Tangible and Intangible Impact of Information and Communication in the Digital Age

Khanty-Mansiysk, Russian Federation, June 3-8, 2018.

UNESCO
United Nations Educational, Scientific and Cultural Organization

IFAP
Information for All Programme

The last MIL …

or the last chance?

Visions from a Naive Digital Dinosaur

Digital Native
**A toxic confusion between
interface & information metabolism
and the responsibility of teachers**

Digital divide
**a toxic confusion...
between access and contents
and its implications**

Information Literacy
A violent emergency...
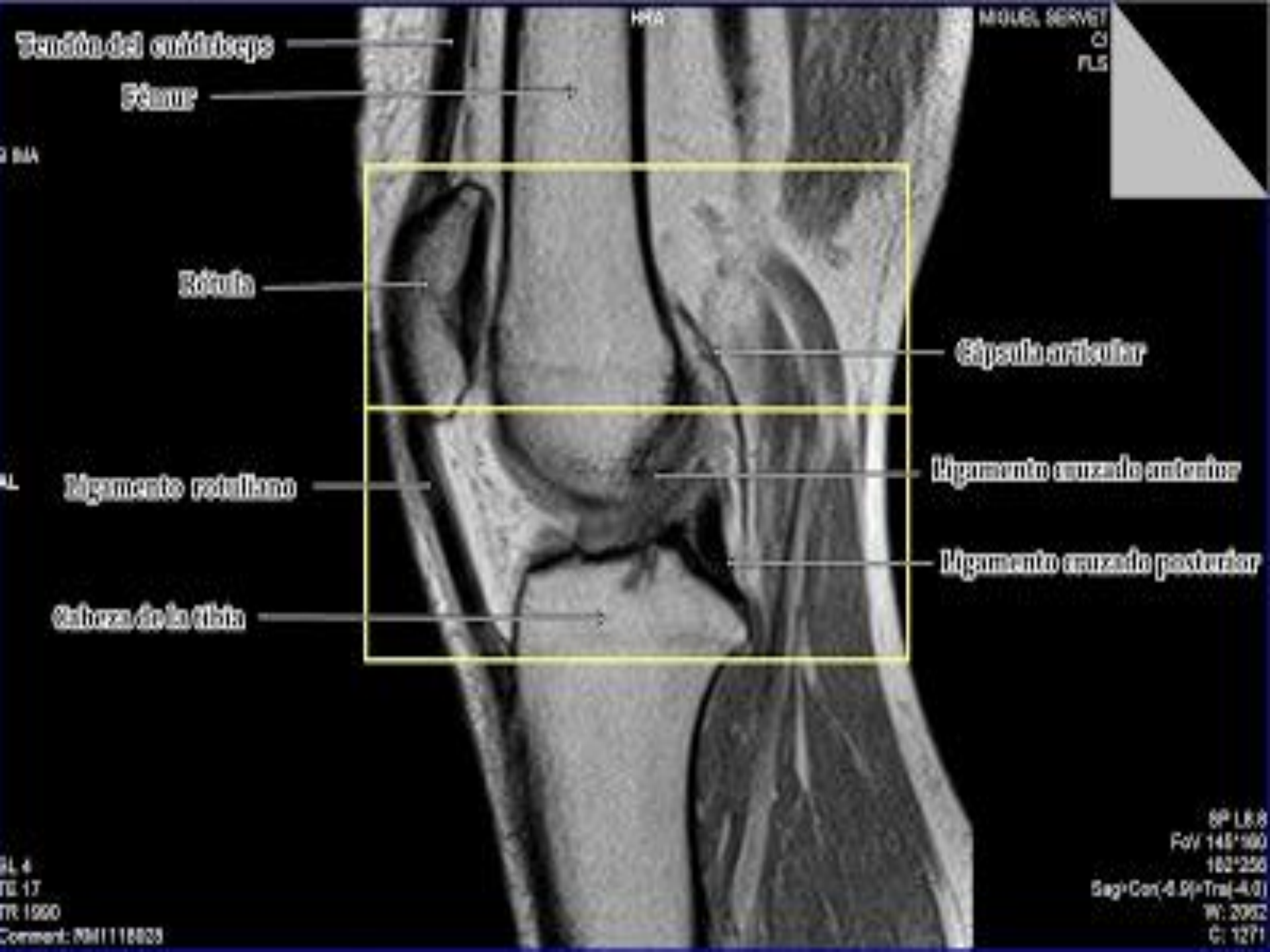
DIGITAL NATIVES VS. TEACHERS

DIGITAL NATIVES VS. DIGITAL DINOSAURS

Tell me about a new technology which has brought revolution to medicine

and

is changing the paradigm of brain studies & psychology?

MAGNETIC RESONANCE IMAGING

Allows fine brain studies...
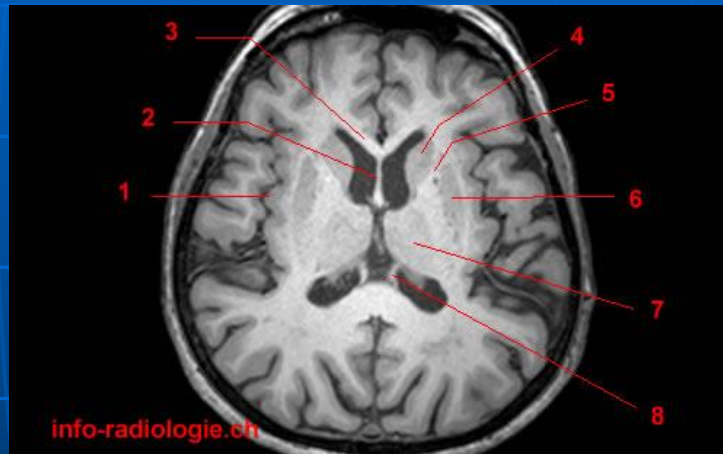
and will eventually change the paradigm in education too...

