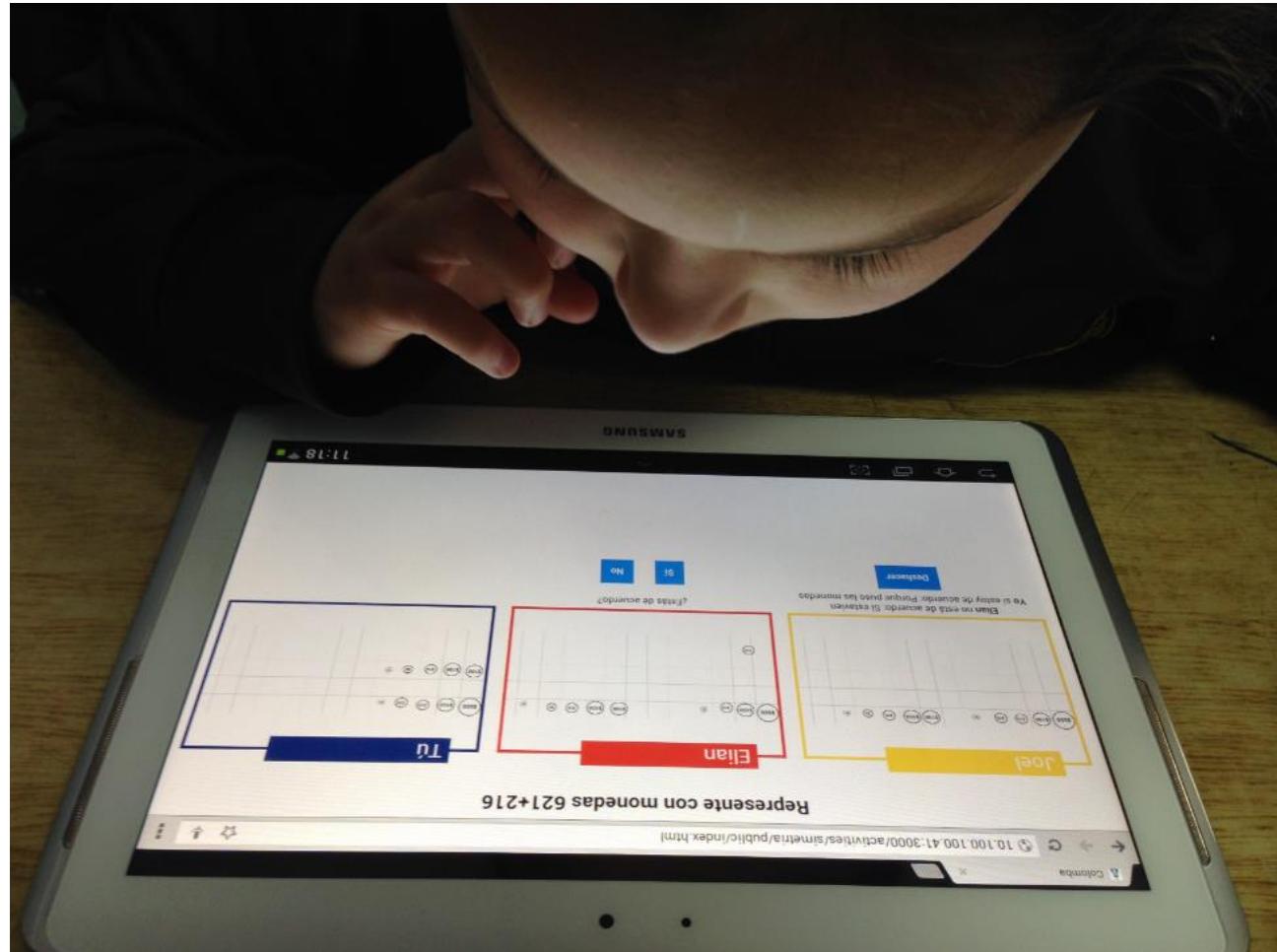




Pontificia Universidad Católica de Chile

Miguel
Nussbaum
mn@ing.puc.cl



El desafío de hoy: El desarrollo de Habilidades Superiores

El problema



La Urgencia

La Urgencia

El futuro presente

Falabella hace click



JUEVES, 23 NOVIEMBRE, 2017

POR: REVISTA CAPITAL

A mediados de 2018, la firma ligada a las familias Solari, Cúneo y Del Río inaugurará un nuevo centro de distribución que operará con robots. Al mismo tiempo, trabaja sigilosamente en un proyecto de markletplace. La batalla contra Amazon viene, y Falabella está construyendo su trinchera.



