10]
9. Castro-Alonso, J. C., Ayres, P., & Paas, F. (2014). Learning from observing hands in static and animated versions of non-manipulative tasks. *Learning and Instruction*, *34*, 11-21. doi: 10.1016/j.learninstruc.2014.07.005 [3.59]
10. Hidalgo, A. A., Trombert, A. N., Castro-Alonso, J. C., Santiviago, C. A., Tesser, B. R., Youderian, P., & Mora, G. C. (2004). Insertions of Mini-Tn*10* Transposon T-POP in *Salmonella enterica* sv. *typhi*. *Genetics, 167*(3), 1069-1077. doi: 10.1534/genetics.104.026682 [4.14]

[Impact factor of the journal at the time of final publication]

Publications: Book Chapters

1. Castro-Alonso, J. C., & Sweller, J. (2020). The modality effect of cognitive load theory. In W. Karwowski, T. Ahram & S. Nazir (Eds.), *Advances in human factors in training, education, and learning sciences: Proceedings of the AHFE 2019 International Conference on Human Factors in Training, Education, and Learning Sciences* (pp. 75-84). Cham, Switzerland: Springer. doi: 10.1007/978-3-030-20135-7_7
2. Castro-Alonso, J. C. (2019). Overview of visuospatial processing for education in health and natural sciences. In J. C. Castro-Alonso (Ed.), *Visuospatial processing for education in health and natural sciences* (pp. 1-21). Cham, Switzerland: Springer. doi: 10.1007/978-3-030-20969-8_1
3. Castro-Alonso, J. C., & Atit, K. (2019). Different abilities controlled by visuospatial processing. In J. C. Castro-Alonso (Ed.), *Visuospatial processing for education in health and natural sciences* (pp. 23-51). Cham, Switzerland: Springer. doi: 10.1007/978-3-030-20969-8_2
4. Castro-Alonso, J. C., Ayres, P., & Paas, F. (2019). VAR: A battery of computer-based instruments to measure visuospatial processing. In J. C. Castro-Alonso (Ed.), *Visuospatial processing for education in health and natural sciences* (pp. 207-229). Cham, Switzerland: Springer. doi: 10.1007/978-3-030-20969-8_8
5. Castro-Alonso, J. C., Ayres, P., & Sweller, J. (2019). Instructional visualizations, cognitive load theory, and visuospatial processing. In J. C. Castro-Alonso (Ed.), *Visuospatial processing for education in health and natural sciences* (pp. 111-143). Cham, Switzerland: Springer. doi: 10.1007/978-3-030-20969-8_5
6. Castro-Alonso, J. C., & Fiorella, L. (2019). Interactive science multimedia and visuospatial processing. In J. C. Castro-Alonso (Ed.), *Visuospatial processing for education in health and natural sciences* (pp. 145-173). Cham, Switzerland: Springer. doi: 10.1007/978-3-030-20969-8_6

Publications: Book Chapters (cont.)

7. Castro-Alonso, J. C., & Jansen, P. (2019). Sex differences in visuospatial processing. In J. C. Castro-Alonso (Ed.), *Visuospatial processing for education in health and natural sciences* (pp. 81-110). Cham, Switzerland: Springer. doi: 10.1007/978-3-030-20969-8_4
8. Castro-Alonso, J. C., Paas, F., & Ginns, P. (2019). Embodied cognition, science education, and visuospatial processing. In J. C. Castro-Alonso (Ed.), *Visuospatial processing for education in health and natural sciences* (pp. 175-205). Cham, Switzerland: Springer. doi: 10.1007/978-3-030-20969-8_7
9. Castro-Alonso, J. C., & Uttal, D. H. (2019). Science education and visuospatial processing. In J. C. Castro-Alonso (Ed.), *Visuospatial processing for education in health and natural sciences* (pp. 53-79). Cham, Switzerland: Springer. doi: 10.1007/978-3-030-20969-8_3
10. Ayres, P., Castro-Alonso, J. C., Wong, M., Marcus, N., & Paas, F. (2019). Factors that impact on the effectiveness of instructional animations. In S. Tindall-Ford, S. Agostinho & J. Sweller (Eds.), *Advances in cognitive load theory: Rethinking teaching* (pp. 180-193). London, UK: Routledge. doi: 10.4324/9780429283895-15
11. Castro-Alonso, J. C., Ayres, P., Wong, M., & Paas, F. (2019). Visuospatial tests and multimedia learning: The importance of employing relevant instruments. In S. Tindall-Ford, S. Agostinho & J. Sweller (Eds.), *Advances in cognitive load theory: Rethinking teaching* (pp. 89-99). London, UK: Routledge. doi: 10.4324/9780429283895-8
12. Castro-Alonso, J. C., & Uttal, D. H. (2019). Spatial ability for university biology education. In S. Nazir, A.-M. Teperi & A. Polak-Sopińska (Eds.), *Advances in human factors in training, education, and learning sciences: Proceedings of the AHFE 2018 International Conference on Human Factors in Training, Education, and Learning Sciences* (pp. 283-291). Cham, Switzerland: Springer. doi: 10.1007/978-3-319-93882-0_28
13. Wong, M., Castro-Alonso, J. C., Ayres, P., & Paas, F. (2019). The effects of transient information and element interactivity on learning from instructional animations. In S. Tindall-Ford, S. Agostinho & J. Sweller (Eds.), *Advances in cognitive load theory: Rethinking teaching* (pp. 80-88). London, UK: Routledge. doi: 10.4324/9780429283895-7
14. Castro-Alonso, J. C., Ayres, P., & Paas, F. (2018). Computerized and adaptable tests to measure visuospatial abilities in STEM students. In T. Andre (Ed.), *Advances in human factors in training, education, and learning sciences: Proceedings of the AHFE 2017 International Conference on Human Factors in Training, Education, and Learning Sciences* (pp. 337-349). Cham, Switzerland: Springer. doi: 10.1007/978-3-319-60018-5_33
15. Castro-Alonso, J. C., Ayres, P., & Paas, F. (2015). The potential of embodied cognition to improve STEAM dynamic visualizations. In X. Ge, D. Ifenthaler, & J. M. Spector (Eds.), *Emerging technologies for STEAM education: Full STEAM ahead* (pp. 113-136). New York, NY: Springer. doi: 10.1007/978-3-319-02573-5_7
16. Castro-Alonso, J. C., Ayres, P., & Paas, F. (2014). Dynamic visualisations and motor skills. In W. Huang (Ed.), *Handbook of human centric visualization* (pp. 551-580). New York, NY: Springer. doi: 10.1007/978-1-4614-7485-2_22