Let's see what Magnetic Resonance Imaging tells us about the use of the Internet

&

what it have to do with Information Literacy...

Digital
Natives   vs.   Dinosaurs

Natives	Dinosaurs
➢ **Mastery interface**	✓**Mastery search**
➢ **Mastery iconic language**	✓**Mastery content evaluation**
➢ **Mobile**	✓**Fixed**
➢ **Parallel- synchronic**	✓**Asynchronic**
➢ **Info-diabetic**	✓**No info-diabetic**

WHAT SCIENCE TELLS US ABOUT HOW THE INTERNET AFFECTS OUR BRAINS?

Source: "La Recherche", No 467, Sept. 2012 pp46-60

- The state of the art of this question.
- Only preliminary and recent studies but it does show trends.
- Most of the results are based on brain magnetic resonance imagery.
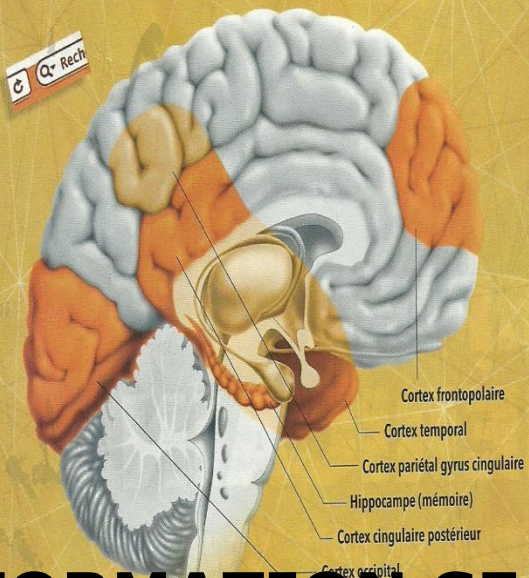
LA Recherche

L'actualité des sciences

Comment
INTERNET

modèle notre
CERVEAU

y recherche des informations ou qu'on y joue, les zones cérébrales activées ne sont pas identiques.

> Rechercher des informati[ons]

Lors des recherches d'in[formations] en ligne, outre les aires [...] impliquées dans la lect[ure,] la prise de décision et d[...] ment complexe s'active [...] usagers expérimentés, [...] cérébrale engagée par c[...] est deux fois plus ampl[e que chez] les novices [1]. Les inter[nautes] mobilisent leur mémoi[re ...] – qui siège au niveau de [l'hippo-] campe – et mémorisent [...] l'emplacement d'une in[formation] en ligne que son conten[u ...]

[1] G. Small et al., *Am. J. Geriatr. Psychiatry*, 17, 116, 2008.
[2] B. Sparrow et al., *Science*, 333 [...]

Cortex frontopolaire
Cortex temporal
Cortex pariétal gyrus cingulaire
Hippocampe (mémoire)
Cortex cingulaire postérieur
Cortex occipital

INFORMATION SEARCH

D'après une étude anglo-danoise, les personnes ayant un grand nombre d'amis sur Facebook présentent une densité accrue de la matière grise (qui contient le corps des neurones) au niveau de l'amygdale et des cortex temporal et entorhinal, zones intervenant dans la perception sociale et la mémoire associative [1]. L'étendue des relations virtuelles semble impliquer un plus grand développement de structures cérébrales dédiées aux relations sociales. Mais cela reste à confirmer par d'autres études.

[1] G. Small et al., *Am. J. Geriatr. Psychiatry*, 17, 116, 2008.

Cortex temporal
Cortex entorhinal
Amygdale

SOCIAL NETWORK

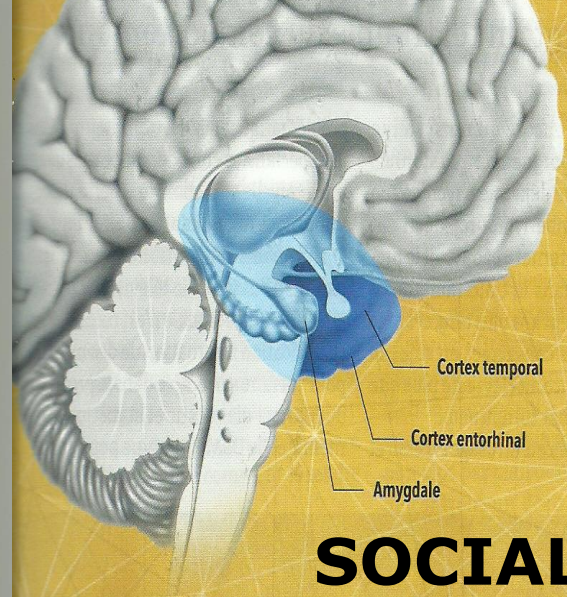## > Réaliser plusieurs tâches à la fois

Pour envoyer un SMS tout en faisant une recherche sur Google et en lisant une page de texte, trois fonctions sont nécessaires : la mémoire rétrospective, assurée par le cortex cingulaire ; la planification et la mémoire prospective, qui reposent sur le cortex préfrontal notamment [1]. Il a été démontré que le fait de réaliser plusieurs tâches simultanément affaiblit les capacités à traiter l'information [2].