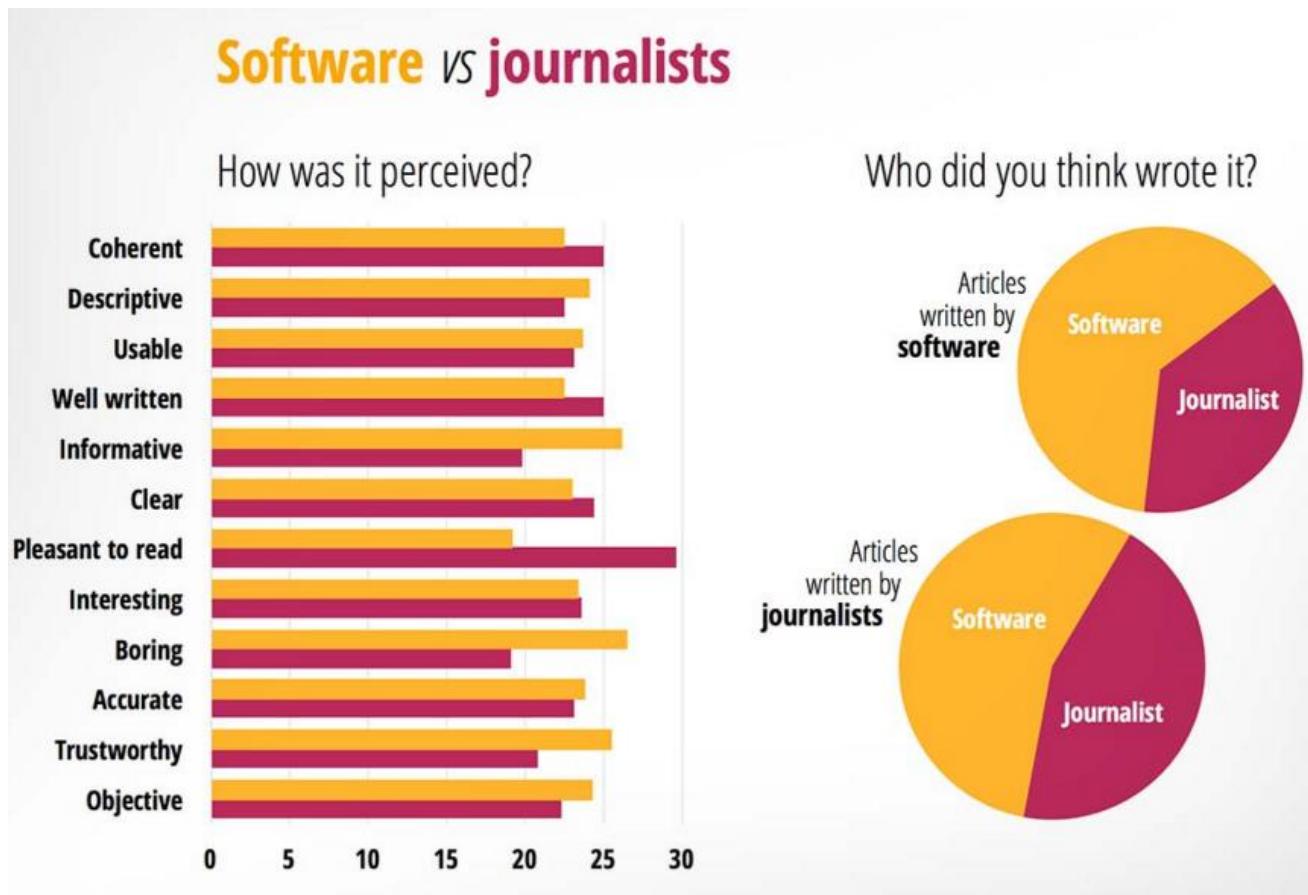
El futuro presente



El futuro presente



El futuro presente

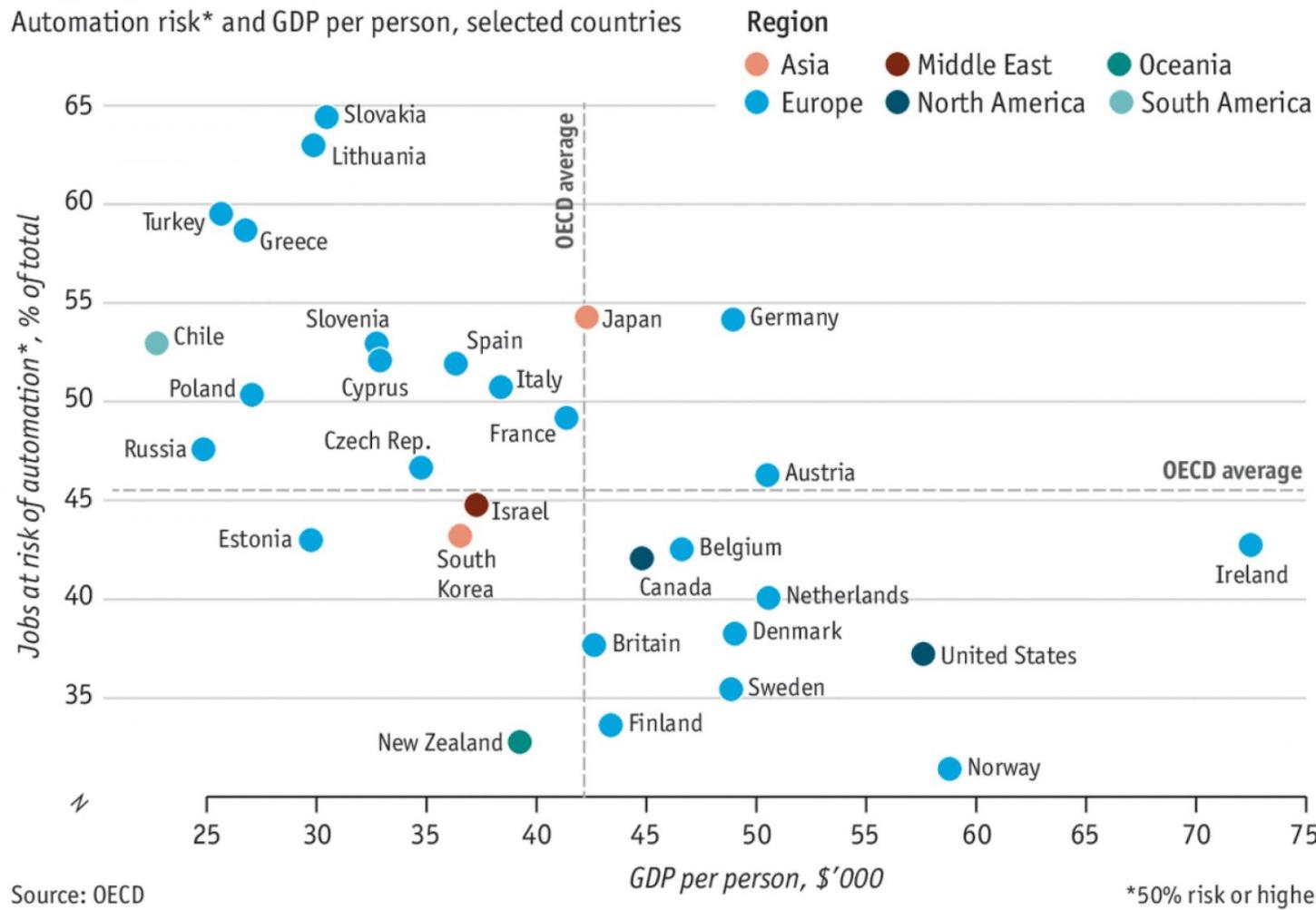


<http://www.techtimes.com/articles/93473/20151010/ap-has-a-robot-journalist-that-writes-a-thousand-articles-per-month.htm>

El futuro presente

Wage against the machine

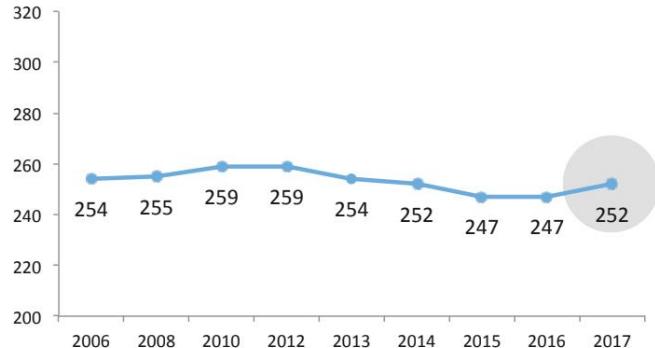
Automation risk* and GDP per person, selected countries



Source: OECD

*50% risk or higher

¿Y que estamos haciendo?



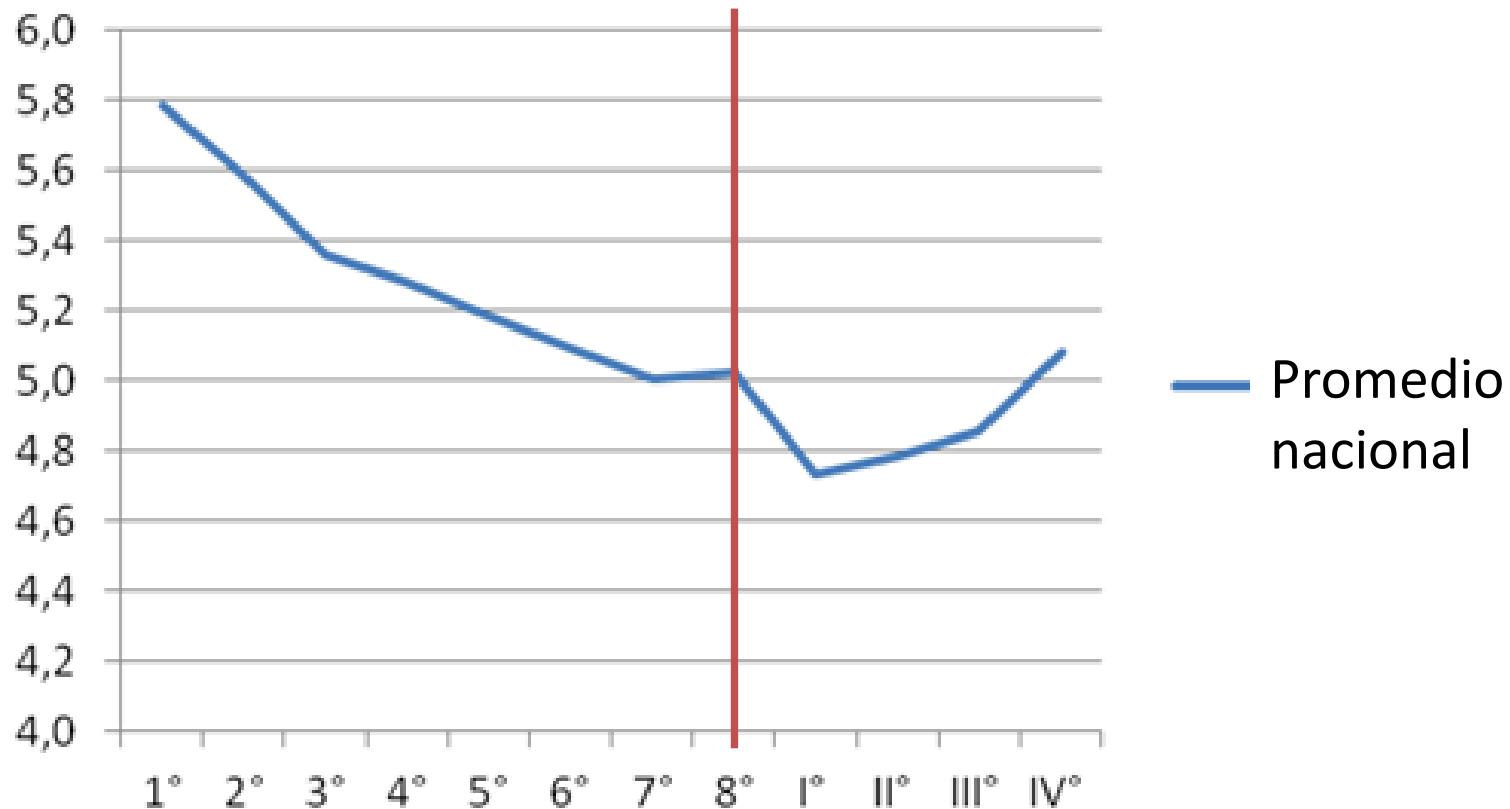
Data from several sources indicate that **boys are less likely to use computers for schoolwork and are more likely to use computers for playing games, but are less likely to use computers for social networking and email than are girls.** Fairlie, R. W. (2016). Do boys and girls use computers differently, and does it contribute to why boys do worse in school than girls?. *The BE Journal of Economic Analysis & Policy*, 16(1), 59-96.

51%

de las mujeres declara que les acomoda leer en formato digital, porcentaje que cae al 39% en los hombres.

Fuente: Resultados Educativos 2017 de evaluaciones Simce e Indicadores de Desarrollo Personal y Social.

