



Universidad
de Invierno
Arona



COMPUTATIONAL THINKING IN TRAVEL AND TOURISM

Introduction to computational thinking

- 25th January, 2018 -

Gara Miranda Valladares

Coromoto León Hernández

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Context

Context



Context



AULA CULTURAL
**PENSAMIENTO
COMPUTACIONAL**

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La noche de las estrellas 2017

17.02.2017

Limonadas Programadas (ESIT - Delegación de alumnos)

14 y 16.03.2017

Programa2 para pensar(Women Techmaker - ESIT)

24.03.2017

IV Feria de la vocaciones científicas y profesionales de Canarias (ciencia@ull.edu.es)

20 y 21.04.2017

Instituto Canario de la mujer

05.05.2017

Jornada de Ciencias de la Computación Fuerteventura

22.06.2017

Taller en la Escuela de Verano de Adeje

19.07.2017

Jornadas de bienvenida a los estudiantes del grado de Ingeniería Informática

12.09.2017

III Congreso de estudiantes de Ingeniería Informática

30.11.2017 y 1.12.2017

[Taller: Una hora de Código para Enseñanza secundaria](#)

05.12.2017

ULL

Universidad
de La Laguna

Escuela Superior de
Ingeniería y Tecnología

Context

- Universidad de La Laguna
 - Dpto. de Ingeniería Informática y de Sistemas
 - Área de Lenguajes y Sistemas Informáticos
- Teaching and research in:
 - Computer Science in general
 - Programming and development of computer systems

Context

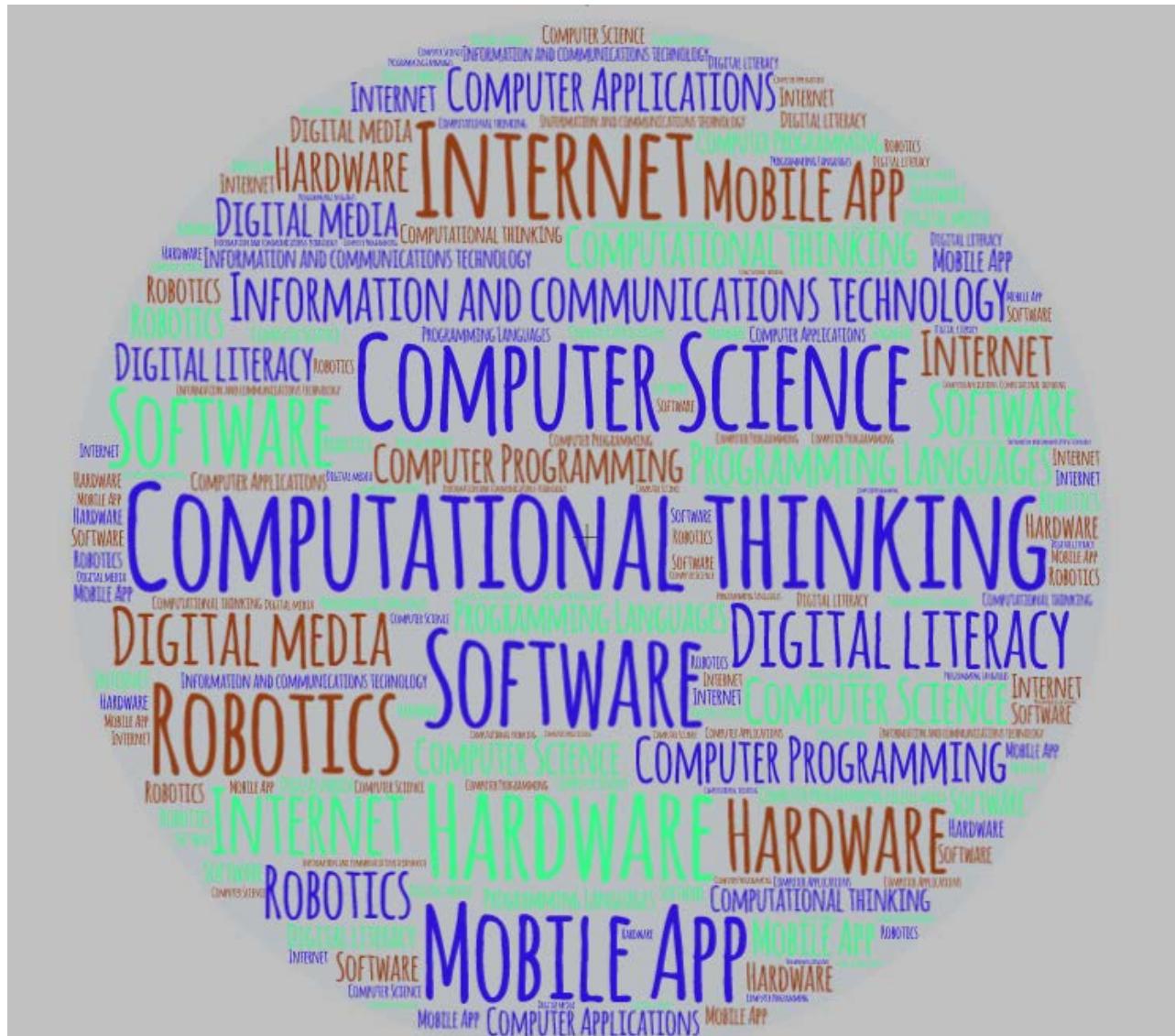
- *We teach about...*
 - *Computer programming*
 - Which includes the:
 - Design
 - Implementation
 - Testing and debugging
 - Maintenance



... of the source code of computer applications

Previous concepts

Previous concepts



Previous concepts

Report by Google, FECYT and Everis:

EDUCACIÓN EN CIENCIAS DE LA COMPUTACIÓN EN ESPAÑA 2015

The screenshot shows the official website of the Spanish Foundation for Science and Technology (FECYT). At the top, there is a banner for the Spanish Government and the Ministry of Economy, Industry, and Competitiveness. Below the banner, the FECYT logo is displayed, consisting of a blue hexagonal icon followed by the acronym 'FECYT' and the full name 'FUNDACIÓN ESPAÑOLA PARA LA CIENCIA Y LA TECNOLOGÍA'. The main navigation menu includes 'La Fundación', 'Ciencia para todos', and 'Participa'. A secondary navigation bar below the main menu includes 'Inicio', 'Organización', 'Ejes de actuación', 'Publicaciones', and 'Eventos'. The main content area features the title 'La educación en Ciencias de la Computación en España 2015, a debate'. Below the title are social sharing icons for Twitter, Facebook, and Google+, along with a rating section showing 2 votes. The date 'Miércoles, 20 Abril, 2016' is listed, along with print, share, and font size adjustment options. A summary text discusses the lack of knowledge about Computer Science in Spain, mentioning its low recognition and implementation in schools. Three bullet points at the bottom provide links to the full report, a summary dossier, and a photo gallery.

- ✓ Disponible el informe completo.
- ✓ Disponible un dossier resumido con infografías del informe.
- ✓ Ver galería de fotos en Flickr del evento.

Lack of knowledge in our society about what Computer Science (CS) is and what subjects it encompass.

- 60% of respondents (parents and students) confuse CS education with digital literacy or competence.
- Only 0.6% of respondents know exactly what is Computer Science.

Previous concepts

What is Computer Science?

- CS is the study of the theory, experimentation, and engineering that form the basics for the design and use of computers.
- CS is the scientific and practical approach to computation and its applications and the systematic study of the feasibility, structure, expression, and mechanization of the methodical procedures (algorithms) that underlie the acquisition, representation, processing, storage, communication of, and access to information.
- CS includes, among other activities:
 - **Design and development of digital systems**
 - **Computational thinking**
 - **Computer programming**

Previous concepts

And Information and Communications Technology (ICT)?

- ICTs are theoretical-conceptual tools, supports and channels that process, store, synthesize, recover and present information in the most varied way.
- The tools have evolved over time:
Computers & Internet
- The use of ICTs represents a remarkable variation in society and in the long term, an important change in education, in interpersonal relationships and in the way of disseminating and generating knowledge.

Previous concepts

What Computer Science isn't

- There are multiple activities related to the use of computers that are usually considered as part of CS, but they aren't really:
 - **Digital literacy or skills**
 - **Online security**
 - **Electronics and robotics**
 - **Use of ICT for education and learning**

Previous concepts

Unplugged - What is Computer Science?

UNPLUGGED ACTIVITY

what is
computer science?

Computational Thinking

Computational Thinking

Viewpoint | Jeannette M. Wing

Computational Thinking

It represents a universally applicable attitude and skill set everyone, not just computer scientists, would be eager to learn and use.



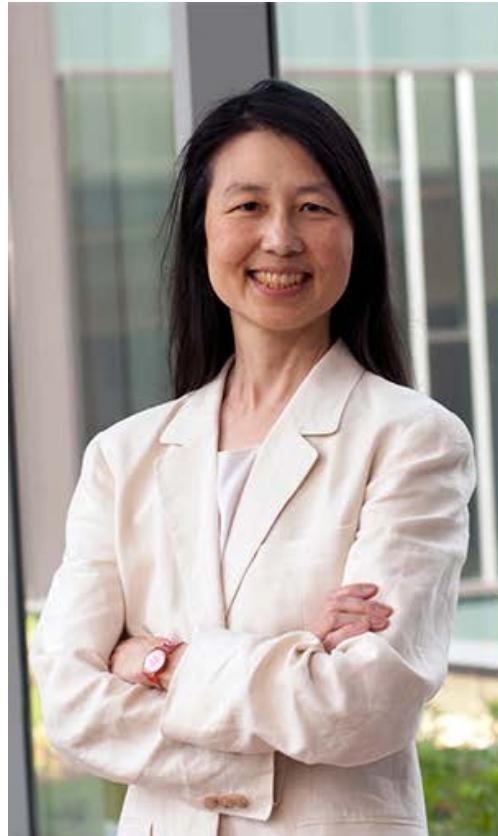
Computational thinking builds on the power and limits of computing processes, whether they are executed by a human or by a machine. Computational

cisely. Stating the difficulty of a problem accounts for the underlying power of the machine—the computing device that will run the solution. We must consider the machine's instruction set, its resource constraints, and its operating environment.

In solving a problem efficiently, we might further

- *Computational thinking (2006) is the thought processes involved in formulating problems and their solutions so that the solutions are represented in a form that can be effectively carried out by an information-processing agent.*

Computational Thinking



“Computer science is not computer programming. Thinking like a computer scientist means more than being able to program a computer. It requires thinking at multiple levels of abstraction.”