[1] P.W. Burgess et al., *Neuropsychologia*, 38, 848, 2000 ;
E. Köchlin et A. Hyafil, *Science*, 318, 594, 2007.
[2] E. Ophir et al., *PNAS*, 106, 15583, 2009.
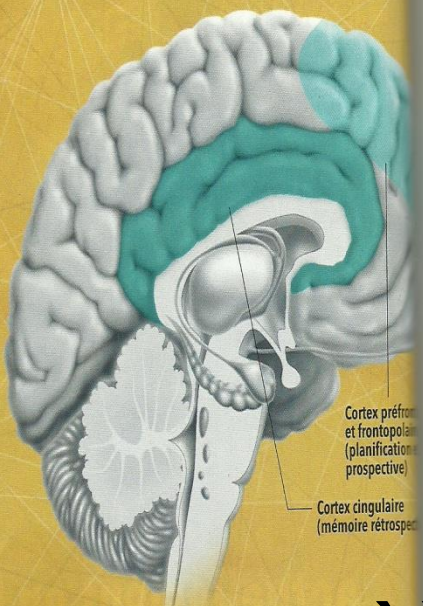
Cortex préfrontal et frontopolaire (planification et mémoire prospective)
Cortex cingulaire (mémoire rétrospective)

MULTI TASKING``

> [Jo]uer [aux] jeux vidéo

[...j]eux vidéo fait appel au [...] moteur (frontopariétal) et [...]x préfrontal [1]. Plusieurs [...]nt montré qu'à terme, cette [...]e améliore les performances [...]s, notamment en augmentant [...]ion allouée au champ visuel [2]. [...]suelle V4 (dans le cortex [...]l) serait capable de mettre en [...]e système visuel, dont le cortex [...]emporal, zone dédiée [...]nnaissance des objets [3].

[...]mitsu et al., *Brain Dev.*, 28, 315, 2006.
[...]en et D. Bavelier, *Nature*, 423, 534, 2003.
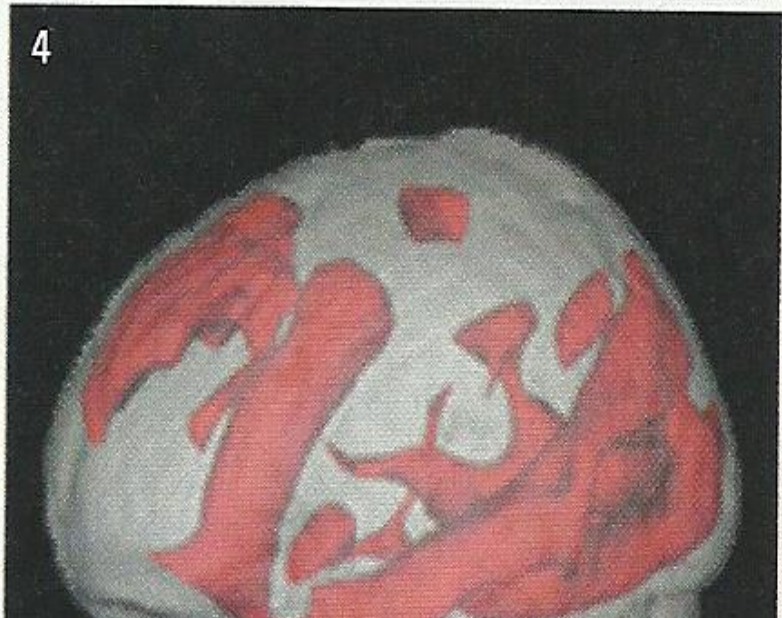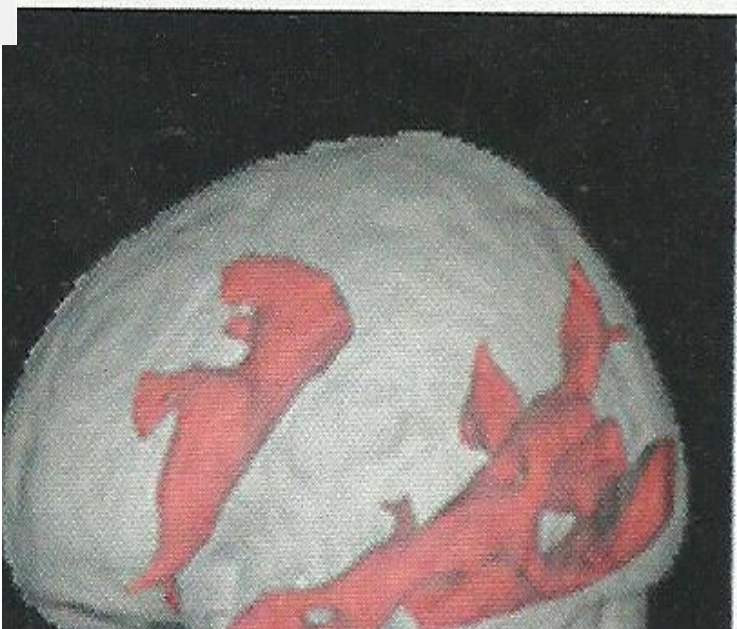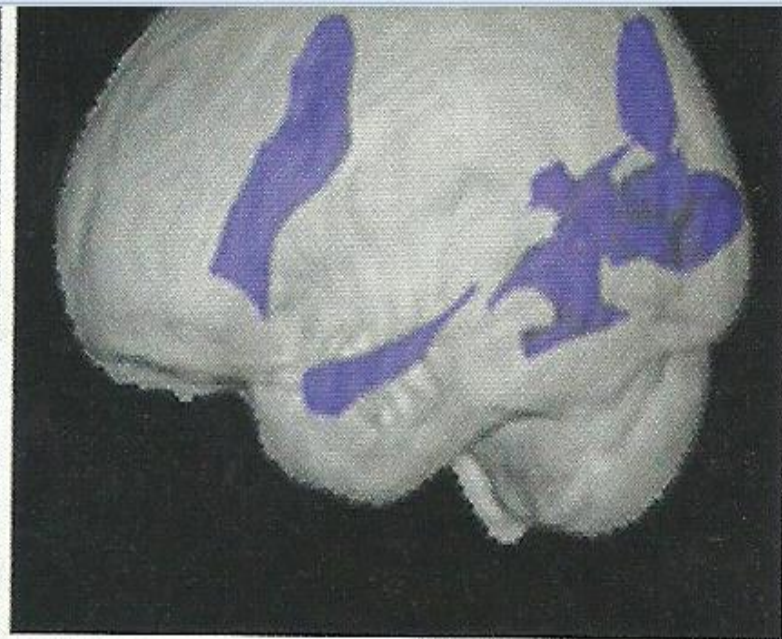[...]enhuber, *Trends Neurosci.*, 27, 72, 2004.
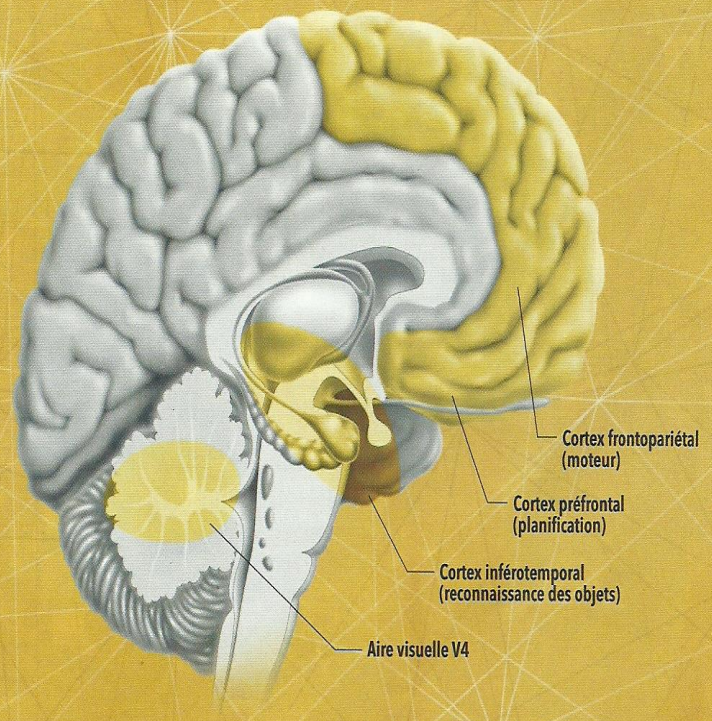
Cortex frontopariétal (moteur)
Cortex préfrontal (planification)
Cortex inférotemporal (reconnaissance des objets)
Aire visuelle V4