Notas nacionales de Matemáticas (2007)





Miguel Nussbaum mn@ing.puc.cl

El Alumno del Siglo XXI

El Alumno del Siglo XXI

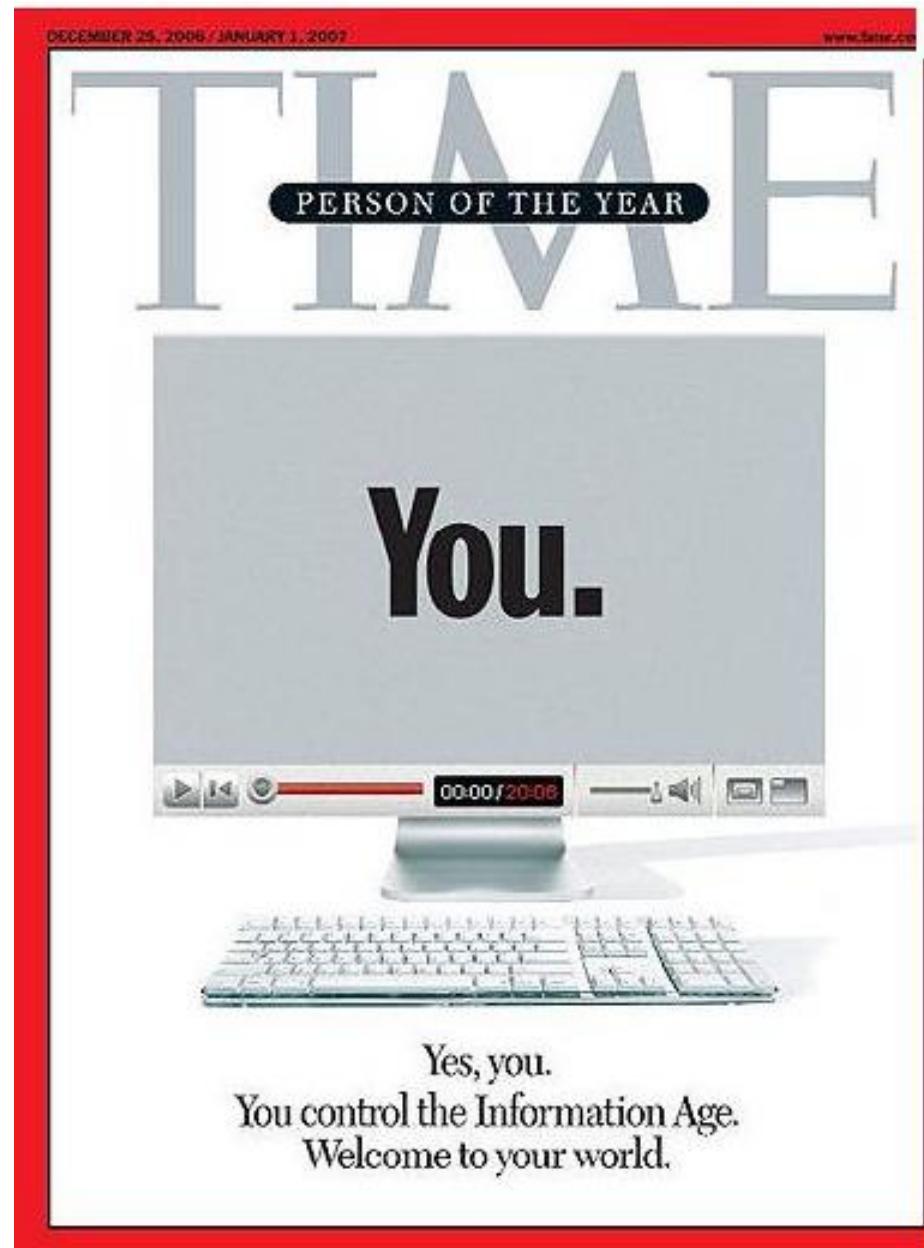
Hiprconectado y de Multiproceso

El alumno del Siglo XXI



El Alumno del Siglo XXI

Creación de contenidos sin Editores



El Alumno del Siglo XXI

Visuales

“YouTube” vs Wikipedia or Google



El Alumno del Siglo XXI

Visuales

... y en tiempo real (interactividad inmediata)



Comunidades para:

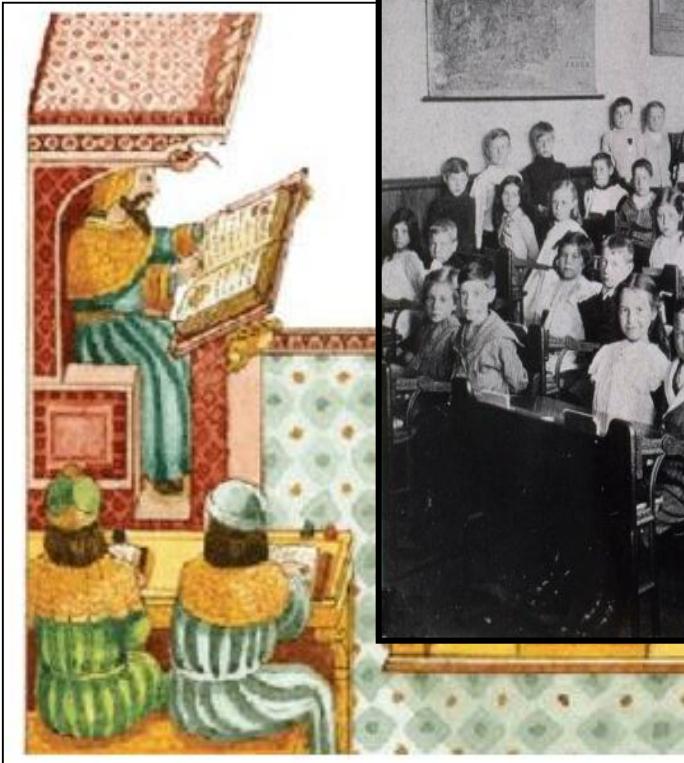
Vivir la experiencia (se hace en comunidad)

Compartir la experiencia (se crece en comunidad)

Construir nuevas experiencias (se crea en comunidad)



¿La tecnología un Camino?



Impacto de las tecnologías en aula

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Education in Peru

Error message

A disappointing return from an investment in computing

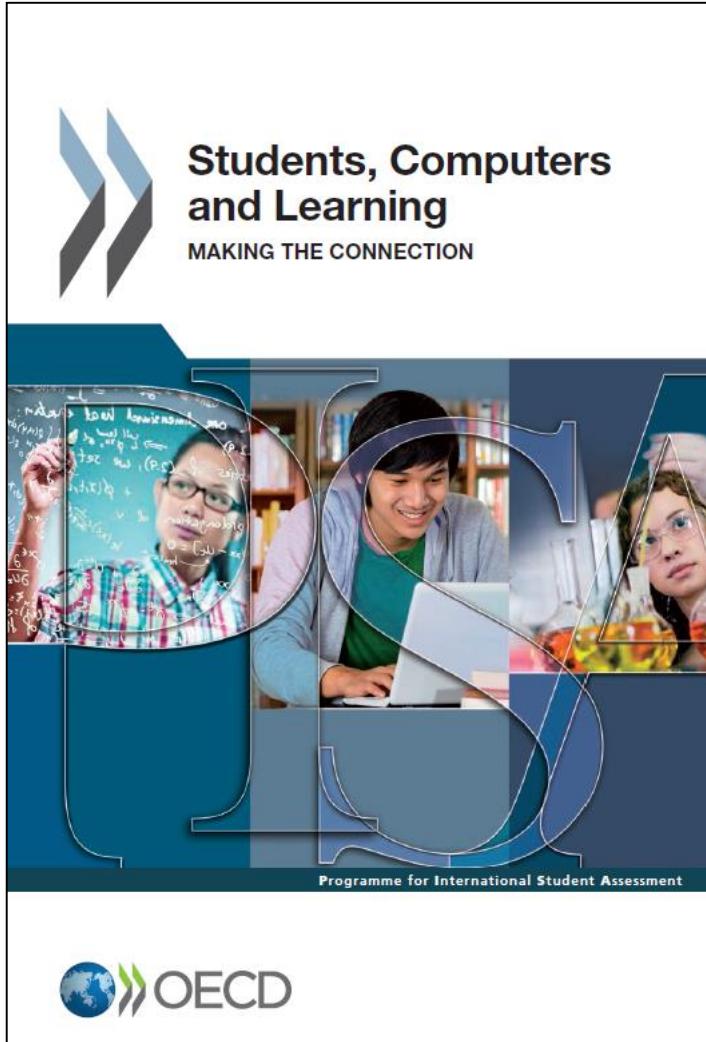
Apr 7th 2012 | LIMA | from the print edition

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eyevine

GIVING a child a computer does not seem to turn him or her into a future Bill Gates—indeed it does not accomplish anything in particular. That is the conclusion from Peru, site of the largest single programme involving One Laptop per Child, an American charity with backers from the computer industry and which is active in more than 30 developing countries around the world.



who use computers rarely. But students who use computers very frequently at school do a lot worse in most learning outcomes, even after accounting for social background and student demographics.