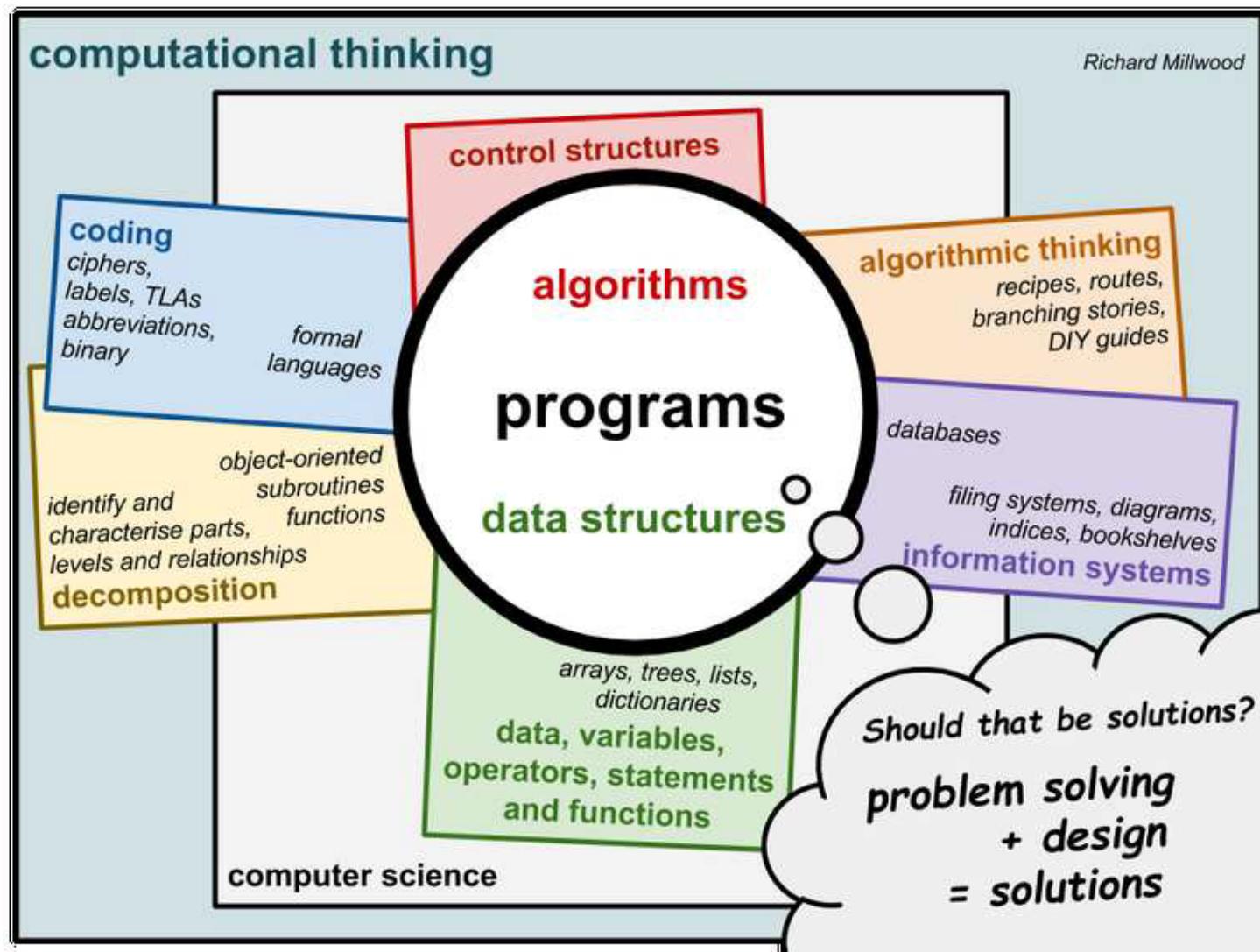
Jeannette M. Wing

Corporate Vice President of Microsoft Research

Image Source: Microsoft.com



Computational Thinking

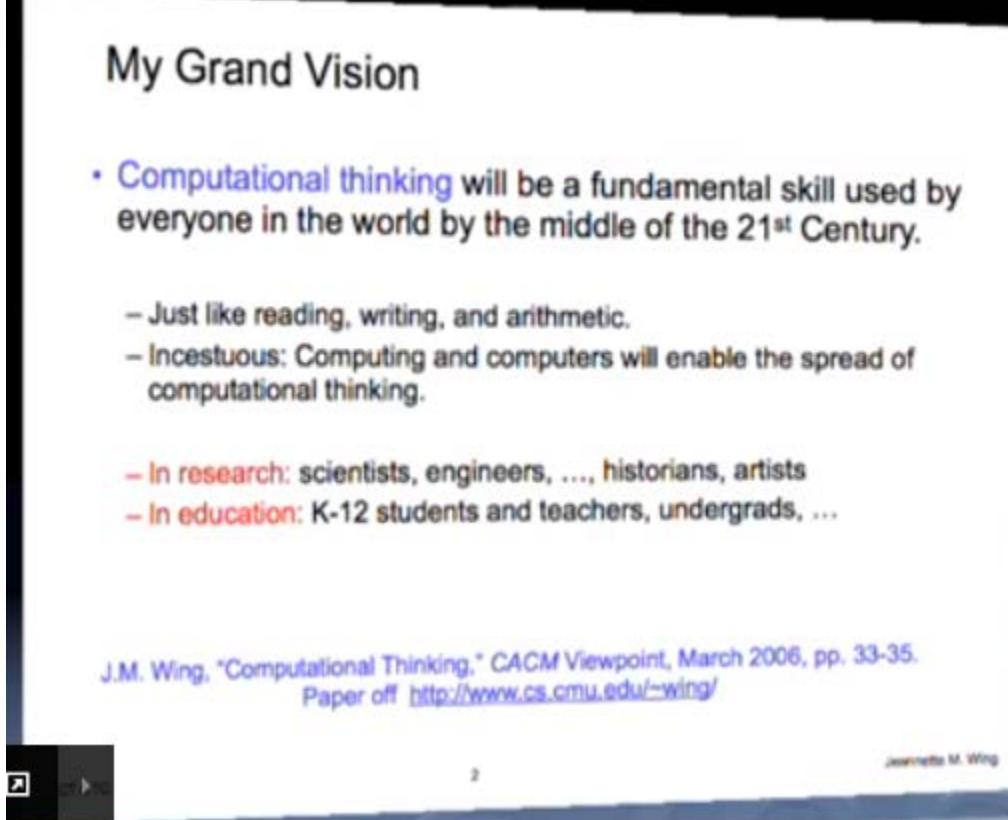


Computational Thinking

My Grand Vision

- Computational thinking will be a fundamental skill used by everyone in the world by the middle of the 21st Century.
 - Just like reading, writing, and arithmetic.
 - Incestuous: Computing and computers will enable the spread of computational thinking.
 - In research: scientists, engineers, ..., historians, artists
 - In education: K-12 students and teachers, undergrads, ...

J.M. Wing, "Computational Thinking," CACM Viewpoint, March 2006, pp. 33-35.
Paper off <http://www.cs.cmu.edu/~wing/>



Computational Thinking

Computing is the Automation of Abstractions

Abstractions

Automation

1. Machine
2. Human
3. Human + Machine
4. Networks of 1, 2, or 3

Computational Thinking focuses on the process of abstraction

- choosing the right abstractions
- operating in terms of multiple layers of abstraction simultaneously
- defining the relationships between layers

as in Mathematics

guided by the following concerns...

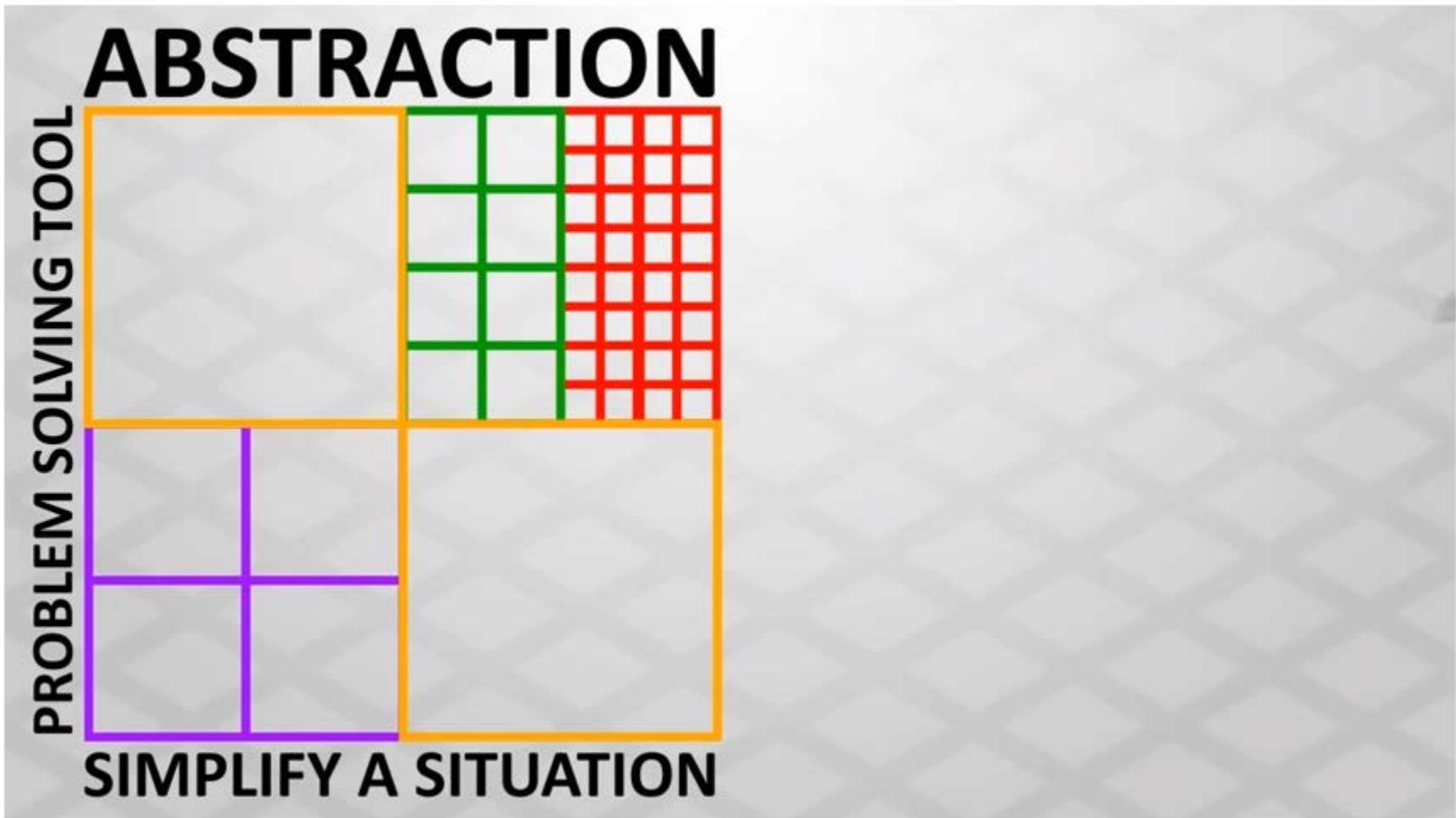
Jeannette M. Wing

1:54 / 1:04:58

Jeannette M. Wing

Computational Thinking and Thinking About Computing (2009)

Computational Thinking



Abstraction - Computational Thinking

Computational Thinking

COMPUTATIONAL THINKING
WHAT? WHY?