VIDEOGAMES

READING   INTERNET SEARCH
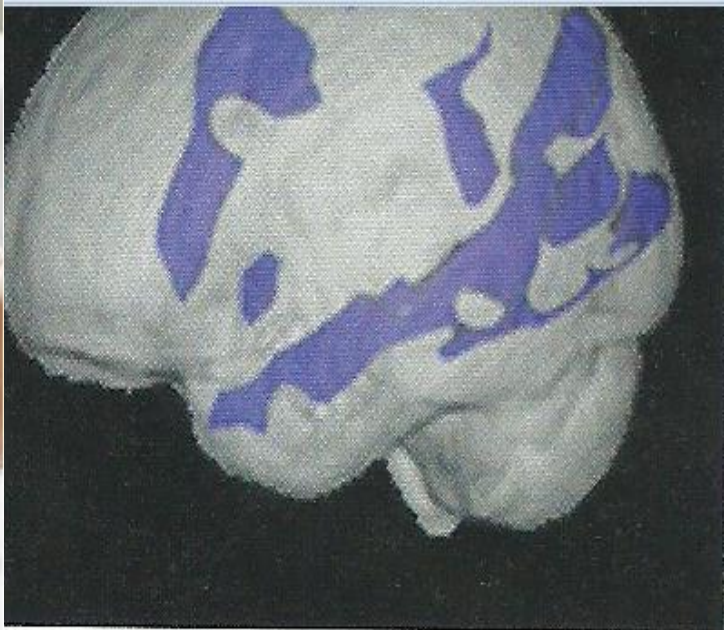
Internet and the brain

- Dinosaurs do not read screens as they were a book.

- Search activates, in dinosaurs, the same areas as reading plus many more; in any case much more areas compared to natives.

- The memory of dinosaurs has changed: they keep the path to information not the information itself.

- Synchronic multi-parallelism of natives causes loss of concentration & reduction of efficiency.

Internet and the brain

- Digital environment does not favor learning.

- No evidence that Internet addiction exists as a pathology (no consensus here).

- No evidence that violent games trigger violent behaviors but they do provide learning of exceptional visual spatial capacities.

FIRST CONCLUSION

- Teachers have a high responsibility mission to help digital native learning, specially in metabolize information into knowledge.

- Information literacy
  - Concentration as a value and an intellectual asset.
  - The teacher complex in front of digital natives is toxic!!!

DIGITAL DIVIDE

"Digital divide, social divide, paradigmatic divide "

july 2007

http://funredes.org/mistica/english/cyberlibrary/thematic/

(also in Spanish and French)