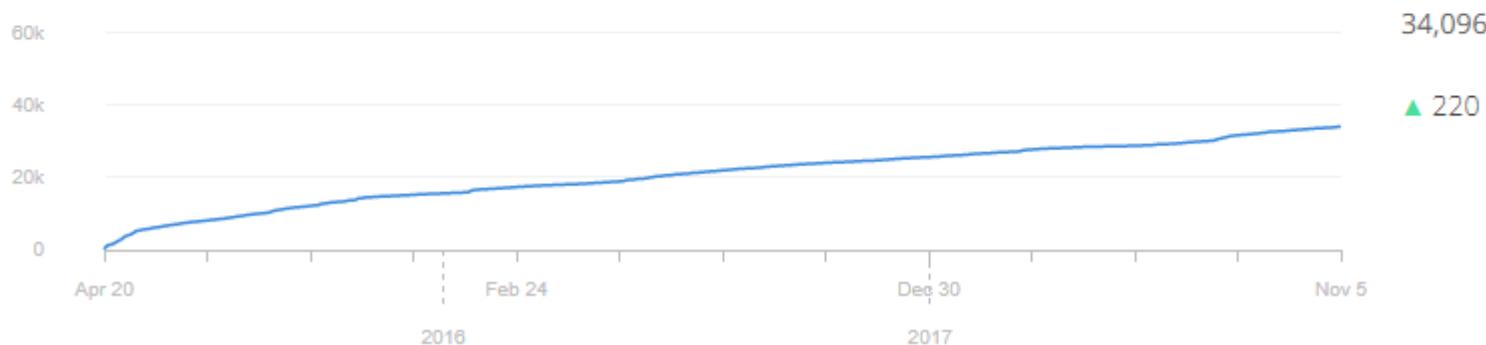
The results also show no appreciable improvements in student achievement in reading, mathematics or science in the countries that had invested heavily in ICT for education. And perhaps the most disappointing finding of the report is that technology is of little help in bridging the skills divide between advantaged and disadvantaged students. Put simply, ensuring that every child attains

Still, the findings must not lead to despair. We need to get this right in order to provide educators with learning environments that support 21st-century pedagogies and provide children with the 21st-century skills they need to succeed in tomorrow's world. Technology is the only way to dramatically expand access to knowledge. Why should students be limited to a textbook that was

Agosto 2015

Total Visitors	Active Learners	Payments	Course Completers
78,584	24,463	683	1,028
▲ 492	▲ 126	▲ 9	▲ 5

Total Enrolled Learners



Hacia una práctica constructivista en el aula

by Pontificia Universidad Católica de Chile

Hacia una práctica constructivista en el aula

by Pontificia Universidad Católica de Chile

Total Visitors

96,060

▲ 474

Active Learners

29,288

▲ 132

Payments

913

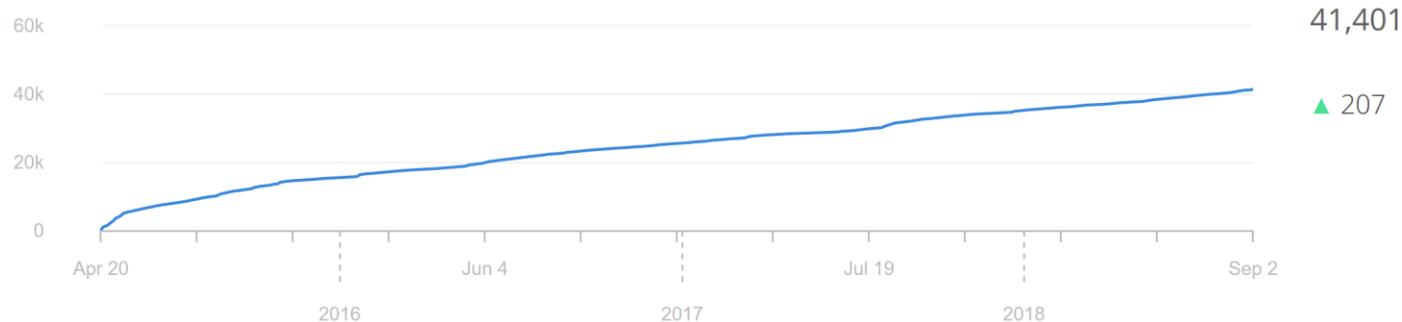
▲ 3

Course Completers

1,287

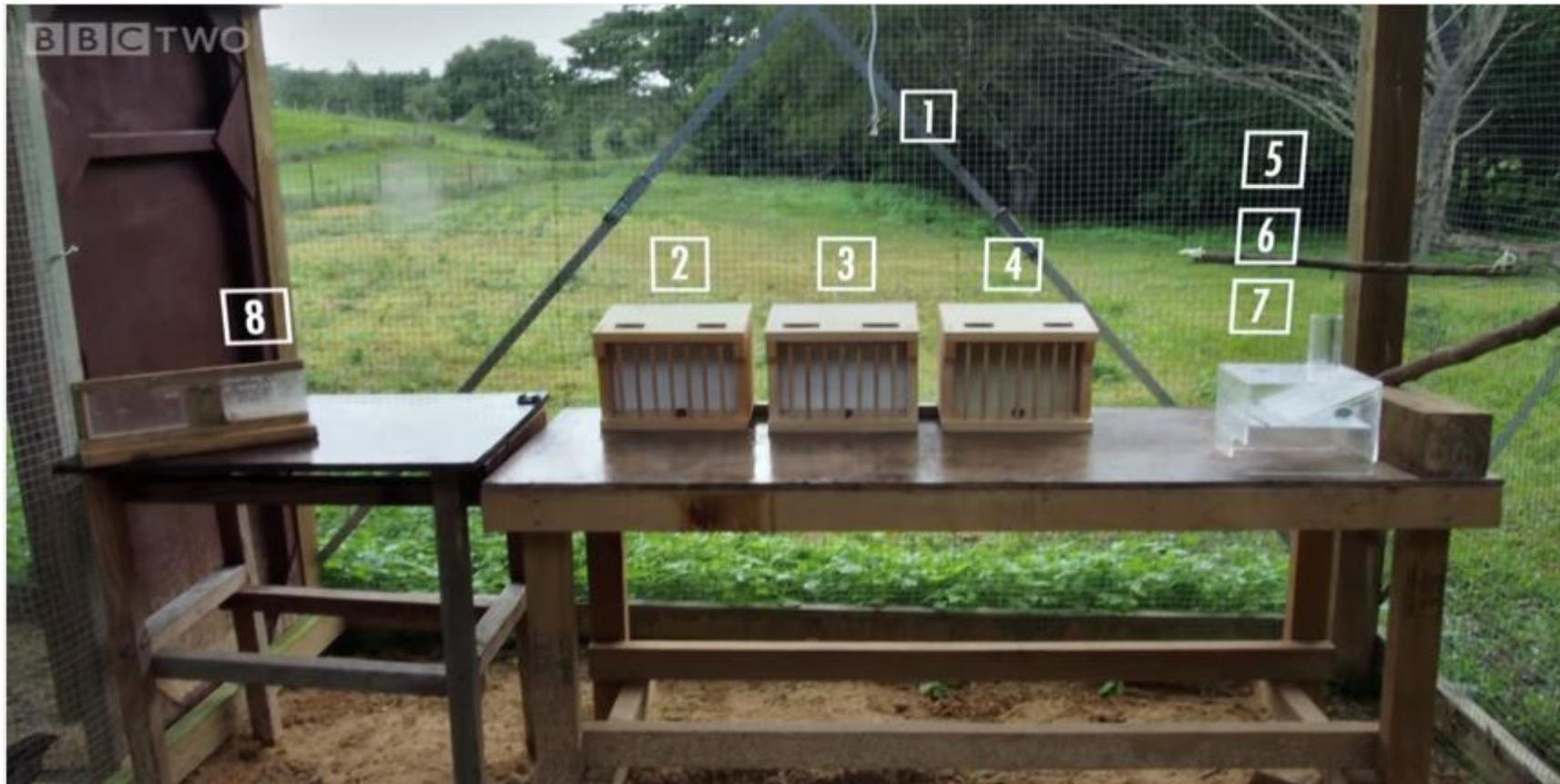
▲ 4

Total Enrolled Learners



¿Qué estamos haciendo mal?

Is the raven a critical thinker?