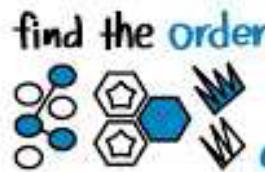
Computational thinking

decomposition

solve a problem
by breaking it
into smaller groups



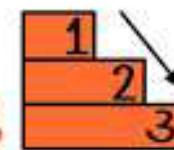
pattern
recognition



find the order
analyze the data

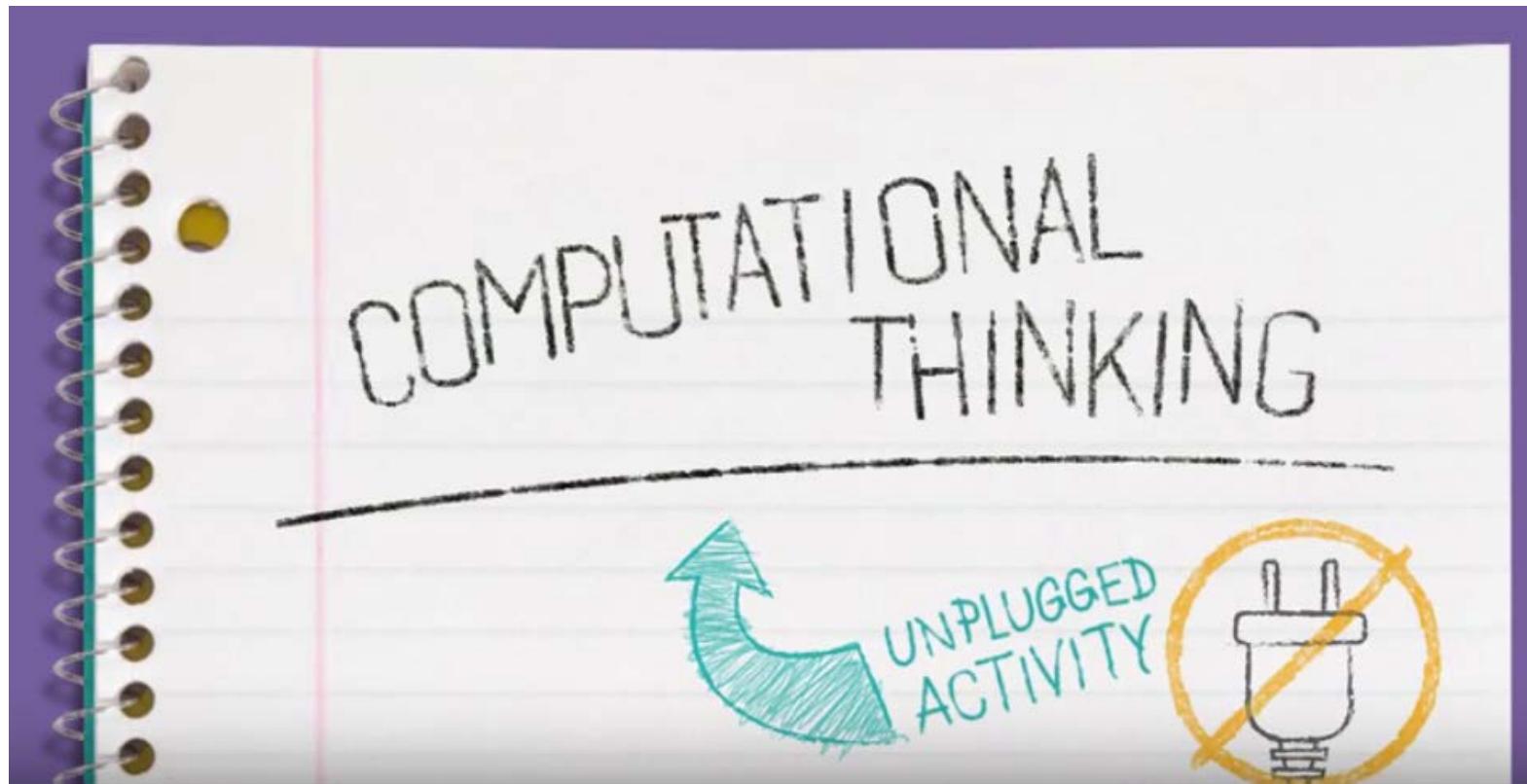
algorithmic
design

creating solutions
using a series
of ordered STEPS



Computational Thinking

Let's see an example...



Computational Thinking

CT concepts are the mental processes (e.g. abstraction, algorithm design, decomposition, pattern recognition, etc) and tangible outcomes (e.g. automation, data representation, pattern generalization, etc) associated with solving problems in computing. These include and are defined as follows:

- **Abstraction:** Identifying and extracting relevant information to define main idea(s)
- **Algorithm Design:** Creating an ordered series of instructions for solving similar problems or for doing a task
- **Automation:** Having computers or machines do repetitive tasks
- **Data Analysis:** Making sense of data by finding patterns or developing insights
- **Data Collection:** Gathering information
- **Data Representation:** Depicting and organizing data in appropriate graphs, charts, words, or images
- **Decomposition:** Breaking down data, processes, or problems into smaller, manageable parts
- **Parallelization:** Simultaneous processing of smaller tasks from a larger task to more efficiently reach a common goal
- **Pattern Generalization:** Creating models, rules, principles, or theories of observed patterns to test predicted outcomes
- **Pattern Recognition:** Observing patterns, trends, and regularities in data
- **Simulation:** Developing a model to imitate real-world processes

Computational Thinking

Google for Education

- **Computational Thinking (CT)** is a problem solving process that includes a number of characteristics and dispositions.
- CT is essential to the development of computer applications, but it can also be used to support problem solving across all disciplines, including math, science, and the humanities.
- Students who learn CT across the curriculum can begin to see a relationship between subjects as well as between school and life outside of the classroom.

State-of-the-art

Smart “world”...



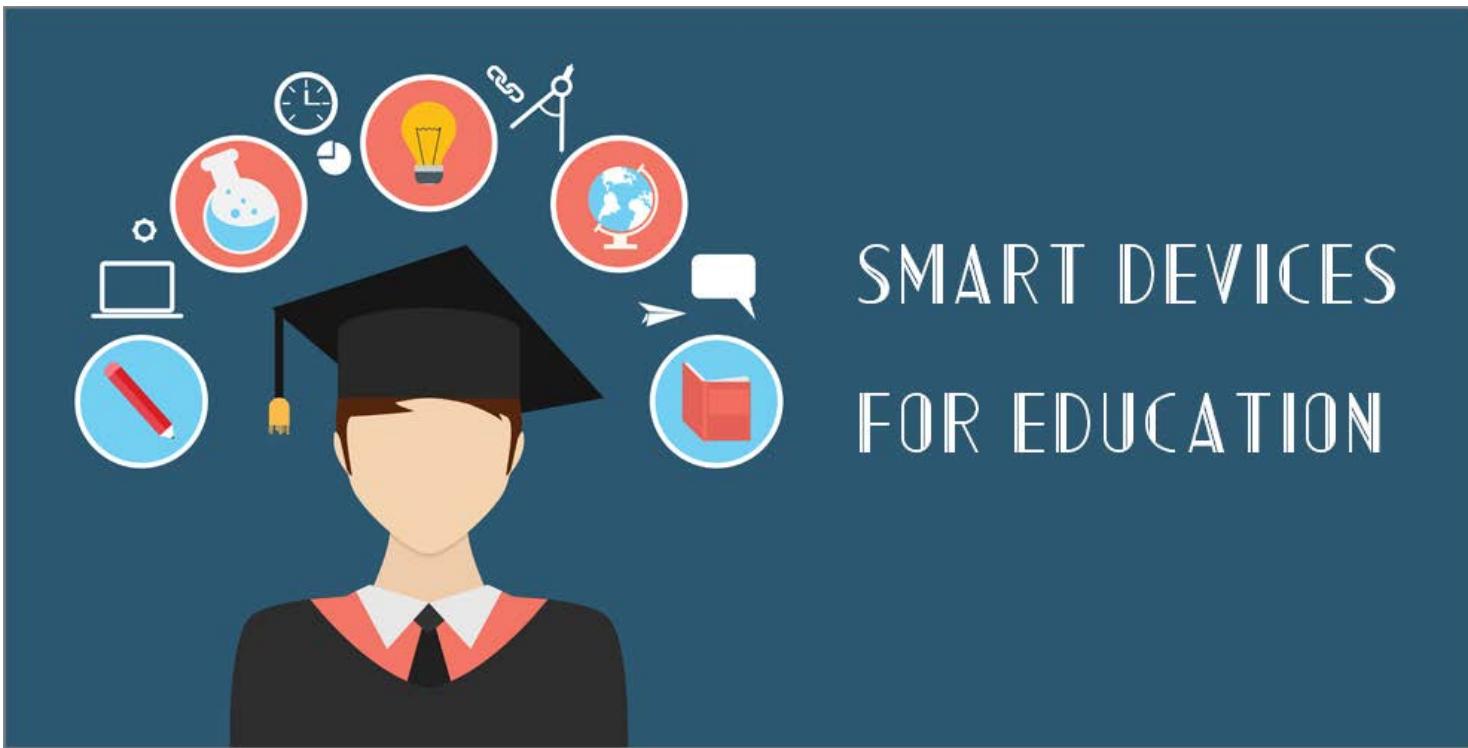
Smart Systems



Smart Devices



Smart Education



Smart Education

*“... smart education can be considered as the education in a **smart environment** supported by **smart technologies**, making use of **smart tools** and **smart devices**”*

M. Coccoi, A. Guercio, P. Maresca, and L. Stanganelli.

“Smarter universities: A vision for the fast changing digital era”

J. Vis. Lang. Comput., vol. 25, no. 6, pp. 1003–1011, Dec. 2014.

Smart Education



Objectives

- The "technological paradox":
 - The constant tendency of the educational system to preserve itself and its practices by assimilating new technologies into existing educational practices.
- The technology ends up being "domesticated" and it is allowed to do precisely what fits in the traditional educational philosophy.
- We are interested in applying technology not only to "modernize" the old methodologies, but also to implement new pedagogical strategies that better adapt to a smart education system.

Smart University

“... smart universities – as a smart system – should implement and demonstrate significant maturity at various *smartness* levels or smart features, including”:

- Adaptation
- Sensing (awareness)
- Inferring (logical reasoning)
- Self-learning
- Anticipation
- Self-organization and re-structuring

V. L. Uskov, J. P. Bakken, A. Pandey, U. Singh, M. Yalamanchili, and A. Penumatsa.
“Smart University Taxonomy: Features, Components, Systems,”
in *Smart Education and e-Learning 2016*,
Springer International Publishing, pp. 3–14, 2016.

Smart University

- Taking into account this vision a, "Smart University" keeps many things in common with traditional Universities.
- However, to achieve the degree of "smartness" it is necessary to include or take into account some additional components:
 - software systems
 - technology
 - hardware/equipment
 - smart curricula
 - smart students or learners
 - smart pedagogy
 - smart classrooms

Smart University

- To achieve these distinctive features, technology is a fundamental and necessary element, but it is not enough.
- **Technology as a means, not as an objective:**
 - Technology must be a fundamental tool, but not the final objective when a transformation towards a "smart education" is taking place.
- If we want to transform the traditional university into a smart university, the implementation and use of the technology itself will not be enough.
- Smart universities should focus on the use of available technologies to improve their performance and improve the quality of their graduates' training.

Smart University

How to improve the skills and training
of our graduates?