The hurdle track from
Information & Communication Technologies (ICT)
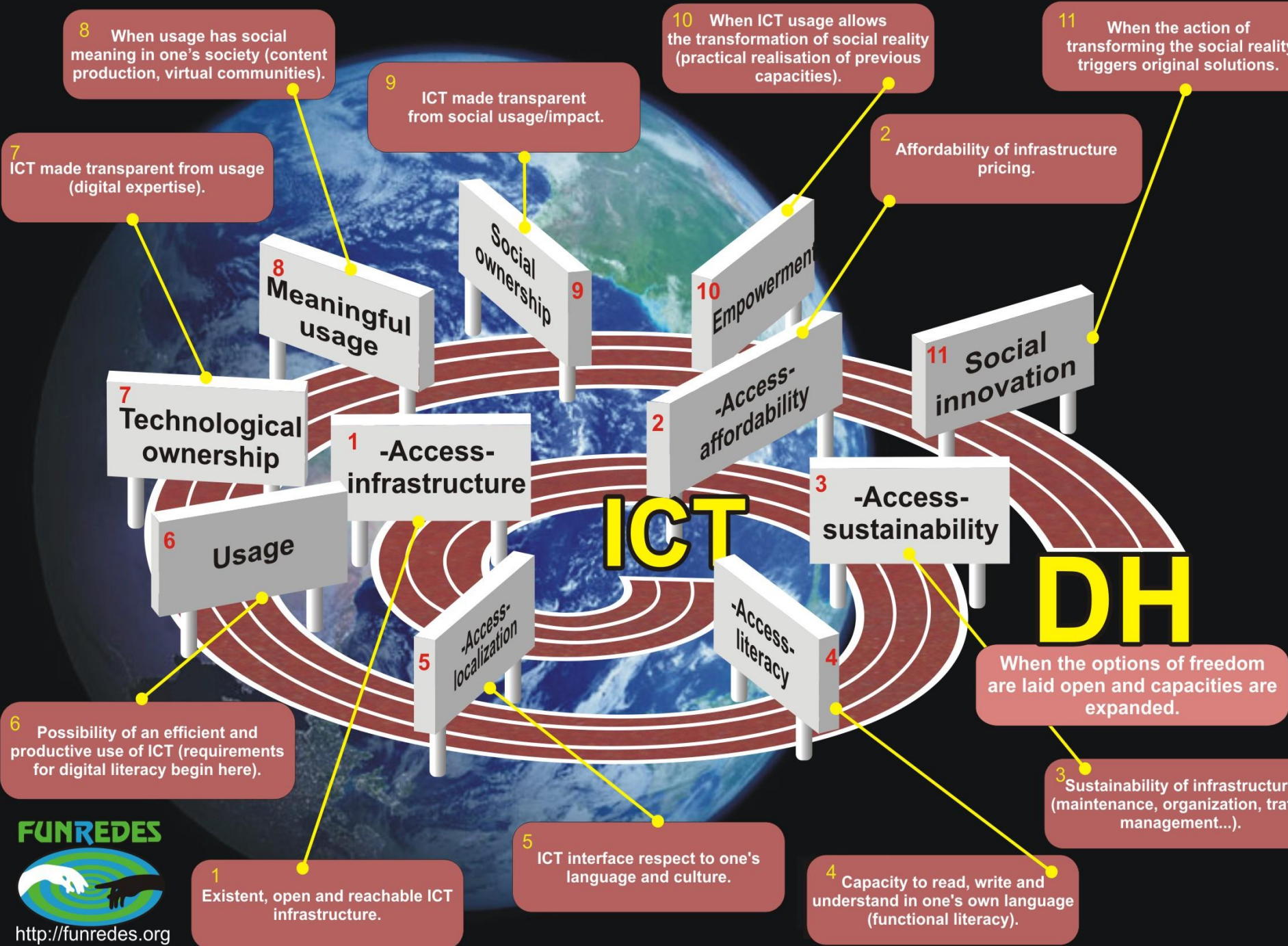# to ICT for Human Development (ICT4HD)
and the process minded approach

ICT

HD

Concepts: Daniel Pimienta
Collaboration: Álvaro Blanco
Graphic Design: Claudio Pizetiti (gerencia@i95digtal.com.ar)

8 When usage has social meaning in one's society (content production, virtual communities).

9 ICT made transparent from social usage/impact.

10 When ICT usage allows the transformation of social reality (practical realisation of previous capacities).

11 When the action of transforming the social reality triggers original solutions.

7 ICT made transparent from usage (digital expertise).

2 Affordability of infrastructure pricing.

8 Meaningful usage

9 Social ownership

10 Empowerment

11 Social innovation

7 Technological ownership

1 -Access-infrastructure

2 -Access-affordability

3 -Access-sustainability

6 Usage

5 -Access-localization

4 -Access-literacy

ICT

DH

When the options of freedom are laid open and capacities are expanded.

6 Possibility of an efficient and productive use of ICT (requirements for digital literacy begin here).

3 Sustainability of infrastructure (maintenance, organization, traffic management...).

5 ICT interface respect to one's language and culture.

4 Capacity to read, write and understand in one's own language (functional literacy).

1 Existent, open and reachable ICT infrastructure.

FUNREDES

http://funredes.org
(contact@funredes.org)

Mientras que los componentes de las telecomunicaciones, del hardware y de software son requisitos previos y previsibles, los pilares verdaderos de las sociedades de información centradas en el humano (sociedades de los saberes compartidos) son la EDUCACIÓN, la ÉTICA y la PARTICIPACIÓN articuladas como un proceso sistémico.

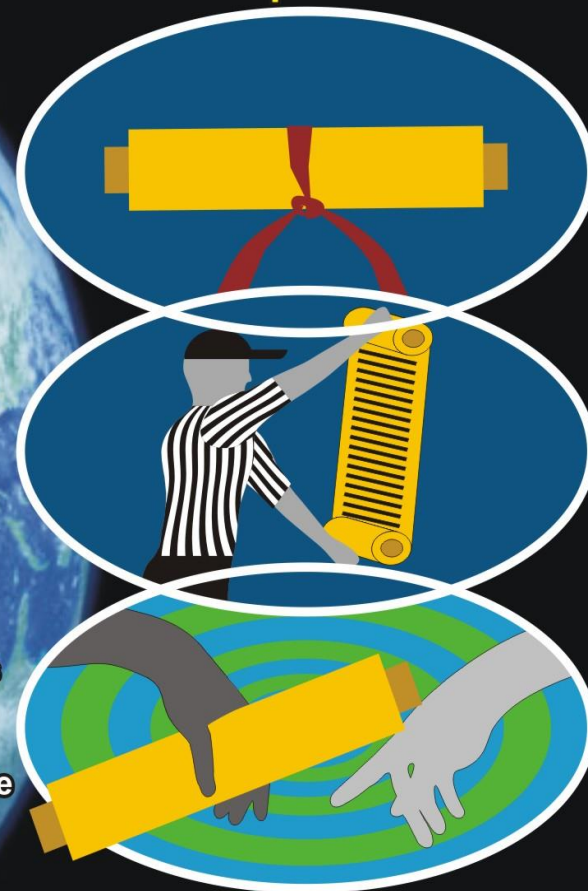**Educación en cultura**
- de red
- de infomación
- de procesos

Ética
- de red
- de información
- de procesos

Participación en
(durante todo el proceso y multisectorialmente)
- la creación de políticas públicas
- el diseño de aplicaciones
- todas las etapas del proceso de construcción de la sociedad de información.