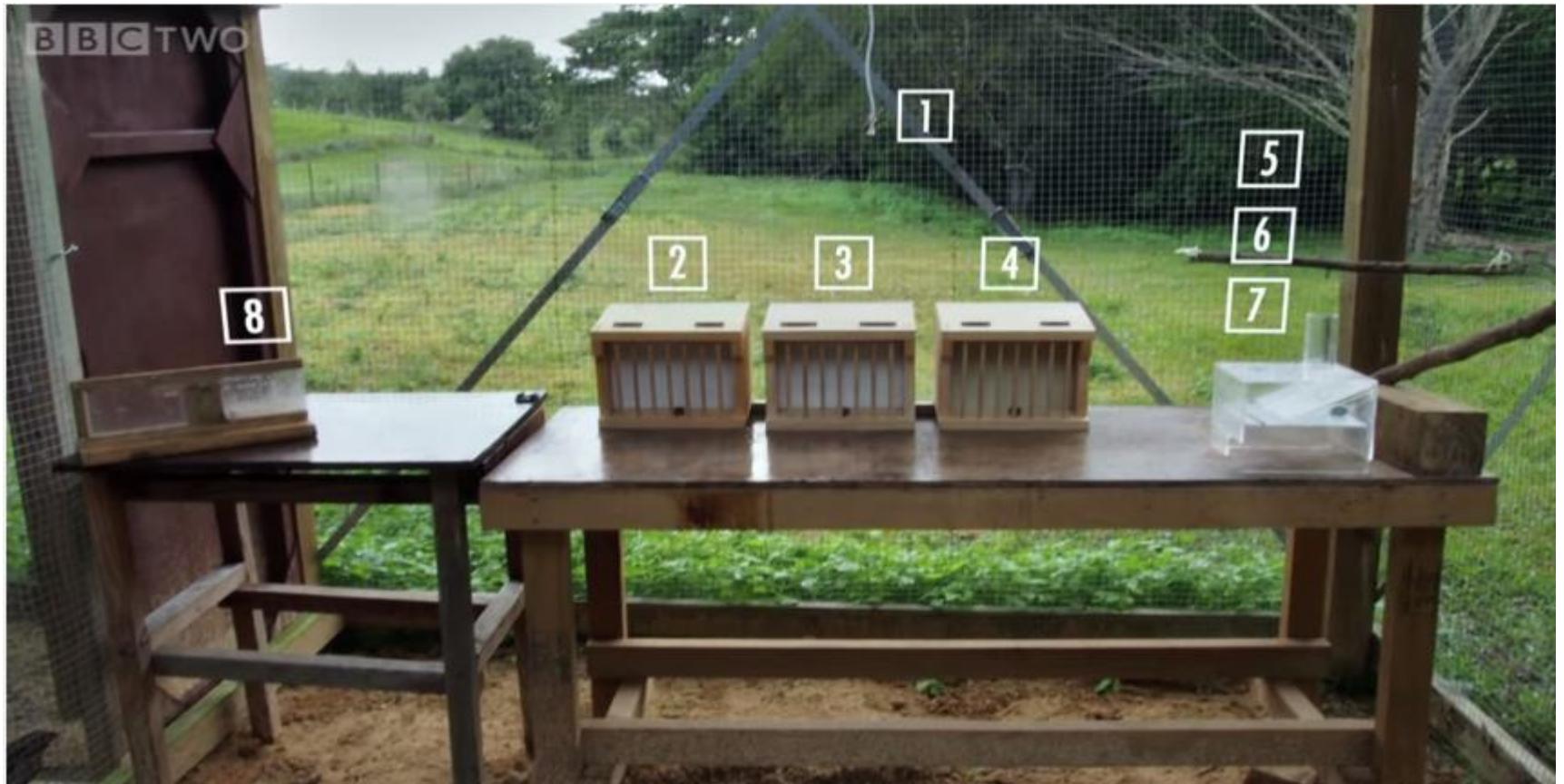


Is the raven a critical thinker?



<https://www.youtube.com/watch?v=AValTA7eBZE>

Can the raven transfer to another situation?



El único camino: Habilidades superiores

Las cuatro C:

Comunicación

Las cuatro C:

Comunicación

Verbalizar Ideas (orales y escritas)

Families' Language and Use Differ Across Income Groups

Measures & Scores	Families					
	13 Professional		23 Working-class		6 Welfare	
Parent	Child	Parent	Child	Parent	Child	
Protest score ^a	41		31		14	
Recorded vocabulary size	2,176	1,116	1,498	749	974	525
Average utterances per hour ^b	487	310	301	223	176	168
Average different words per hour	382	297	251	216	167	149

Our final sample consisted of 42 families who remained in the study from beginning to end. From each of these families, we have almost 2 1/2 years or more of sequential monthly hourlong observations. On the basis of occupation, 13 of the families were upper socioeconomic status (SES), 10 were middle SES, 13 were lower SES, and six were on welfare. There were African-American families in each SES category, in numbers roughly reflecting local job allocations. One African-American family was upper SES, three were middle, seven were lower, and six families were on welfare. Of the 42 children, 17 were African American and 23 were girls. Eleven children were the first born to the family, 18 were second children, and 13 were third or later-born children.

Las cuatro C:

Comunicación

Verbalizar Ideas (orales y escritas)

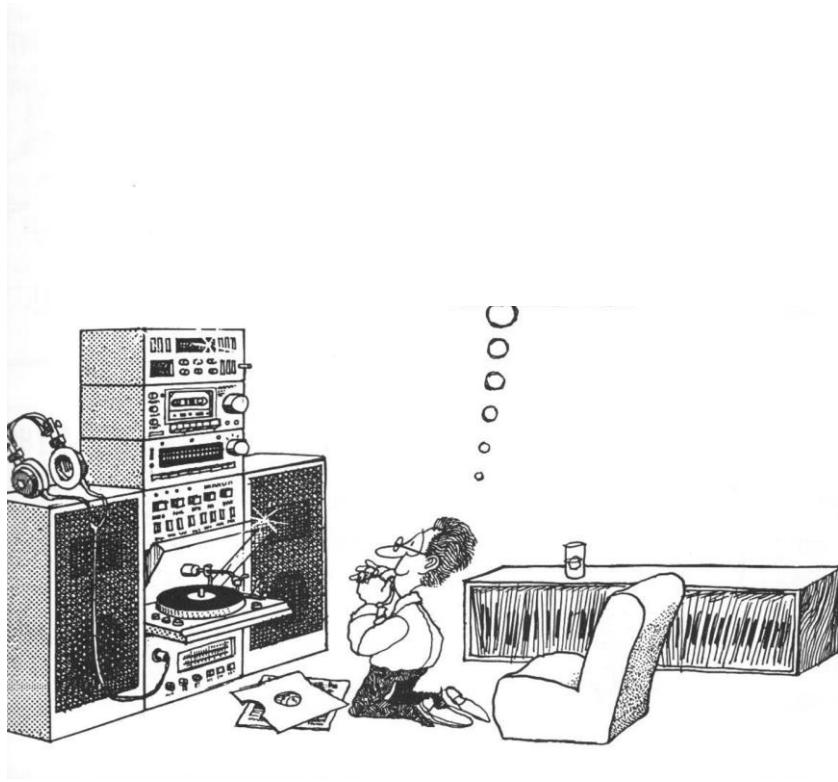
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Las cuatro C:

Comunicación



Las cuatro C:

Comunicación

Verbalizar Ideas (orales y escritas)

Lectura

Estudio OCDE revela que sólo el 2% de los chilenos entiende bien lo que lee

29

JUNIO
2016

POR 24HORAS.CL TVN

Además, cerca de la mitad tiene problemas de comprensión de lectura y el 62% posee un nivel bajo de razonamiento matemático.

El estudio realizado por la OCDE, grupo al que pertenece Chile, reveló que **el 48% de los chilenos no comprende lo que lee y sobre el 62% no puede resolver problemas matemáticos.**

Las cuatro C: Comunicación en INTERNET...



International evidence shows that, at best, there is a weak or negative relationship between the use of ICT at school and student performance Slavin (2008)



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Education in Peru

Error message

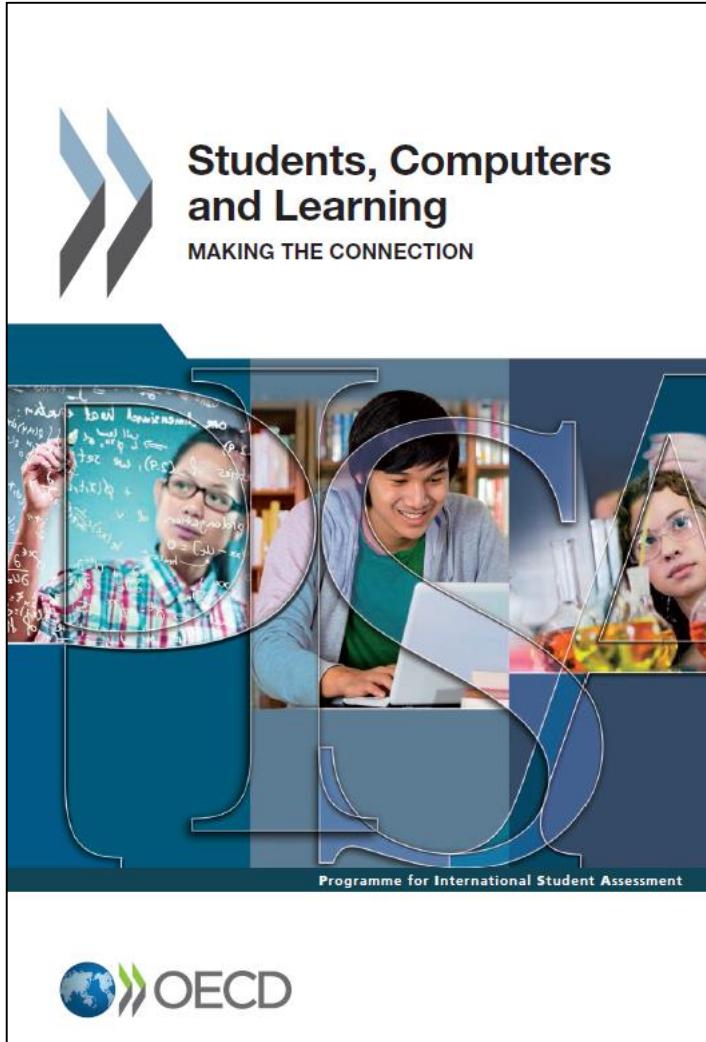
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Slavin, R. E., & Lake, C. (2008). Effective programs in elementary mathematics: A best-evidence synthesis. *Review of Educational Research*, 78(3), 427-515.