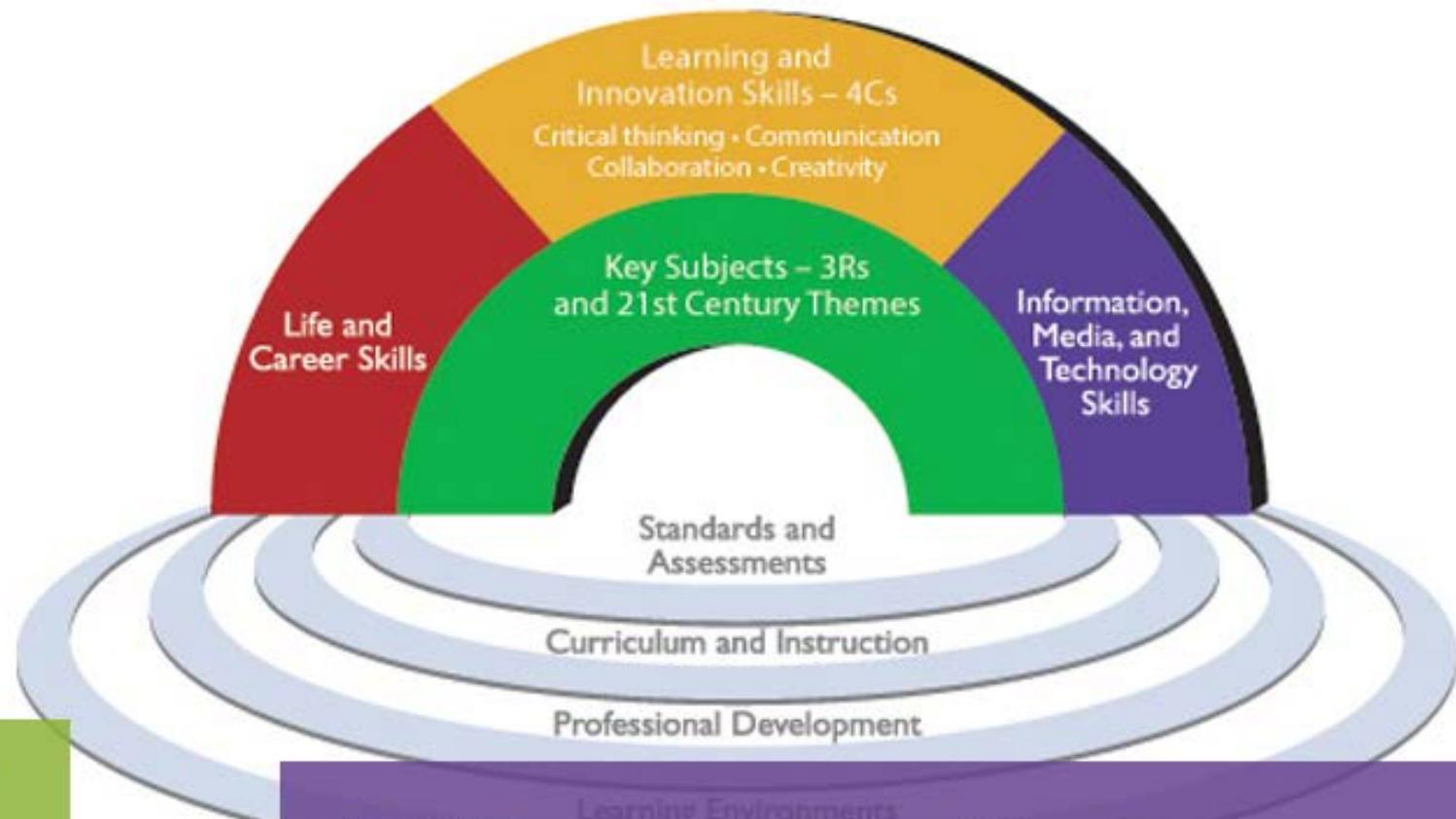
- Detect the set of main skills to be developed.
- Identify the mechanisms that will allow these skills to be developed.



Smart University

21st century skills

- Many studies to try to:
 - Identify or define such skills
 - Classify such skills
 - Promote them
- Skills and competences of people to be able to function and live effectively both in the professional field and in the personal field.
- Several proposals ...



Learning Environments

P21 Framework for 21st Century Learning



Smart University

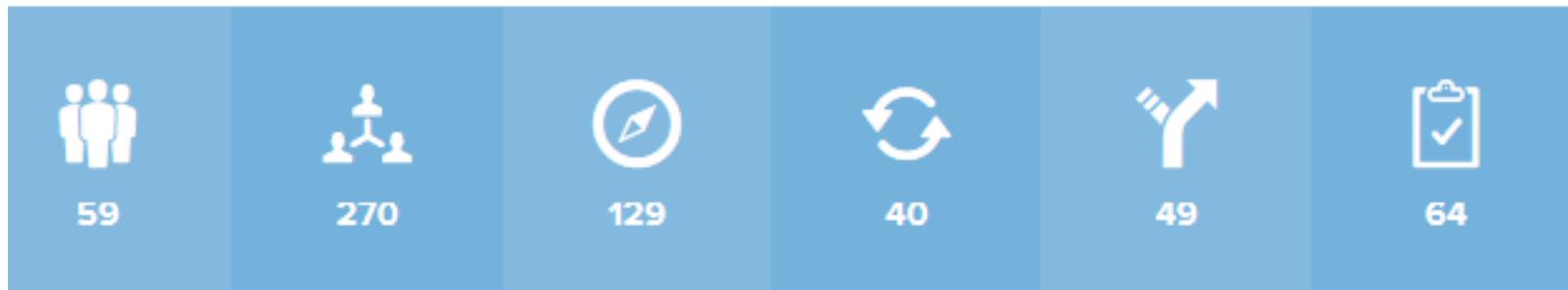
21st century skills

- Skills for learning and innovation:
 - Critical thinking and problem solving
 - Communication and collaboration
 - Creativity and innovation
- Technological skills and digital literacy:
 - Access to digital information
 - Digital communication media
 - Literacy in the field of ICTs
- Skills for professional career and personal life:
 - Flexibility, adaptability, initiative, autonomy, social and intercultural interaction, productivity, responsibility, leadership, etc.

Smart University



MindTools
Essential skills for an excellent career



Leadership Skills

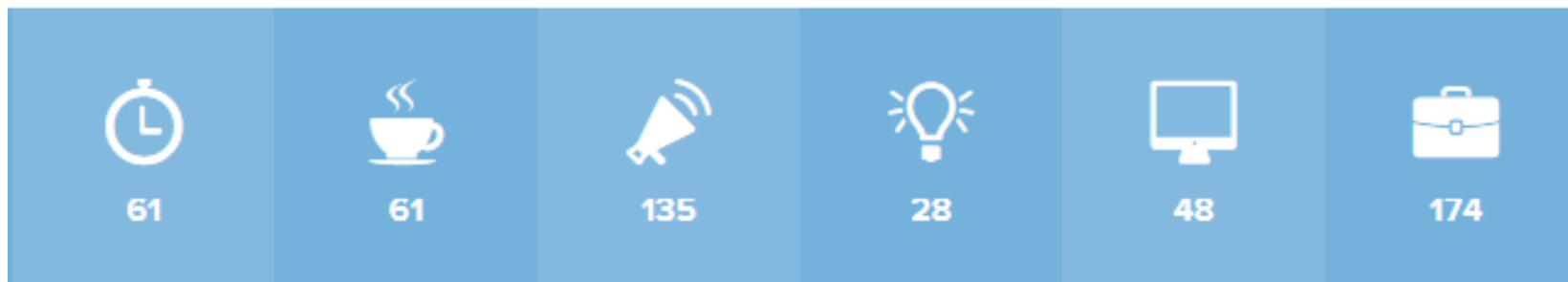
Team Management

Strategy Tools

Problem Solving

Decision Making

Project Management



Time Management

Stress Management

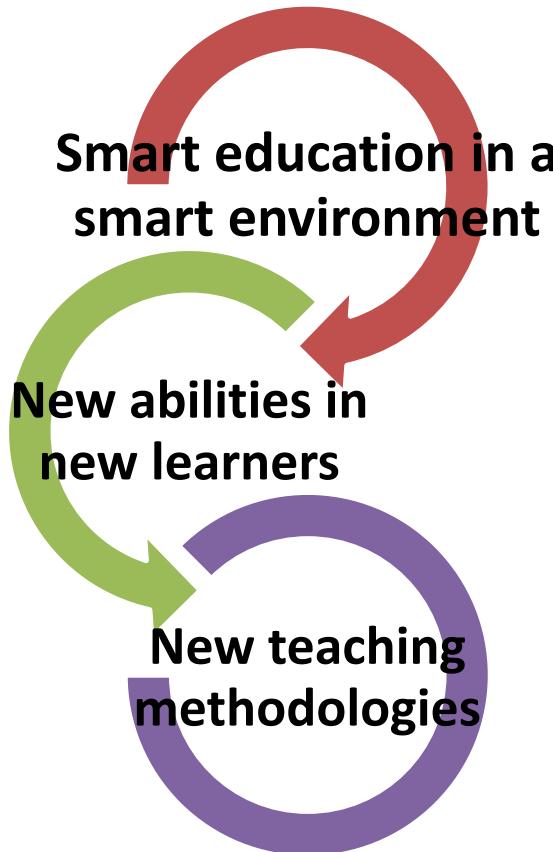
Communication Skills

Creativity Tools

Learning Skills

Career Skills

Smart Pedagogies



If we want different results ...

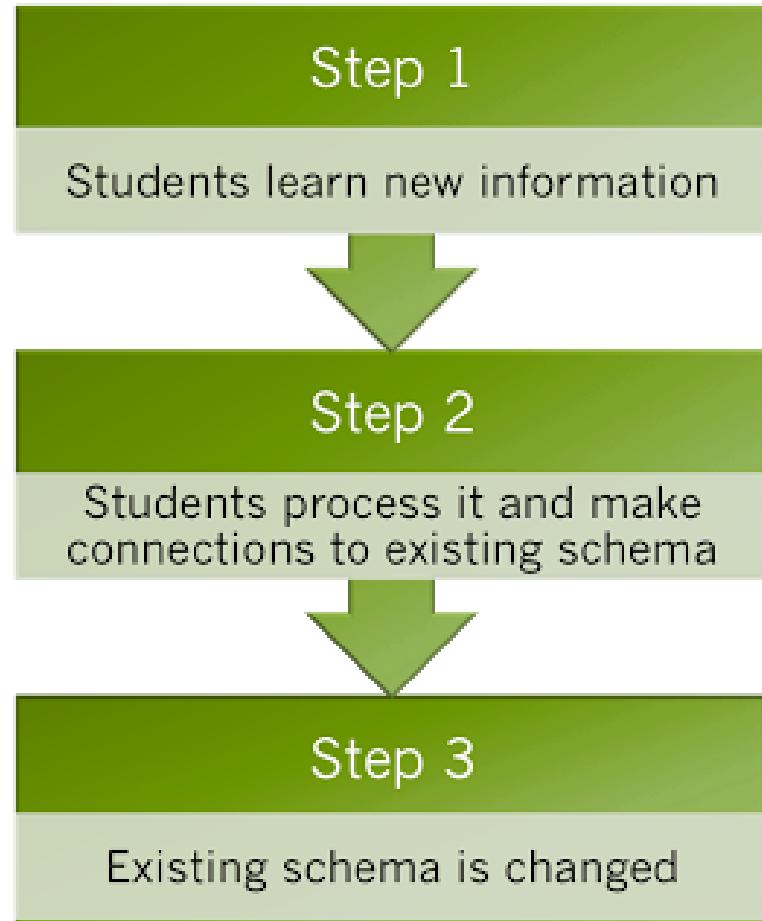
We can't continue doing always the same

Smart Pedagogies

- They deal with learning processes.
 - ✓ The methodologies or strategies must be adapted according to the learning needs of the students: requirements, background, experience, interests and preferences, among others.
 - ✓ They must also be adapted to smart environments and new technologies.
- Multiple proposals:
 - Personalized learning or directed by interests.
 - Online learning.
 - Cooperative learning.
 - Generative learning.
 - ...