Referencias:
- "Development as Freedom", Amartya Sen, Oxford University Press (1999)
- "Trabajando la Internet con una visión social", Comunidad virtual Mistica, (2002)
  http//funredes.org/mistica/castellano/ciberoteca/tematica/esp_doc_olist2.html
- "Measuring linguistic diversity in the Internet: models for development and measurement"
  D. Pimienta, in Unesco (2005)
  http://www.uis.unesco.org/template/pdf/cscl/MeasuringLinguisticDiversity_Fr.pdf (Francés)
  http://www.uis.unesco.org/template/pdf/cscl/MeasuringLinguisticDiversity_En.pdf (Inglés)

FUNREDES
http://funredes.org
(contact@funredes.org)

Second conclusion

- This work showed the undervalued importance of Information Literacy in the digital divide.

- The main reason of the undervaluation is the unique focus on <u>access</u> neglecting the language divide and the content divide.

¿SO INFORMATION LITERACY IS ONLY IMPORTANT SO TO BECOME A GOOD PROFESSIONAL?

No!!!!!!!

¿TWO MAJOR CHALLENGES OF TODAY ARE ALSO CONCERNED…

… by the emergency to develop information literacy strategies and programs

NEWS

LIVE

NEGRESCO

AFP: LOCAL OFFICIAL SAYS THE
DRIVER OF THE LORRY HAS BEEN KILLED

news.com · OUND 60 PEOPLE HAVE BEEN KILLED AFTER A LORRY HIT A CROWD OF PEOPLE CELEBRATING

¿WHAT RELATIONSHIP BETWEEN INFORMATION LITERACY AND ISLAMIST TERRORISM?

The weakness in information literacy and specifically the lack of capacity to evaluate information are broth culture for :

➢ **Conspiracy theory**

➢ **Simplistic racist explanations**

➢ **Hate propagation via the Net**

➢ **Radicalization via the Internet**

Third conclusion

- **Information literacy** is certainly not <u>the</u> solution to terrorism but it could contribute to reduce its propagation.

1000 mb Wind vectors [m/s]
Sea level SL Pressure [mb]

GFS analysis for 06Z 15 JUL 16
GFS analysis for 06Z 15 JUL 16
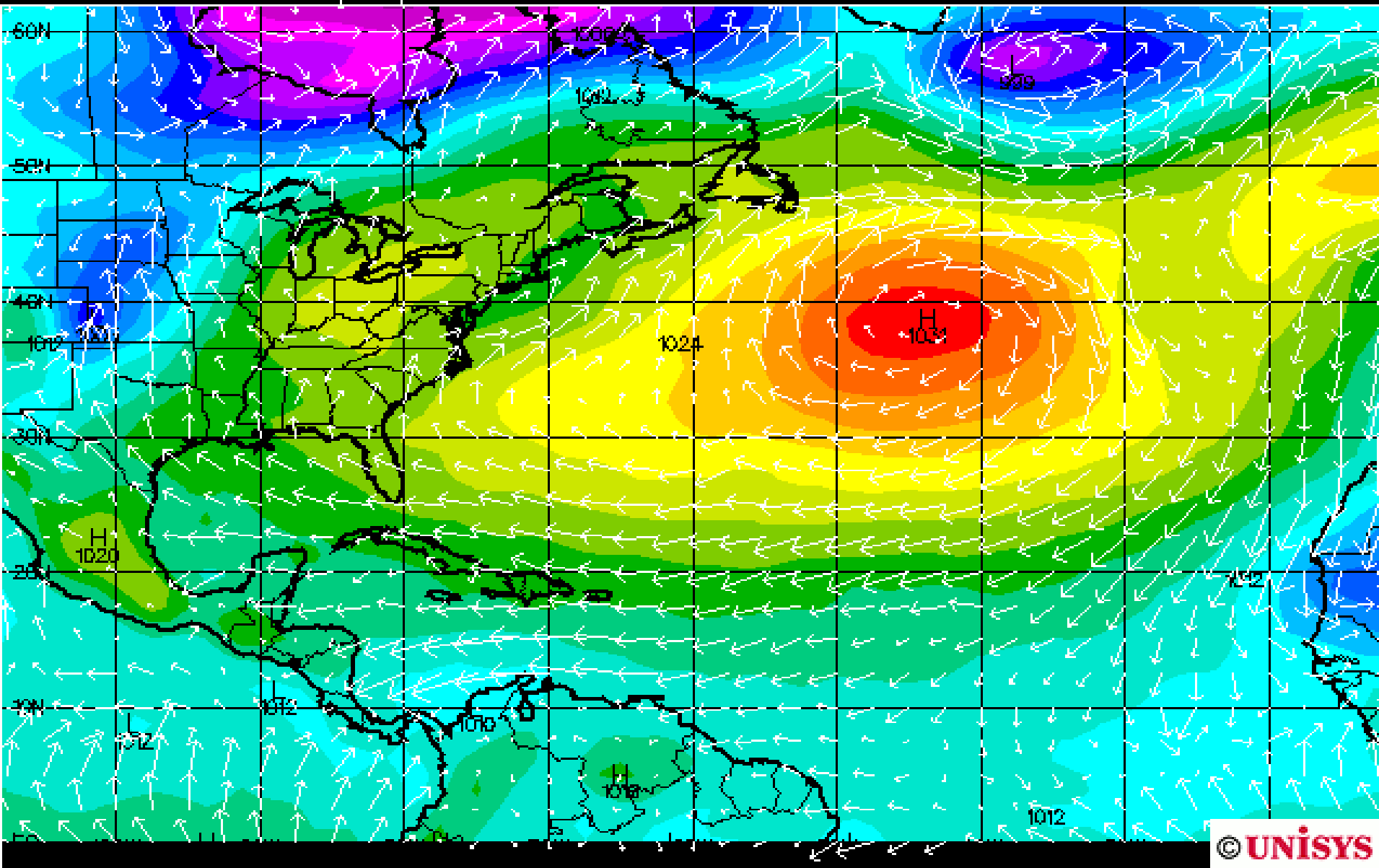
©UNISYS