Editorial Activity

Academic editor of PLoS ONE

Scientific advisory board member and reviewer for submissions to the affiliated conference of Human Factors in Training, Education, and Learning Sciences of the 10th (2019), 9th (2018), and 8th (2017) International Conference on Applied Human Factors and Ergonomics (AHFE)

Reviewer for submissions to: Division C of 2020 and 2018 AERA Annual Meeting; 18th (2019) and 17th (2017) Biennial EARLI Conference; and 4th (2018) Biennial Gender & STEM Network Conference

Ad hoc reviewer for: Applied Cognitive Psychology; British Journal of Educational Technology; Cambridge Journal of Education; Computers & Education; Computers in Human Behavior; Contemporary Educational Psychology; Educational Psychology Review; Educational Research Review; Educational Technology Research & Development; Educational Technology & Society; Frontiers in Computational Neuroscience; Frontiers in Psychology; International Journal of Gender, Science and Technology; International Journal of Human-Computer Interaction; Journal of Educational Psychology; Journal of Experimental Psychology: Applied; Journal of Research in Science Teaching; Learning and Instruction; PLoS ONE; Research Quarterly for Exercise and Sport

Ad hoc reviewer of book and chapter proposals for Routledge and Springer

Conference Presentations (Selection)

1. Castro-Alonso, J. C., Ayres, P., & Paas, F. (2019). Gesturing and manipulations: Primary skills that aid attaining secondary STEM skills. 18th Biennial EARLI Conference. Aachen, Germany, 12-16 August
2. Castro-Alonso, J. C., & Sweller, J. (2019). The modality effect of cognitive load theory. 10th International Conference on Applied Human Factors and Ergonomics. Washington DC, USA, 24-28 July
3. Castro-Alonso, J. C., Wong, M., Adesope, O. O., Ayres, P., & Paas, F. (2019). A meta-analysis of variables affecting learning from dynamic versus static visualizations: Implications for cognitive load theory. 12th International Cognitive Load Theory Conference. Maastricht, The Netherlands, 17-19 June
4. Castro-Alonso, J. C., & Uttal, D. H. (2018). Spatial ability for university biology education. 9th International Conference on Applied Human Factors and Ergonomics. Orlando, USA, 21-25 July
5. Castro-Alonso, J. C., Ayres, P., & Paas, F. (2017). Visuospatial tests correlate with STEM animation learning: Perspectives to cognitive load measurement? 10th International Cognitive Load Theory Conference. Wollongong, Australia, 20-22 November
6. Castro-Alonso, J. C., Ayres, P., & Paas, F. (2017). Computerized and adaptable tests to measure visuospatial abilities in STEM students. 8th International Conference on Applied Human Factors and Ergonomics. Los Angeles, USA, 17-21 July
7. Castro-Alonso, J. C., Ayres, P., & Paas, F. (2016). Transient visualizations hinder learning when controlling moderating variables: Critical review and experimental example. 7th International Conference on Applied Human Factors and Ergonomics. Orlando, USA, 27-31 July
8. Castro-Alonso, J. C., Ayres, P., & Paas, F. (2015). Gender effects when learning from instructional animations depicting Lego tasks. 16th EARLI Biennial Conference. Limassol, Cyprus, 25-29 August

International Professional Memberships

International Cognitive Load Theory Association (ICLTA)	2012-Present
European Association for Research on Learning and Instruction (EARLI)	2013-Present
EARLI SIG 06: Instructional Design	2013-Present
EARLI SIG 07: Technology-Enhanced Learning and Instruction	2013-Present

Key Skills

Computing

- Softwares: Microsoft Office 365 2019 (Word, Excel, PowerPoint, Outlook); Adobe Creative Cloud 2019 (Premiere Pro, Animate, Audition, Photoshop, Illustrator, After Effects); SPSS Statistics 25; EndNote X9
- Programming Languages: SPSS Command Syntax; ActionScript 3.0

Languages

- Spanish, native language
- English, full professional proficiency (IELTS Overall Score 8.0, 2014)

Ethics and Research

Social & Behavioral Research course certified by the Collaborative Institutional Training Initiative (CITI Program, USA)