Smart Pedagogies

Generative Learning

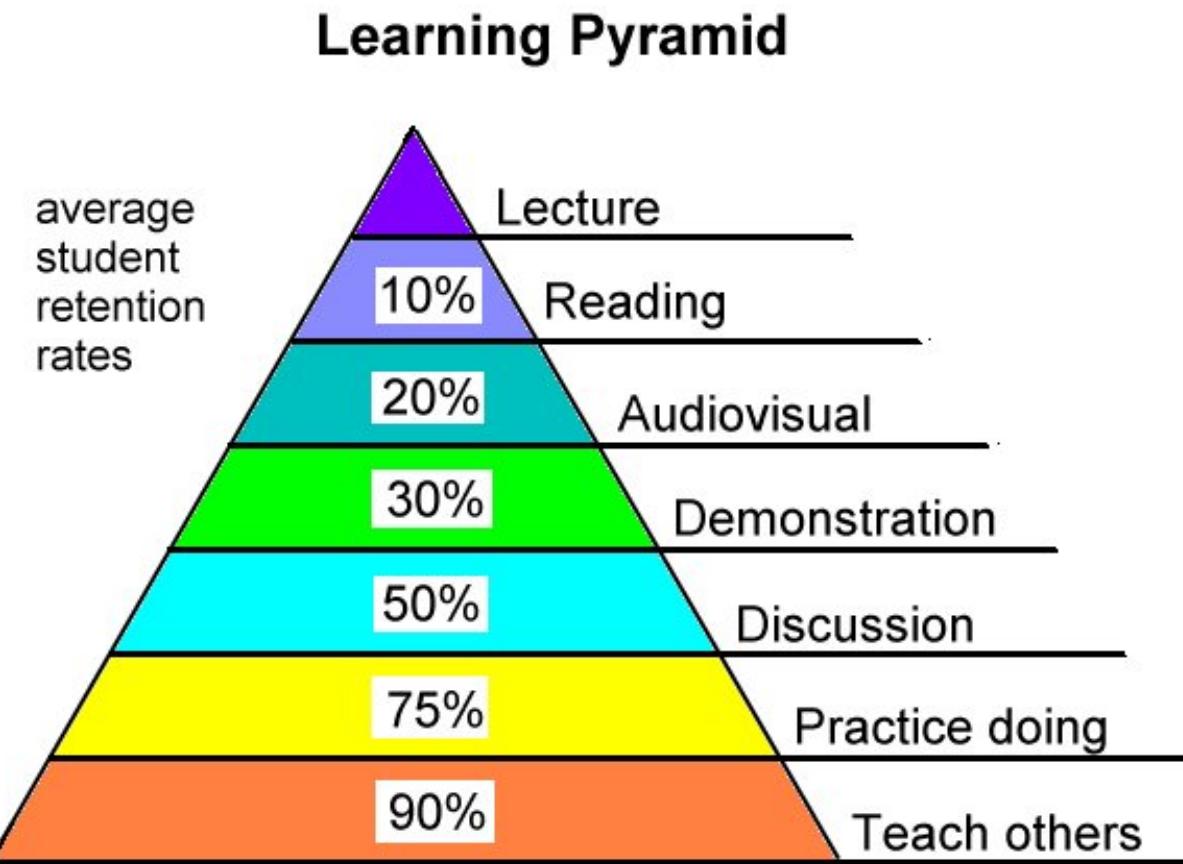


Smart Pedagogies

Some strategies to promote generative learning

- Learning by summarizing
- Learning by mapping
- Learning by drawing
- Learning by imagining
- Learning by self-testing
- Learning by self-explaining
- Learning by teaching
- Learning by enacting

Smart Pedagogies



Source: National Training Laboratories, Bethel, Maine

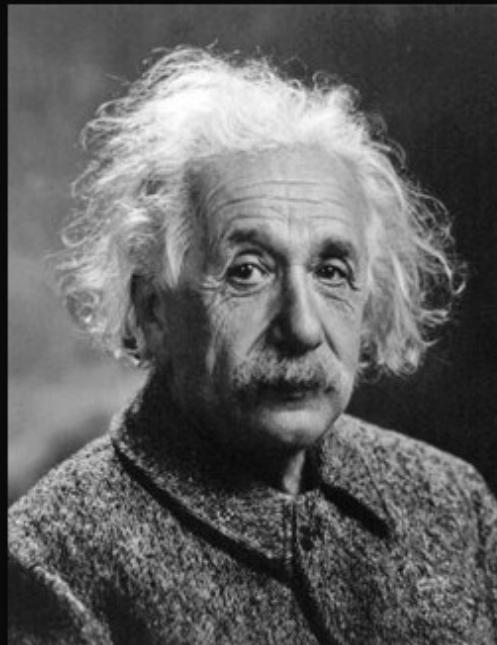
Smart Pedagogies

"DIME Y LO OLVIDO,
ENSEÑAME Y LO RECUERDO,..
INVOLÚCRAME Y LO APRENDO"
(BENJAHÍN FRANKLIN)



dottide sonrisa
www.gestalt-terapia.es

Smart Pedagogies



No entiendes realmente algo a menos que seas capaz de explicárselo a tu abuela.

(Albert Einstein)

akifrases.com

Smart Pedagogies

¿Learning by programming?



The education model of the future

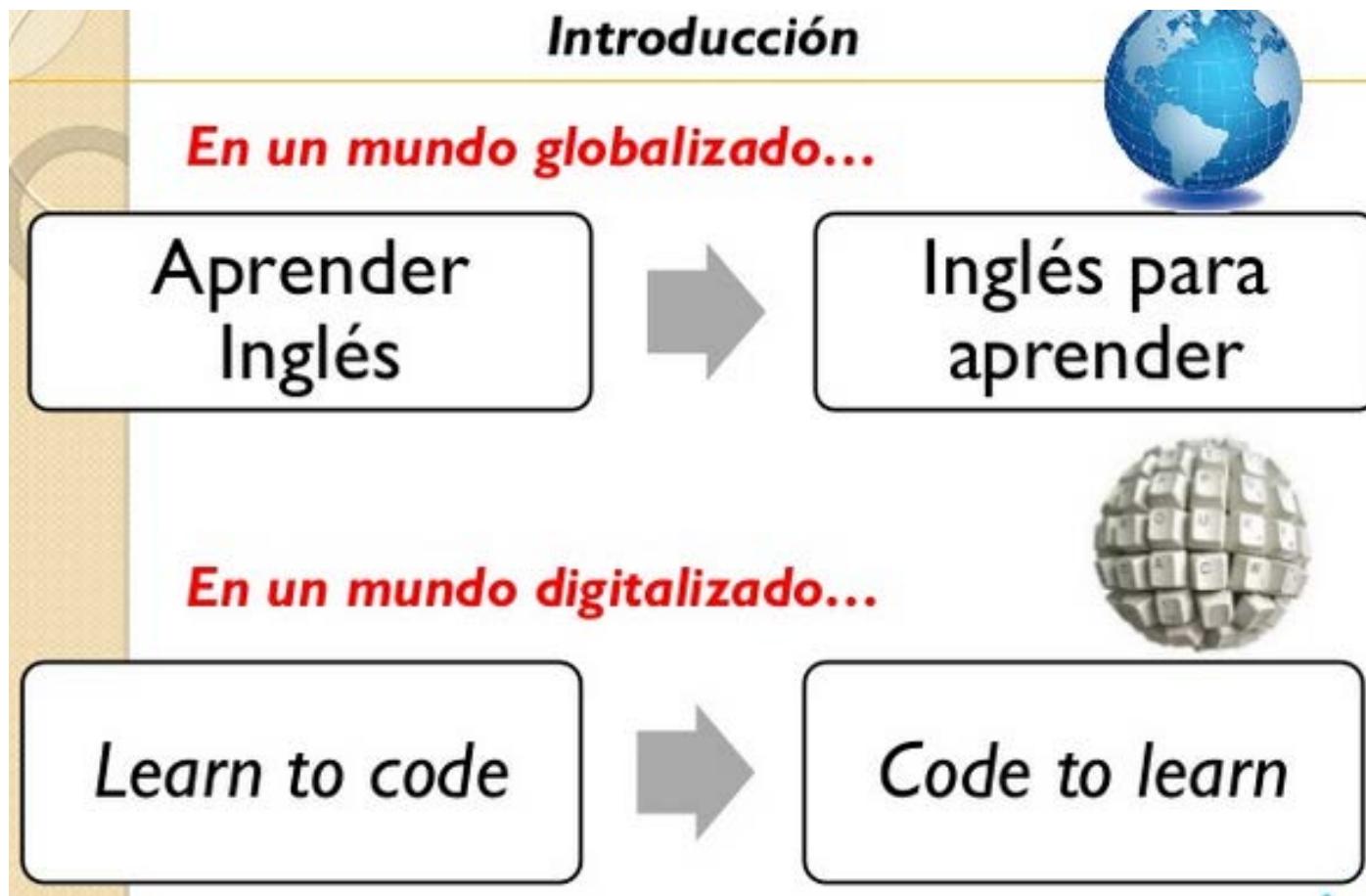
Literacy

- English as a complementary skill
- English as an indispensable requirement to learn