Max vect 28.2

WHAT RELATIONSHIP BETWEEN INFORMATION LITERACY AND GLOBAL WARMING???
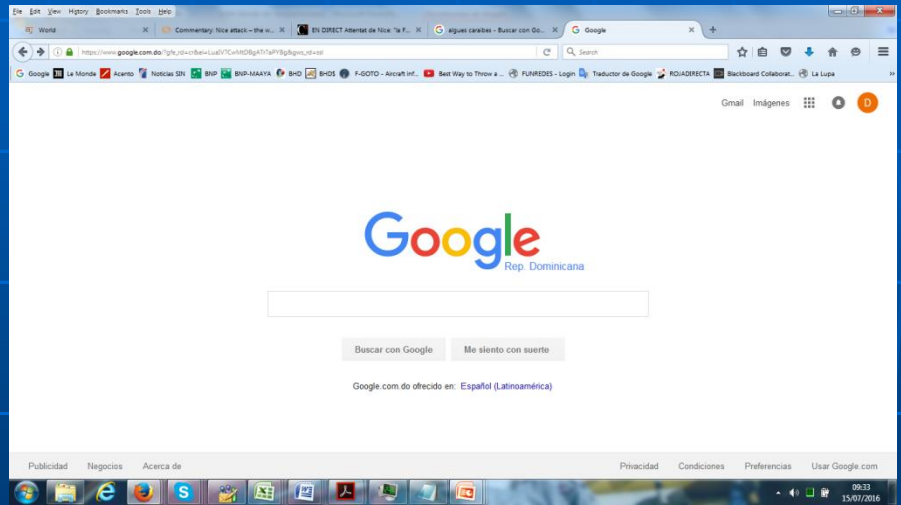
¿WHICH SITUATION PRODUCE MORE CO2?

2007 data : IMPACT of 2%
Source : www.researchgate.net/publication/228365136_
Estimating_Total_Power_Consumption_by_Servers_in_the_US_
and_the_World, J.G. Koomey

¿What will be the percentage of electric consumption due to the Internet in 2020?

➢ **Traffic growths as the square of number of users.**

➢ **Internet bandwidth has an exponential growth**

➢ **Video traffic will go over 80% of total Internet traffic by2020**

Source : Cisco Visual Networking Index: Forecast and Methodology,

Now what is the percentage of non ethical traffic on the Internet?

Fake news chains
Duplicated download
False files in P2P
Email and web spam
Etc...

Probably more than 33%

Fourth conclusion

One third of huge Internet impact on global warming is due to wrong management of information.

Learning <u>ecology of information</u> is not only a desired competency for professionals, it is also a priority for our societies.

NOW SOMETHING RATHER ALARMING TO THINK ABOUT

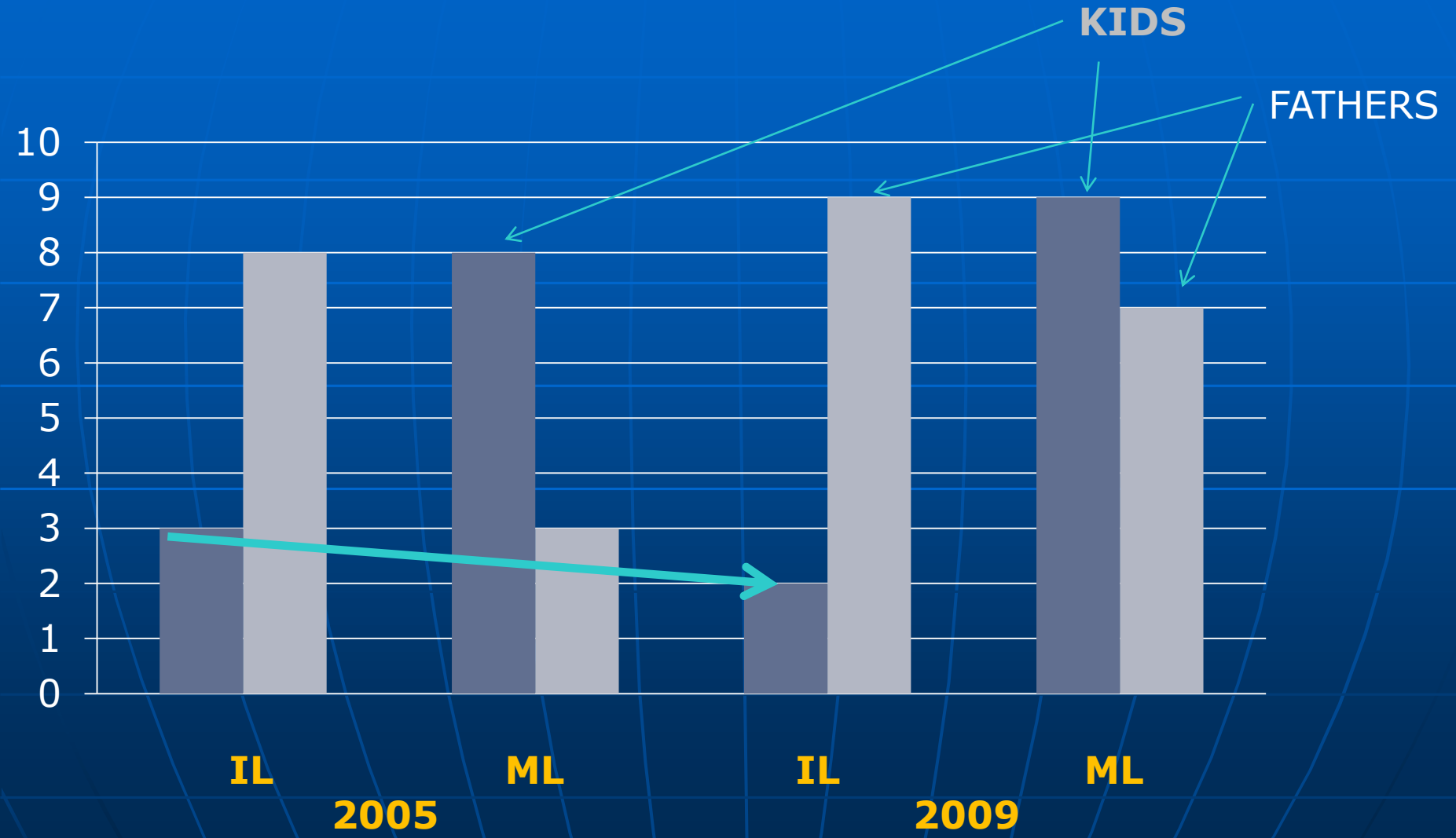Y. Eshet-Alkalai, and E. Chajut, "Change over time in Digital Literacy",