Miguel Nussbaum mn@ing.puc.cl



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Agosto 2015

Las cuatro C:

Comunicación

Colaboración



Las cuatro C:

Comunicación

Colaboración



Las cuatro C:

Comunicación

Colaboración

Pensamiento Crítico

Pensamiento Crítico (Facione)

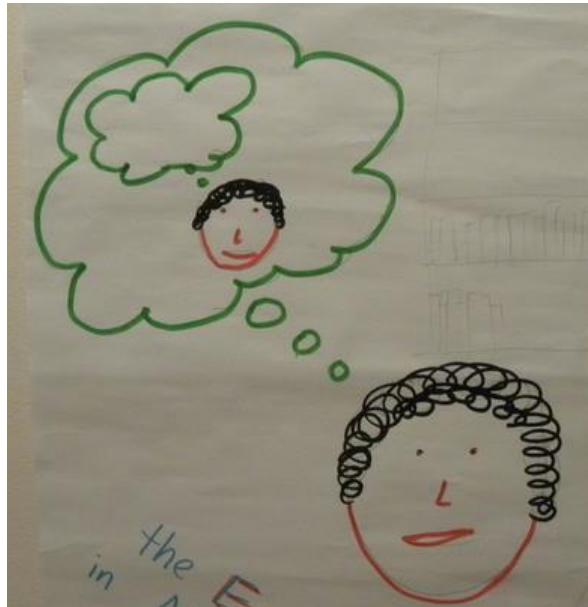


Autoregulación





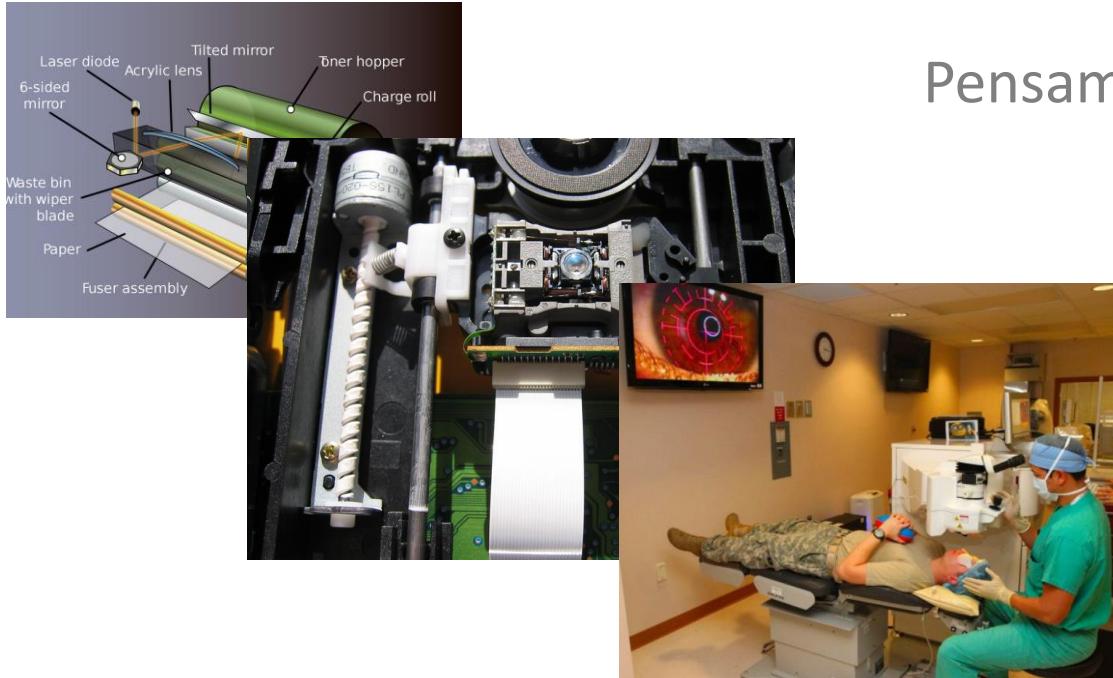
Pensamiento Crítico (Facione)



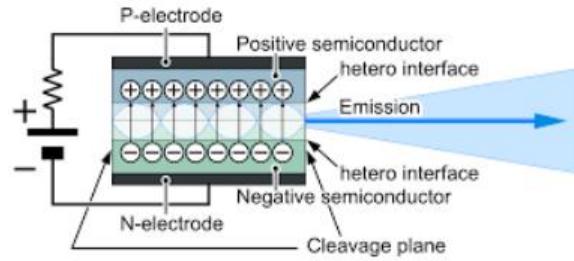
Metacognición



Pensamiento Crítico (Facione)



Transferencia



Las cuatro C:

Comunicación

Colaboración

Pensamiento Crítico

Creatividad

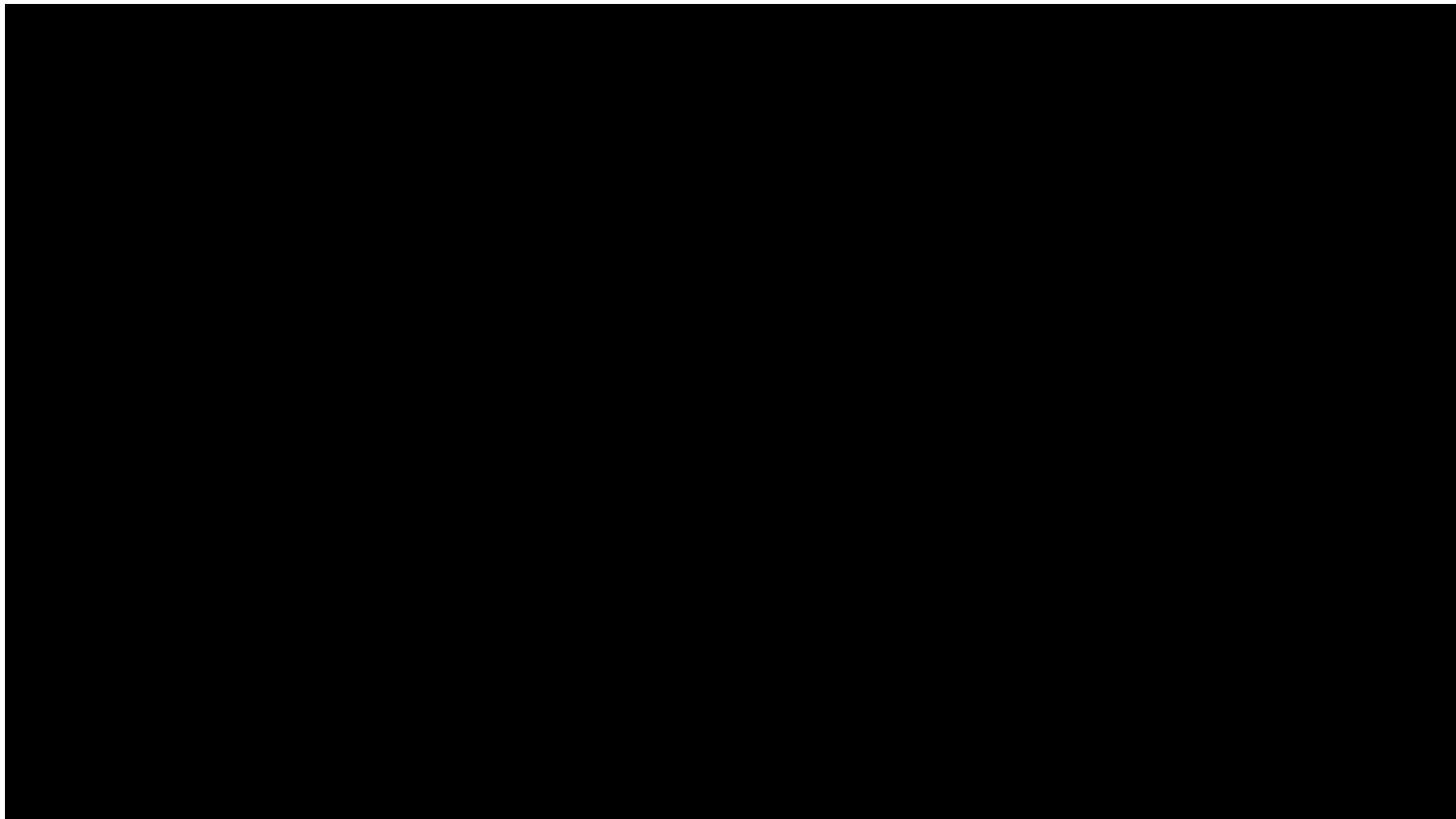


Creatividad



Predisposición

Fuerza de voluntad



<https://www.youtube.com/watch?v=EbP8AXKX0d8>

predisposición

Objetivo

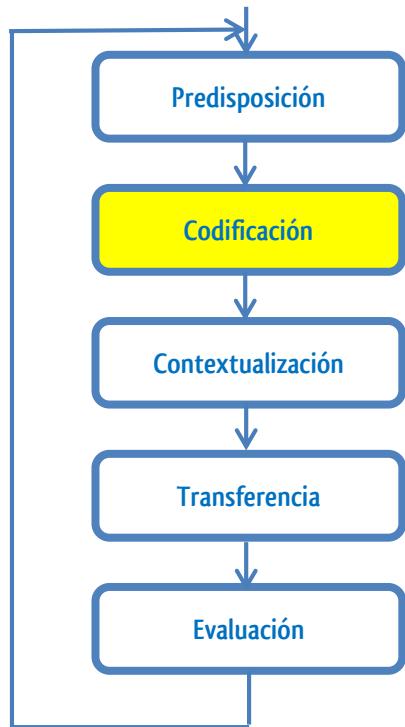
Energizador

Fuerza de voluntad



Perserverancia

Creatividad



$$\frac{1}{2} mv^2 = mgh$$

Creatividad



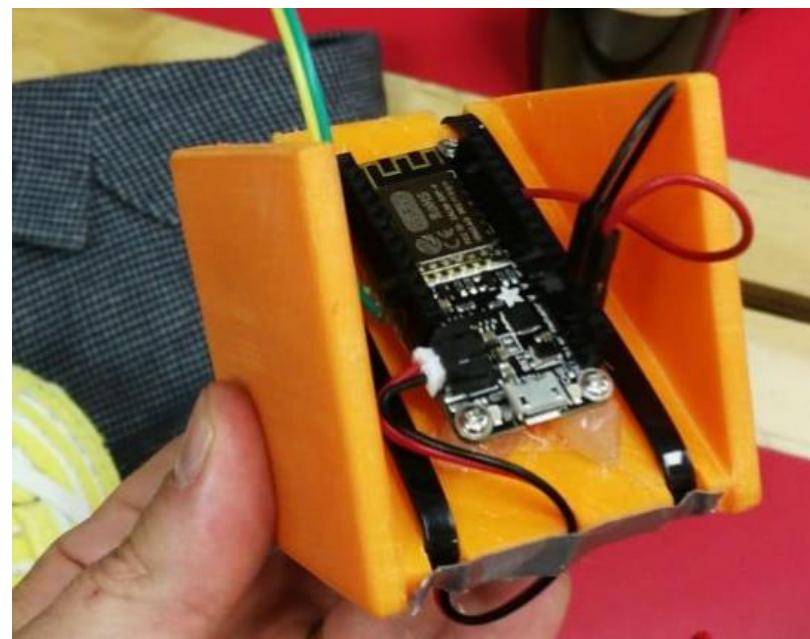
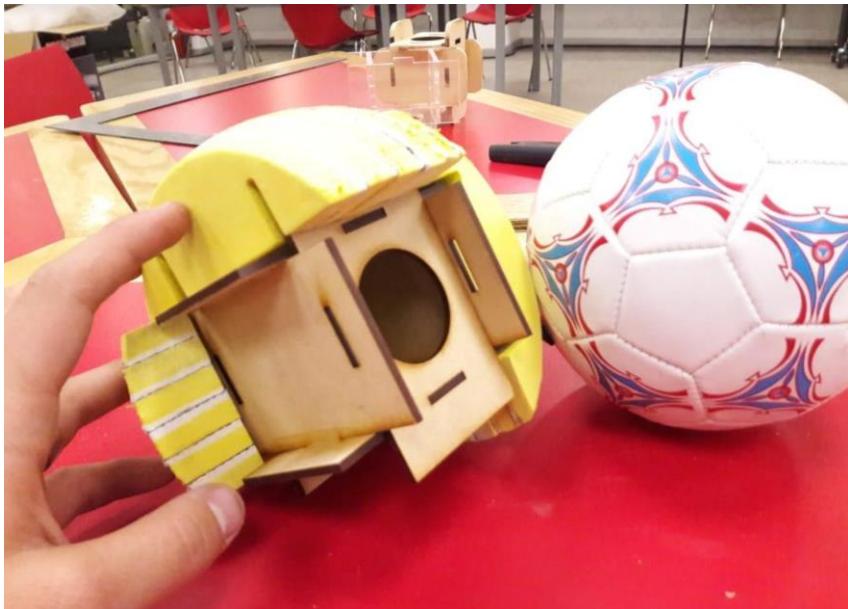
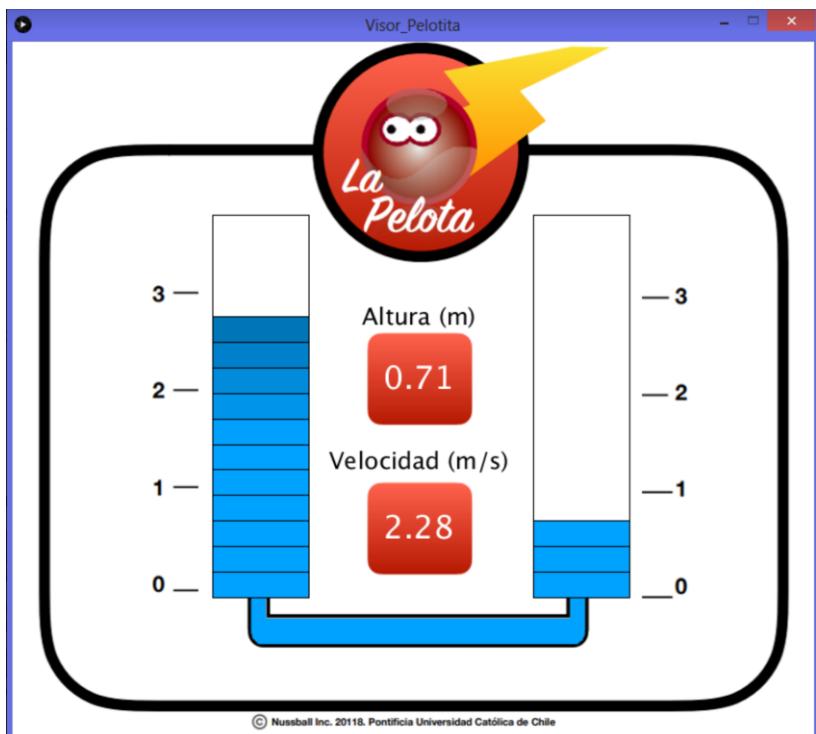
Contextualización



Creatividad



Transfer



Creatividad



EvaLución Formativa

Curso: 2º C

Piensa individualmente y escribe todos los ejemplos que se te ocurran en el que observes la **conservación de energía** en la vida real. (7 min)

- Carreras
- El trunam.
- El salto y bala
- trampolín
- Bolas para la
- ascensor
- avión
- paracaidas

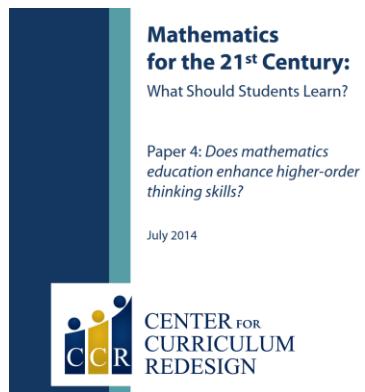
Conclusiones

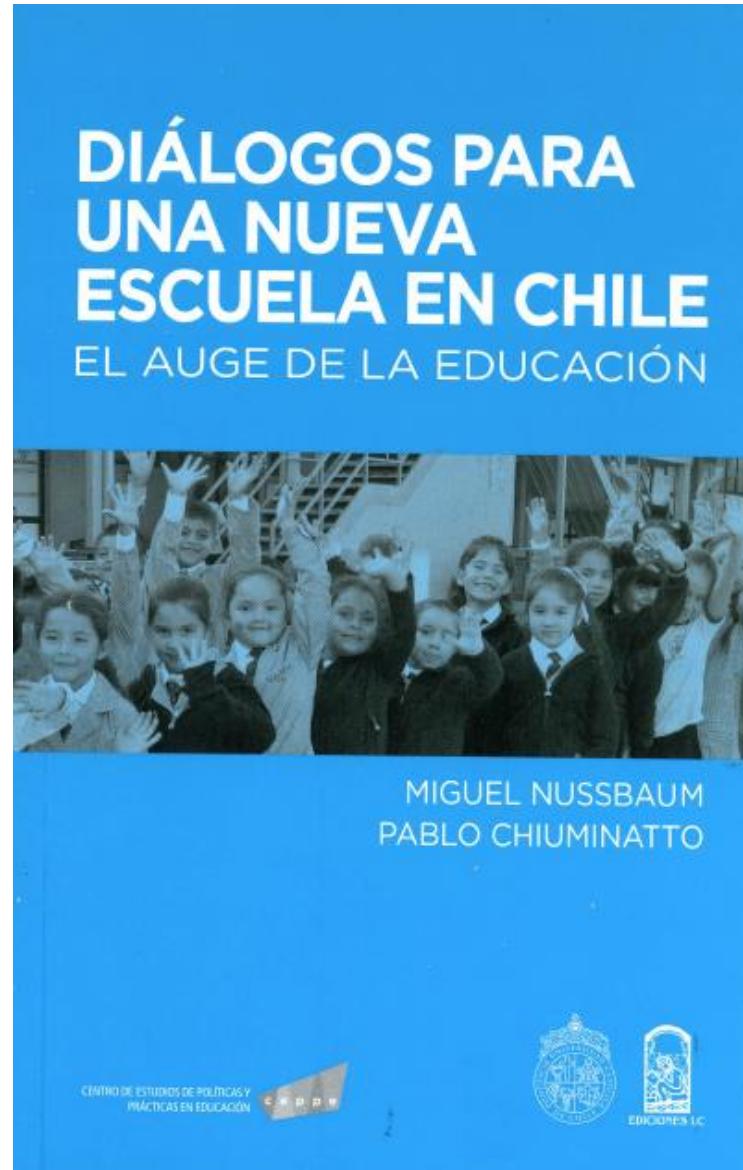
1. Como enseñamos
2. Lo que enseñamos

Taken together, these studies do explore many different facets of mathematics in the brain, but they do not provide evidence that mathematics training is uniquely suited to build higher order functions. There is clearly a relationship between mathematics achievement, the DLPFC, the IPS, and general cognitive skills such as executive function and working memory, but **from the current findings it is most likely that higher order functions support the building of mathematics skills, not the reverse.**