Digital literacy

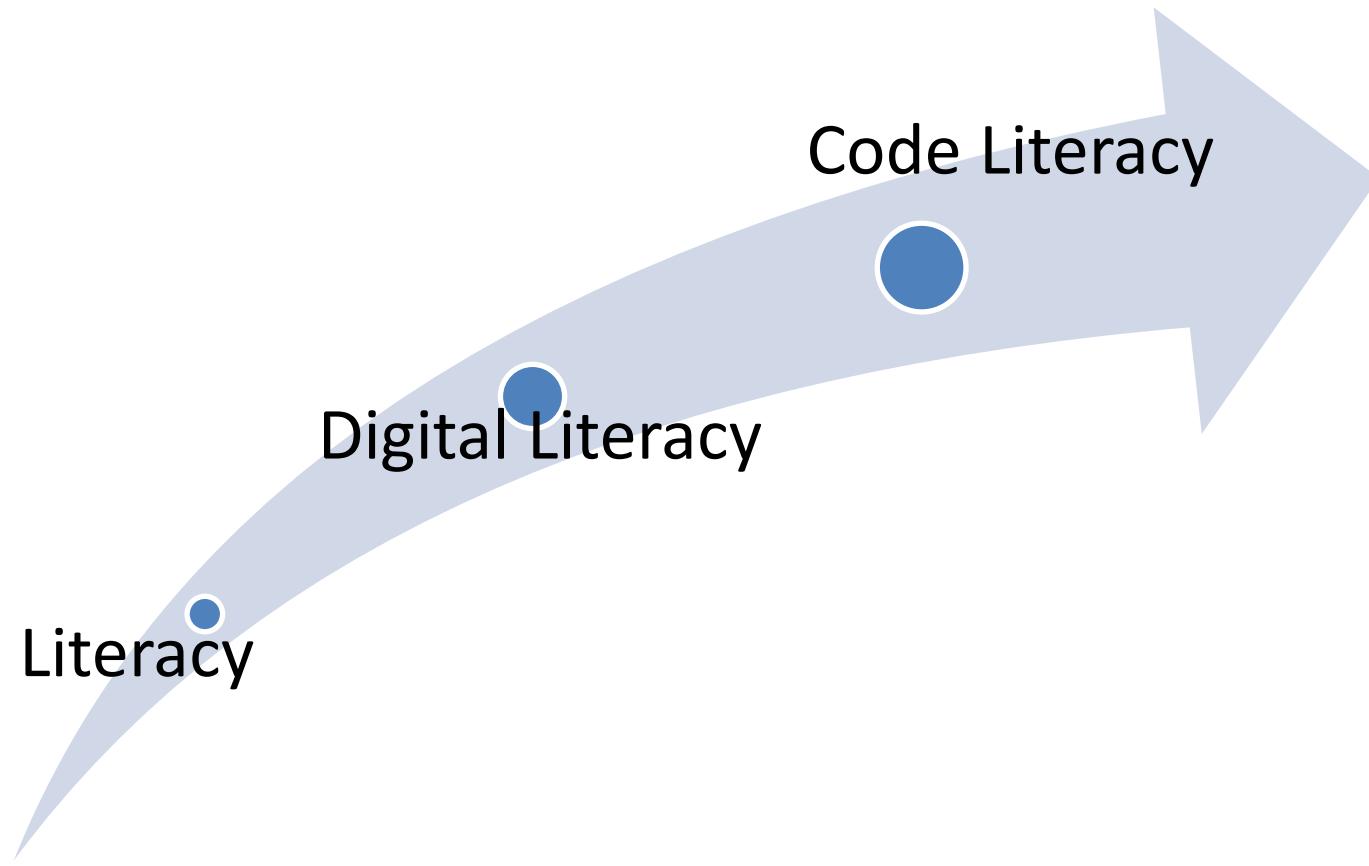
- Final user
- User who understands technology and is able to create own projects

The education model of the future



<https://www.slideshare.net/emadridnet/emadrid-2015-04-17-urjc-marcos-romn-test-de-pensamiento-computacional-principios-de-diseo-validacin-de-contenido-y-anlisis-de-tems>

The education model of the future



Informe elaborado por Google, la FECYT y Everis: EDUCACIÓN EN CIENCIAS DE LA COMPUTACIÓN EN ESPAÑA 2015

- El estudio de las CC en Educación Primaria y Secundaria se está introduciendo recientemente en algunos centros educativos y Comunidades Autónomas, pero no ha sido todavía incluido en el currículo escolar en la mayoría de casos.
 - De todos los niños y niñas entre 6 y 16 años encuestados, sólo un 5% de los estudiantes de Primaria y un 16% de Secundaria afirman utilizar sus dispositivos TIC para programar, y menos del 25% conocen algún lenguaje de programación.
- Sin embargo, la mayoría de los encuestados muestran interés en estudiar CC.
 - Este interés se incrementa cuando han comenzado a dar clases de alguna materia relacionada con las CC

Informe elaborado por Google, la FECYT y Everis:

EDUCACIÓN EN CIENCIAS DE LA COMPUTACIÓN EN ESPAÑA 2015

- Tanto los padres y madres como los niños y niñas tienen una percepción positiva sobre las CC.
 - Las CC se consideran como una **materia creativa e importante para el futuro**, ya que será esencial en muchas profesiones y, por tanto, debería formar parte de la educación formal en centros escolares.
 - Existe la percepción, tanto por parte de los padres y madres como de los alumnos, de que las CC son una **materia demasiado complicada de estudiar** y sólo accesible para alumnos con muy buenos expedientes académicos.
- Con carácter general, **los alumnos españoles disponen de la infraestructura necesaria** para poder realizar actividades relacionadas con las CC (existe una alta penetración en el uso de dispositivos TIC y el acceso a Internet está ampliamente extendido).

Informe elaborado por Google, la FECYT y Everis:

EDUCACIÓN EN CIENCIAS DE LA COMPUTACIÓN EN ESPAÑA 2015

- **La percepción** de la importancia de las CC, las habilidades necesarias para su aprendizaje o la probabilidad de necesitarlas en el futuro **no muestra diferencias por género**.
- No obstante, las niñas muestran menos interés real en estudiar las CC, y perciben en menor medida que los chicos que sus padres y madres les consideran capaces de cursar estudios de tecnología.
 - Las mujeres están claramente infrarrepresentadas en los estudios tecnológicos.
 - Frente al 55% de mujeres que escogen carreras sociales y de humanidades, o el 36% que cursan estudios vinculados a la salud, solo el 9,15% de las universitarias españolas se matriculan en una escuela técnica.
 - El porcentaje entre los chicos se eleva, en cambio, hasta el 34,3%, en las titulaciones técnicas según datos del Ministerio de Educación.

Current education system



Buscar...



Registrarse | Iniciar sesión

PORADA | INTERNACIONAL | POLÍTICA | ECONOMÍA | SOCIEDAD | BARCELONA | DEPORTES | OCIO Y CULTURA | EXTRA | TELEVISIÓN | OPINIÓN | ENTRE TODOS

Vídeos

Fotogalerías

e-Periódico

Sociedad



Vídeo de la UPC y la UOC para fomentar las vocaciones tecnológicas entre las chicas.

Vídeo de la UPC y la UOC para fomentar las vocaciones tecnológicas entre las chicas.

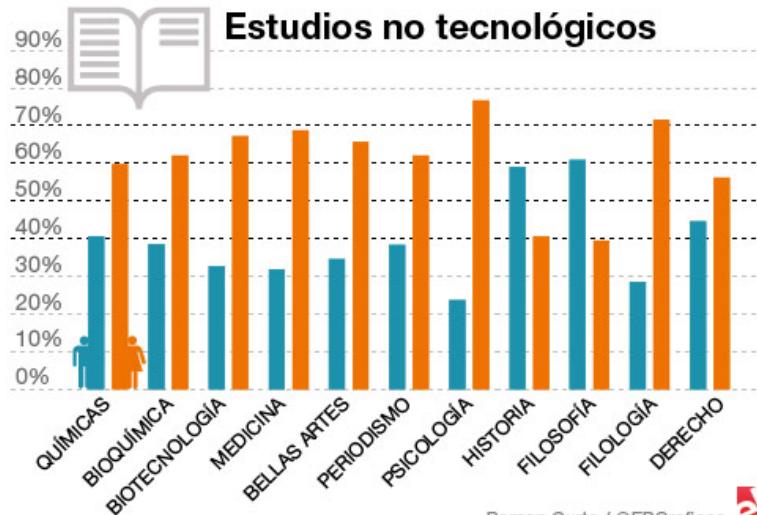
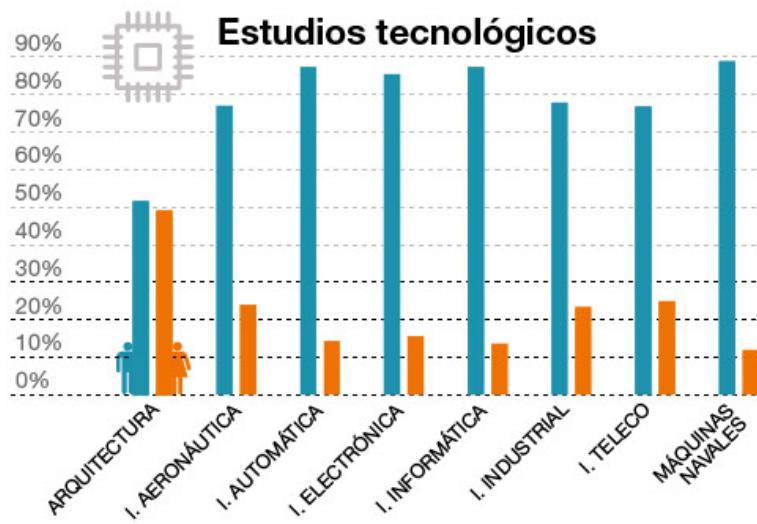
Otros videos



<https://tv.upc.edu/contenidos/lo-que-no-te-explican>

LA ELECCIÓN DE LOS ESTUDIOS

CHICOS CHICAS



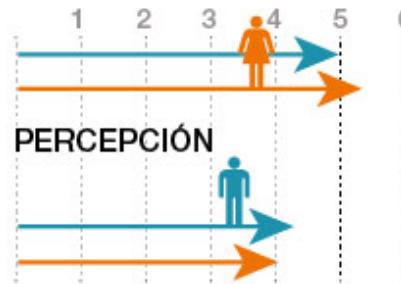
Ramon Curto / @EPGraficos

LOS RESULTADOS DE MATERIAS Y LA PERCEPCIÓN DE NOTAS POR SEXOS

→ CHICOS → CHICAS

Matemáticas

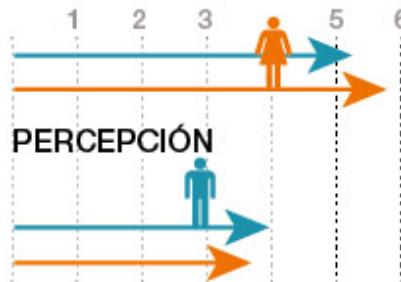
RESULTADOS



PERCEPCIÓN

Física y Química

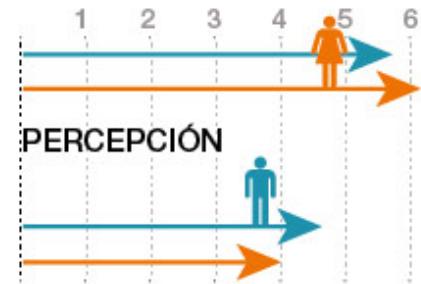
RESULTADOS



PERCEPCIÓN

Tecnología

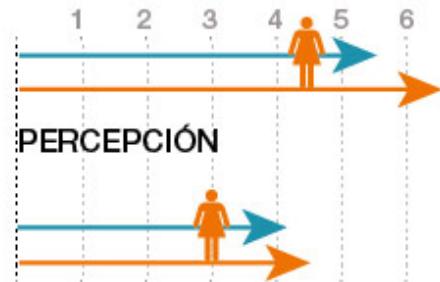
RESULTADOS



PERCEPCIÓN

Biología y Geología

RESULTADOS



PERCEPCIÓN

Current education system

¿Motivos para no atraer a las chicas?

- Mundo de hombres
- Falta de estereotipos femeninos
- Estereotipo de “friki”
- Alta dificultad
- Familia (conciliación)
- Pocas aplicaciones sociales

Current education system

- En Europa, la enseñanza de las CC en etapas pre-universitarias está ganando cada vez más relevancia, y la Comisión Europea señala que **las CC son un ámbito de conocimiento clave**, y el aprendizaje de la **programación informática constituye una habilidad básica del Siglo XXI**.
- Un reciente estudio de la propia Comisión Europea señala que hay un **déficit de profesionales** adecuadamente formados en esta disciplina y estima que en 2020 habrá 825.000 vacantes de puestos de trabajo relacionados con las TIC.

Current education system

- Actualizaciones curriculares en algunos países europeos para:
 - Desarrollar habilidades en los alumnos que van más allá del conocimiento de la materia (**pensamiento lógico, resolución de problemas, algorítmica y generación de código**).
 - Hacer atractivo el estudio de las CC en la educación superior para mejorar la empleabilidad de los jóvenes.

	Nivel de integración			Integración por nivel educacional			Ubicación en el currículo		
	Nivel nacional	Nivel autonómico	Nivel centro docente	Primaria	Secundaria	Bachillerato	Depende del currículo autonómico o del centro educativo	Asignatura específica	Parte de otra materia como tecnología
Austria	●	●	●	●	●	●	●	●	●
Bulgaria	●	●	●	●	●	●	●	●	●
Chipre	●	●	●	●	●	●	●	●	●
República Checa	●	●	●	●	●	●	●	●	●
Dinamarca	●	●	●	●	●	●	●	●	●
Estonia	●	●	●	●	●	●	●	●	●
Francia	●	●	●	●	●	●	●	●	●
Grecia	●	●	●	●	●	●	●	●	●
Hungría	●	●	●	●	●	●	●	●	●
Irlanda	●	●	●	●	●	●	●	●	●
Italia	●	●	●	●	●	●	●	●	●
Lituania	●	●	●	●	●	●	●	●	●
Malta	●	●	●	●	●	●	●	●	●
Polonia	●	●	●	●	●	●	●	●	●
Portugal	●	●	●	●	●	●	●	●	●
Eslovaquia	●	●	●	●	●	●	●	●	●
Reino Unido	●	●	●	●	●	●	●	●	●

● Asignatura obligatoria
 ● Asignatura opcional
 ● Depende del currículo autonómico o del centro educativo

Tabla 1. Nivel de integración de las CC en los planes de educativos de 18 países europeos, el nivel de enseñanza en el que se aplica y en qué parte del plan de estudios se introduce

Current education system

Integración de las CC en el sistema educativo británico

- El currículo escolar fue modificado en el año 2013 para integrar las CC en la educación Key Stage 1 (de 7 a 11 años) y Key Stage 2 (de 11 a 14 años) como una nueva asignatura:
 - Comprender y aplicar los principios fundamentales y conceptos de las CC, incluyendo **abstracción, lógica, algorítmica y representación de datos**.
 - Tener la capacidad de analizar problemas en términos computacionales y disponer de la experiencia práctica suficiente para **crear programas informáticos que solucionen estos problemas**.
 - Poder **evaluar y aplicar las tecnologías de la información**, incluyendo nuevas tecnologías, de una manera analítica para la resolución de problemas.
 - Ser usuarios de TIC responsables, competentes, creativos y con confianza.

Current education system

[Who we are](#)[Community Site](#)[Classroom Resources](#)[Projects](#)[Login](#)

Promoting and supporting excellence in computer science education

Redevelopment of this website has been kindly funded by



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[Search](#)[Join CAS](#)

WELCOME TO THE MAGAZINE
JOIN THE CLUB
New magazine 'Hello World!' (issue 2)
THOUGHTS ON BREAKING THE
5,000 UK CLUBS MILESTONE.
WORLDWIDE EXPANSION
AND WHAT 2017 HAS IN STORE
FOR COMPUTING & DIGITAL MAKING EDUCATORS

[read more](#)

Issue 1 | Spring Term 2017 | [helloworld.co](#)

In collaboration with the Raspberry Pi Foundation we are launching a replacement to "Switched On". The new magazine is called Hello World! and the first issue launched at BETT 2017.

**EXCELLENT COMPUTING
IN EVERY SCHOOL:
A TOOLKIT FOR SCHOOL
LEADERS**

[read more](#)

Produced with support from Microsoft Youthspark

This toolkit is designed to support school leadership teams in developing computing in their schools in ways that are consistent with the school's desire to provide a broad and balanced curriculum...

**QuickStart
Computing**

[read more](#)

QuickStart Computing has been developed to support primary and secondary schools with the computing programme of study introduced in September 2014. Quickstart Computing provides all teachers...

Current education system

Integración de las CC en el sistema educativo español

- **Competencia digital** (a desarrollar en Primaria y Secundaria) que permite a los estudiantes ser creativos y críticos en el uso de las tecnologías de la información y comunicación (como usuarios finales).
- En ESO, como materias opcionales y dentro de la programación de la oferta educativa que establezca cada Administración Educativa Autonómica, el currículo escolar puede incluir las asignaturas de:
 - “**Tecnología**” (primer y segundo ciclo de ESO)
 - “**Tecnologías de la Información y la Comunicación**” (únicamente en segundo ciclo de ESO).

Current education system

Integración de las CC en el sistema educativo español

- Navarra: ha incluido en el currículo de la asignatura de matemáticas (Primaria) elementos de las CC.
 - Programa **Código21** para la formación docente.
- Madrid: asignatura específica en 1º y 3º de la ESO (“Tecnología, Programación y Robótica”).
 - Plataforma **Code Madrid**.
- Cataluña:
 - La iniciativa **mSchools** ha introducido la programación de aplicaciones móviles en la ESO.

Since 2012, the *National Research Council* (NRC) of U.S.A. formally recommends mathematics and computational thinking as one of the eight main skills in the field of STEM:

1. Asking questions and defining problems

2. Developing and using models

3. Planning and carrying out investigations

4. Analyzing and interpreting data

5. Using mathematics and computational thinking

6. Constructing explanations and designing solutions

7. Engaging in argument from evidence

8. Obtaining, evaluating, and communicating information

Copyright 2011. International Society for Technology in Education (ISTE) and the Computer Science Teachers Association (CSTA). This material is based upon work supported by the National Science Foundation under Grant No. CNS-1030054.



Current education system

- *Computer Science for All* (White House):

“empower all American students, from kindergarten through high school, to learn computer science and be equipped with the computational thinking skills they need to be creators, and not just consumers, in the digital economy, and to be active citizens in our technology-driven world”.

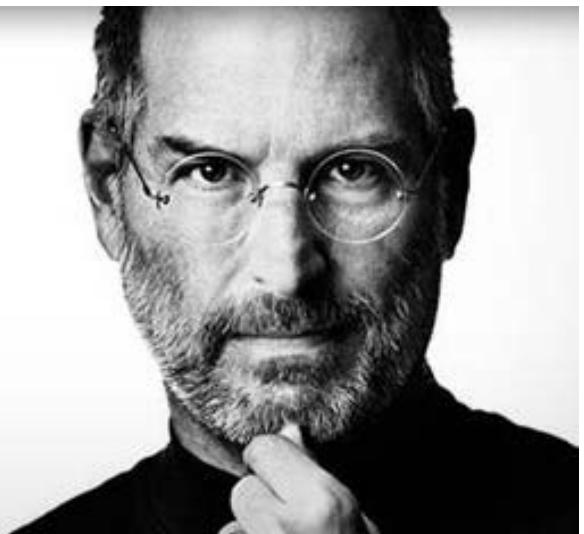


Projects and initiatives

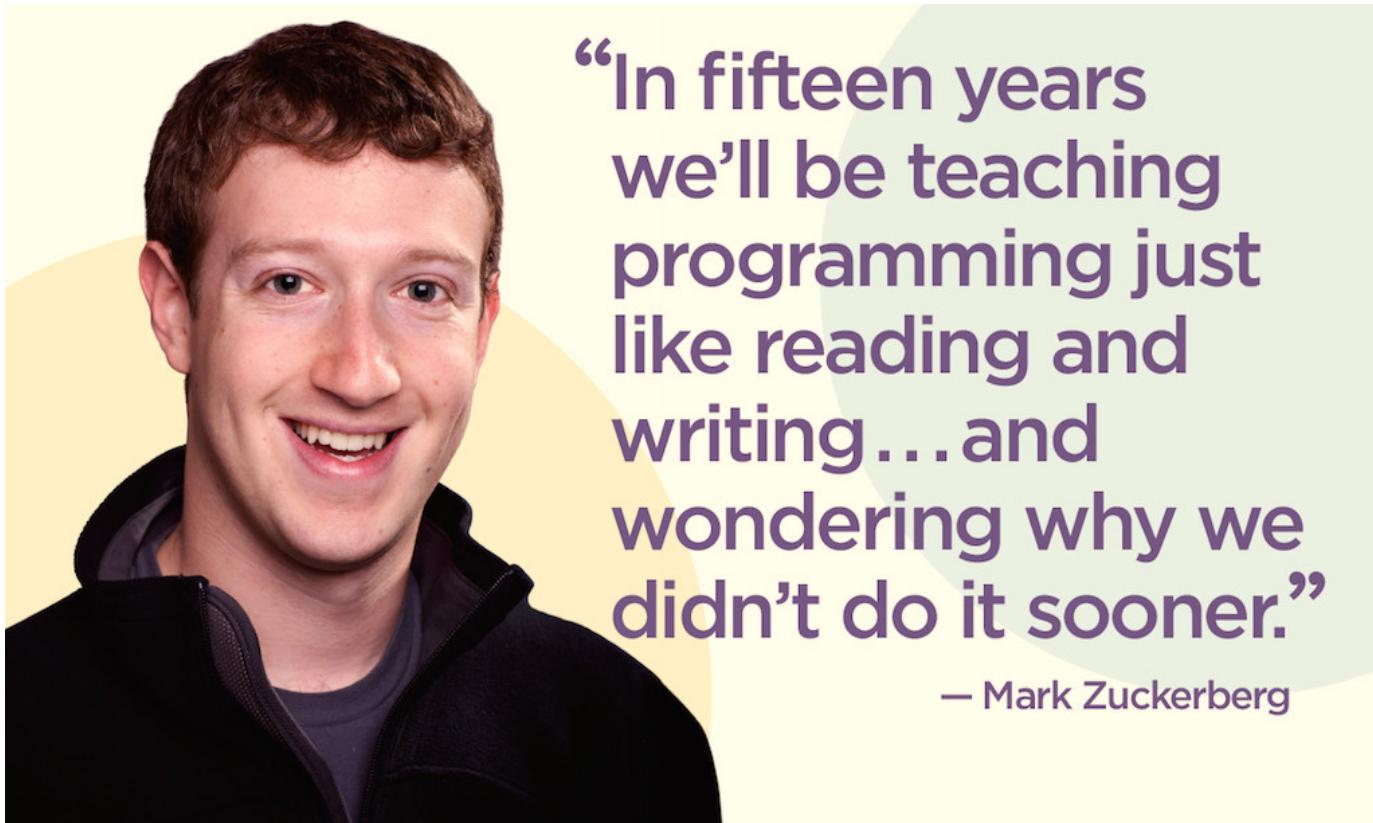
Projects and initiatives

**Everybody in this country should
learn to program a computer...
because it teaches you how to think**

Steve Jobs, co-founder and CEO of Apple Inc. (1955 - 2011)



Projects and initiatives



“In fifteen years
we’ll be teaching
programming just
like reading and
writing...and
wondering why we
didn’t do it sooner.”

— Mark Zuckerberg

Projects and initiatives



Promote Computer Science

Every student in every school should have the opportunity to learn computer science

If you agree, sign your name. Join 2,130,307 others.