CONCLUSION

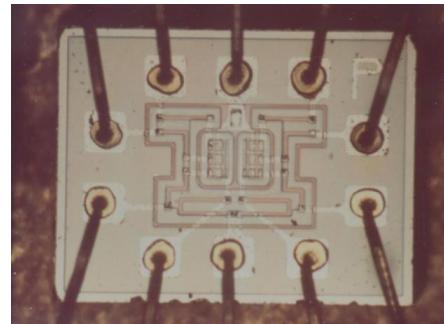
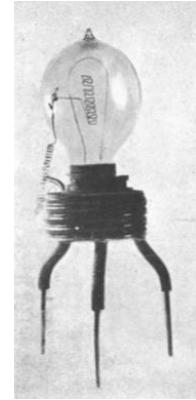
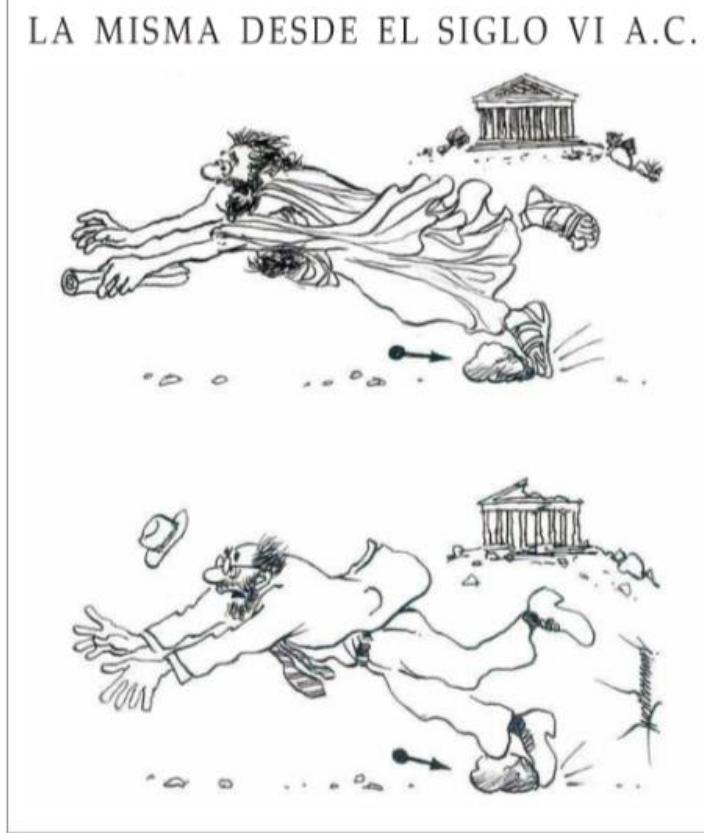
We have shown here that there is not sufficient evidence to conclude that mathematics enhances higher order cognitive functions. The CCR calls for a much stronger cognitive psychology and neuroscience research base to be developed on the effects of studying mathematics. Future research should aim to disentangle the brain processes involved in various mathematical tasks, teaching styles and epistemologies, and determine which of them, if any, could train higher-order thinking.





<http://ediciones.uc.cl/ediciones-uc-educaci%C3%B3n-dialogos-para-nueva-escuela-chile-p-10135.html>

Conocimiento Experto Conocimiento Social



Project Debater: Personas debaten con la inteligencia artificial de IBM

La máquina argumentó usando información de artículos que almacenó en su sistema.

¿Qué tan conveniente es que los países inviertan sus recursos en tecnologías para explorar el espacio? ¿Se puede confiar en la telemedicina para generar diagnósticos certeros? Esas fueron dos de las interrogantes que debió responder durante su primera demostración en público Project Debater, el sistema de inteligencia artificial de IBM desarrollado para debatir temas complejos con humanos.

La máquina —una pantalla rectangular de color negro y de casi 180 cm

de largo— se enfrentó en San Francisco (Estados Unidos) ante Noa Ovadia y Dan Zafrir, ambos campeones de debates.

Tomando como base los millones de textos —libros, diarios y artículos de revistas— que almacena en su sistema, el computador de IBM fue capaz de reconocer los temas en discusión, estructurar una posición al respecto y rebatir a sus oponentes a través de su discurso.

Aunque los asistentes al encuentro



Dan Zafrir y Noa Ovadia se preparan para su debate en contra de Project Debater, el sistema de inteligencia artificial con forma de pantalla que se ve a la izquierda.

coincidieron en que los oponentes humanos desarrollaron mejor sus argumentos, una encuesta mostró que la audiencia sentía que Project Debater había hecho una labor destacada.

A largo plazo, el sistema busca

ayudar a las personas a razonar de mejor forma “al proporcionar argumentos basados en evidencias y limitar la influencia de la emoción, el prejuicio o la ambigüedad”, explicaron desde IBM.

EL MERCURIO

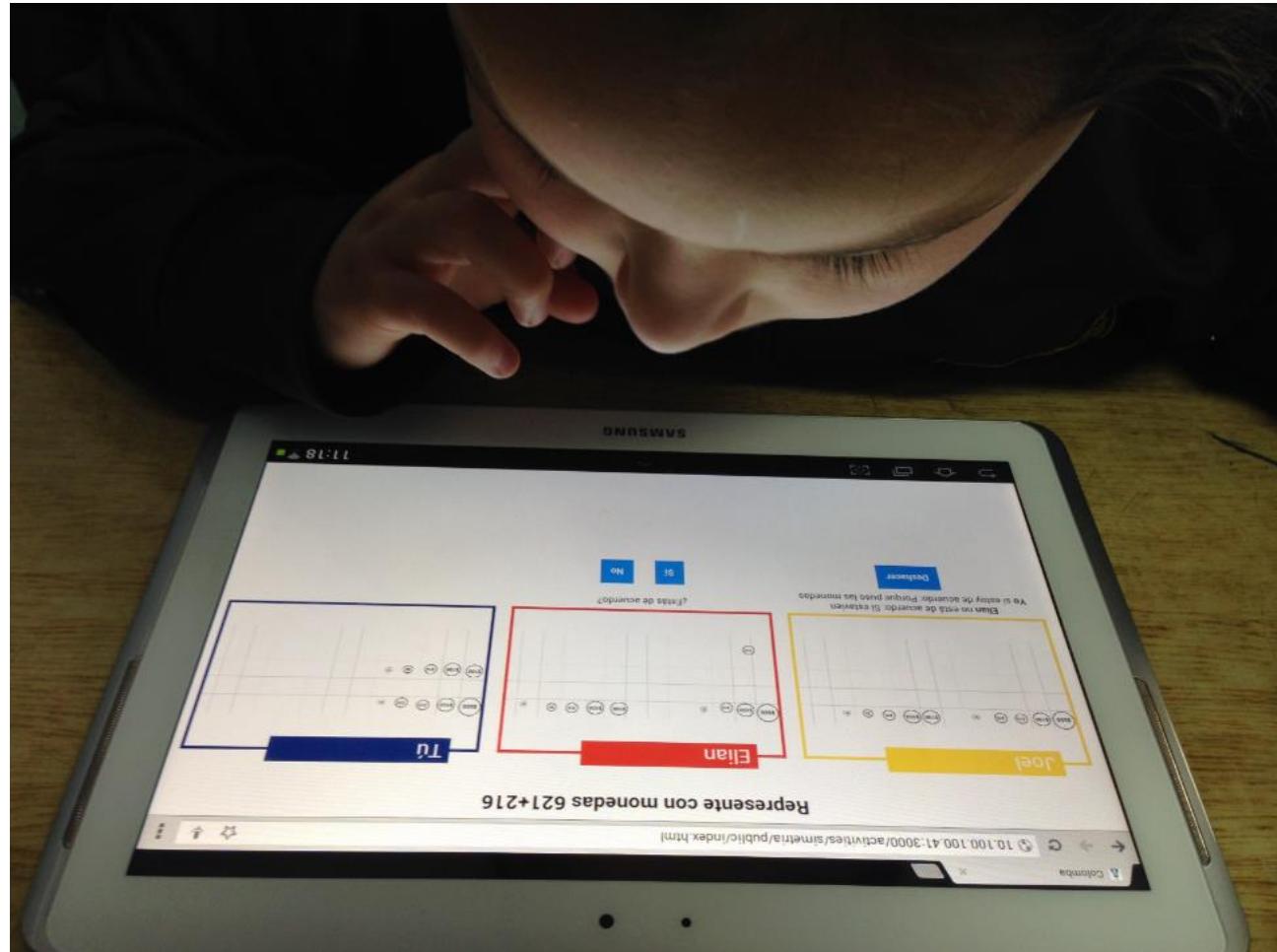
Vida • Ciencia • Tecnología

SANTIAGO DE CHILE, MIÉRCOLES 20 DE JUNIO DE 2018



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El desafío de hoy: El desarrollo de Habilidades Superiores