Name Email ZIP code or country Age I am a - Select -

Only used for infrequent updates Enter country if outside the United States See our privacy practices for children

Choose a State



Computer science drives innovation throughout the US economy, but it remains marginalized throughout K-12 education.

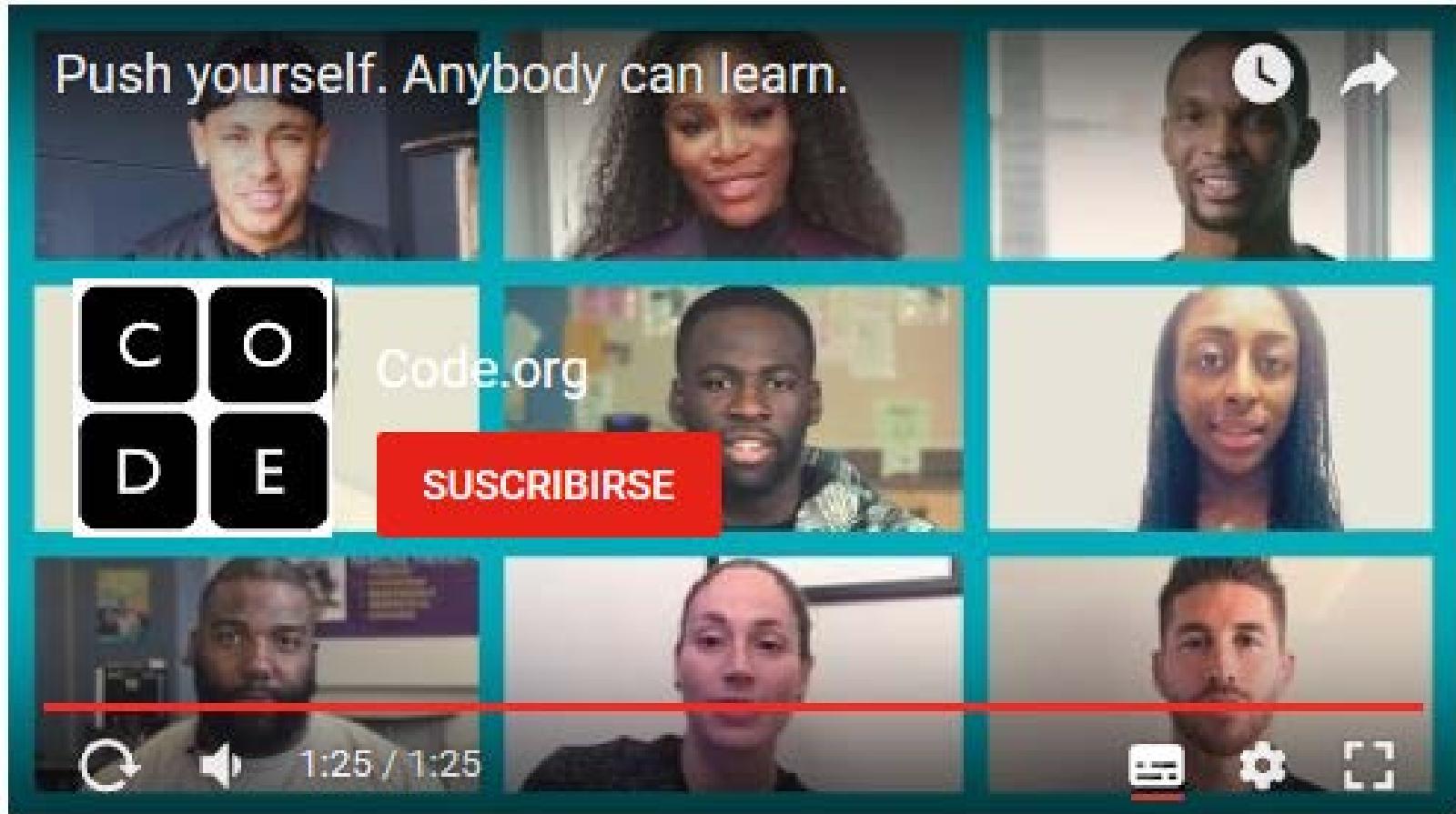
Only **29** states allow students to count computer science courses toward high school graduation.

There are currently **559,321** open computing jobs nationwide.

Last year, only **42,969** computer science students graduated into the workforce.

Fuente: <https://code.org/promote>

Projects and initiatives



Projects and initiatives

La Hora del Código es un movimiento global, que llega a decenas de millones de estudiantes en más de 180 países. Cualquier persona, en cualquier lugar del mundo puede organizar una Hora del Código. Los tutoriales, de una hora de duración, están disponibles en más de 30 idiomas. No se necesita experiencia.

Para edades entre 4 y 104 años.

105,979 eventos de la Hora del Código alrededor del mundo, 690 en España / Spain

Host an hour



Projects and initiatives



Computer science is for everyone | Hadi Partovi | TEDxRainier

Projects and initiatives

Google for Education

Exploring Computational Thinking

[Google for Education](#) > [Computer Science](#) > **Exploring Computational Thinking** > CT Overview

CT Overview

[Home](#)

CT Overview

[CT Materials](#)

[Resources](#)

[FAQ](#)

Computational Thinking (CT) is a problem solving process that includes a number of characteristics and dispositions. CT is essential to the development of computer applications, but it can also be used to support problem solving across all disciplines, including math, science, and the humanities. Students who learn CT across the curriculum can begin to see a relationship between subjects as well as between school and life outside of the classroom.

CT involves a number of skills, including:

Projects and initiatives

Iniciativas a nivel global



CS First es un programa de programación abierto de Google que incrementa la exposición de los alumnos a las CC en el colegio, actividades extra-escolares y programas de verano.



Made With Code es una iniciativa de Google con el propósito de incentivar a mujeres jóvenes a aprender a programar y así reducir la brecha de género en este ámbito.



Lanzado en 2013, **Code.org** es un programa sin ánimo de lucro dedicado a expandir el acceso a las CC y abogar por su inclusión en la educación formal.



Code Club es una organización sin ánimo de lucro con el objetivo de brindar a los niños y niñas la oportunidad de aprender a programar.



Khan Academy es una organización educativa sin fines de lucro creada en 2006 con el objetivo de proporcionar una educación gratuita de calidad para todo el mundo. La organización es un compendio de recursos de aprendizaje para todas las edades (incluye CC).



CoderDojo es una comunidad integrada por voluntarios consistente en la creación de clubs de programación para jóvenes.

Projects and initiatives

Iniciativas a nivel europeo

#codeEU

EU Code Week es un evento para enseñar cómo hacer realidad ideas mediante programación, haciéndola más visible y reuniendo a gente motivada por aprender.



La Iniciativa Europea de Código 'All you need is {C<3DE}' promueve el pensamiento computacional a todos los niveles educativos desde un ámbito no formal.

Iniciativas en España

GENIOS

Genios Es un proyecto de Ayuda en Acción y Google.org para enseñar programación a niños y niñas con el fin de promover una integración social y tecnológica.



Programamos es una organización sin ánimo de lucro cuyo objetivo es promover el desarrollo del pensamiento computacional desde edades tempranas.

Projects and initiatives

Made w/ Code Google

PROJECTS

MENTORS

ABOUT



since 1971 **STARBUCKS®**

things you love are

Made w/ Code

Made with Code and Starbucks are showing young women the creative ways code comes to life.

[WATCH FILM](#)

Projects and initiatives



[About](#) [Get Involved](#) [Projects](#) [FAQ](#)

A worldwide network of
volunteer-led coding clubs for
children aged 7-13

The mission of Code Club is to give every child in the world the chance to learn to code by providing project materials and a volunteering framework that supports the running of after-school coding clubs

Projects and initiatives

The screenshot shows the CoderDojo website's homepage. At the top, there is a navigation bar with links for 'ABOUT', 'ATTEND A DOJO' (which is underlined in blue), 'CREATE A DOJO', 'VOLUNTEER', 'RESOURCES', 'NEWS', and 'COMMUNITY'. To the left, there is a sidebar with social sharing icons for Facebook (9.1k shares), Google+ (4.4k), LinkedIn (44), Twitter, and WhatsApp. The main content area features a large heading 'What Is CoderDojo?' followed by two paragraphs describing the organization's mission and values.

9.1k Shares

ABOUT ATTEND A DOJO CREATE A DOJO VOLUNTEER RESOURCES NEWS COMMUNITY

What Is CoderDojo?

CoderDojo is a worldwide movement of free, volunteer-led, community-based programming clubs for young people. Anyone aged seven to seventeen can visit a Dojo where they can learn to code, build a website, create an app or a game, and explore technology in an informal, creative, and social environment.

The CoderDojo movement believes that an understanding of programming languages is increasingly important in the modern world, that it's both better and easier to learn these skills early, and that nobody should be denied the opportunity to do so.

Projects and initiatives

all you need is
{'C<3 DE'}

European Coding Initiative



Teacher



A Student



An Adult

Projects and initiatives



Projects and initiatives

The screenshot shows the homepage of the BEBRAS Computing Challenge 2016. At the top left is a cartoon beaver holding an American flag. Next to it is the logo 'BEBRAS® COMPUTING CHALLENGE 2016'. A red banner on the right side of the header announces 'New 2016 challenge: November 7 - 18'. Below the header is a navigation bar with links: HOME (highlighted in green), STUDENTS, TEACHERS, EXAMPLES, REGISTER, SPONSORS, LINKS, and CONTACTS. A green horizontal bar below the navigation bar contains the word 'Home' in white. The main content area features a large green button with the text 'CLICK HERE TO START' and a red button with the text 'REGISTER NOW!'. Below these buttons, descriptive text encourages users to start the challenge or register.

New 2016 challenge:
November 7 - 18

HOME STUDENTS TEACHERS EXAMPLES REGISTER SPONSORS LINKS CONTACTS

Home

Start your challenge now

CLICK HERE TO START

REGISTER NOW!

Already have a login? Just cluck on this green button and you can start your challenge right away. Have fun!

It doesn't take much time and is completely free. Register now and you can still join the official 2016 challenge!

Projects and initiatives



Teacher Sneak Preview: Create an Hour of Code Club for CSEdWeek, Dec. 5-9!

Google CS First

Join 500,000+ users.

Inspire kids to create with technology through free computer science clubs.

CN
CARTOON NETWORK

I am a...

TEACHER

PARENT

TECH ADVOCATE

STUDENT

GRACIAS SPASSIBO NUHUN CHALTU WAQHANYELAY YAQHANYELAY TASHAKKUR ATU SUKSAMA EKHMET HATUR GUI EKOJU SIKOMO MAKETAI
ARIGATO SNACHALHYA WABEEJA MAITEKA YUSPAGABATAM DHANYABAAD ANNIA SPASIBO DENKAUJA UNHALCHEEESH
SHUKURIA MERASTAMHY SANCO MAAKE ATTO MERSI HENACHALHYA
JUSPAXAR TAVTAPUCH MEDAWAGSE GAEJTHO LAH FAKAAUE KOMAPSUMNIDA MAKEE Paldies PALDIES BOLZİN MERCI
GOZAIMASHITA
EFCHARISTO
BAINKA
MINMONCHAR
TINGKI
BIYAN
SHUKRIA
THANK YOU