Cyberpsychology & Behavior, Volume 12, Number X, 2009

In a school in Israel, researchers

measured the respective level of MIL of a group of students and their parents,

separating M and I measures

and repeated the measurement of the same sampling 4 years later.

RESULTS

Fifth conclusion

If nothing is done the level of information literacy of youngsters will not only be low but it will keep dropping overtime!!!

Something to get extremely worried…

FINAL CONCLUSION

Information literacy **(much more than media literacy or imbedded with it)** is an urgent emergency worldwide.

Today we have more than 4 billions people connected (over 7.5) and aiming to connect the next 2...
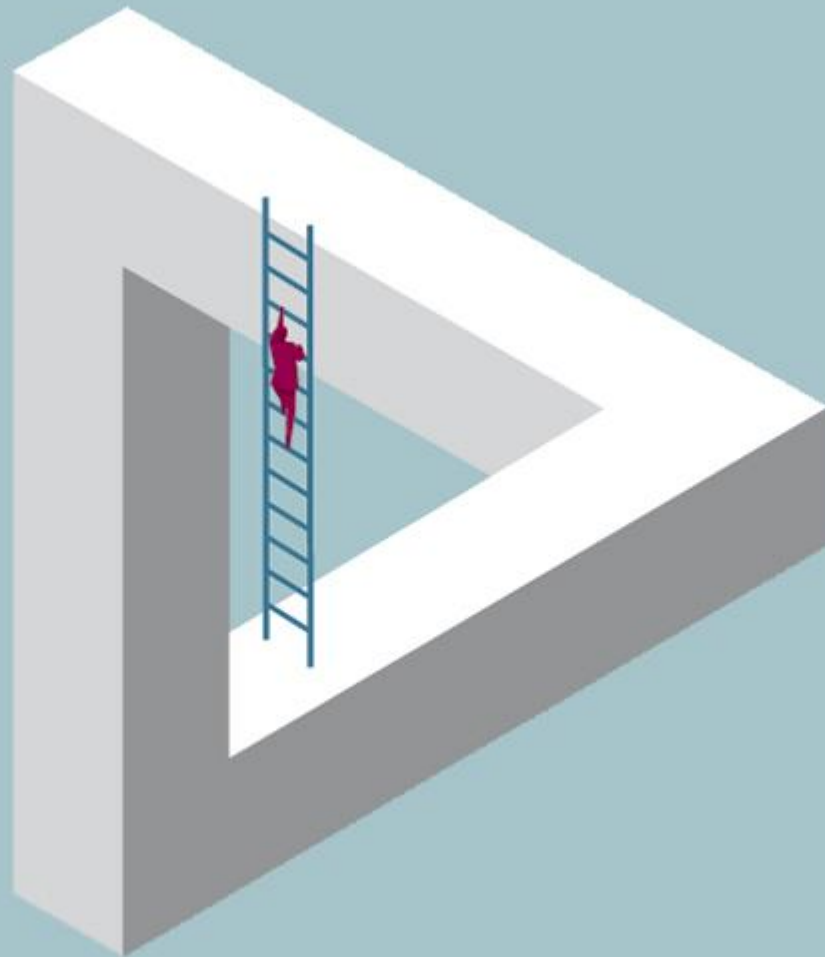
How many of them are information literate?

HOW ABOUT SOLUTIONS?

→ MIL AS an urgent priority for policies concerning the whole education system from primary to university, but not only (librarians, NGOs and other innovative channels to be involved so to reach out fast and largely)

→ What else?

THE WEB 2.0 PARADOXES AND LEARNING FROM EXPERIENCE

Why virtual communities was one of the most wonderful asset of Internet 1.0 and social networks are such a 2.0 mess?

WEAPONS OF

You Tube

MASS DISTRACTION

VIRTUAL COMMUNITY	SOCIAL NETWORKS
ADRESS CLOSED GROUPS	**OPENESS TO THE WORLD**
RULES & MUTUAL RESPECT	**UNRULED & MUTUAL IRRESPECT**
MODERATION NOT CENSORSHIP	**CONFUSION ON FREEDOM OF EXPRESSION**
SENSE OF COMMON VALUES & GOALS	**"CAFÉ DU COMMERCE", VIOLENCE and HATE**
MANAGE COMPLEXITY	**DENIAL OF COMPLEXITY**

SOCIAL NETWORKS

- The "café du commerce" syndrome
- The "watch movie at home" syndrome
- The blurring of privacy frontiers
- The un-censorship as a trigger for freedom of (racist) expression
- The anonymous as a freedom of (hate) expression.

"On the Internet, nobody knows you're a dog."

PARADOX

Why at the same time 2.0 users have lost their privacy and being anonymous allow many of them to vomit their hatred and racism without fear (on the name of freedom of expression**)?**
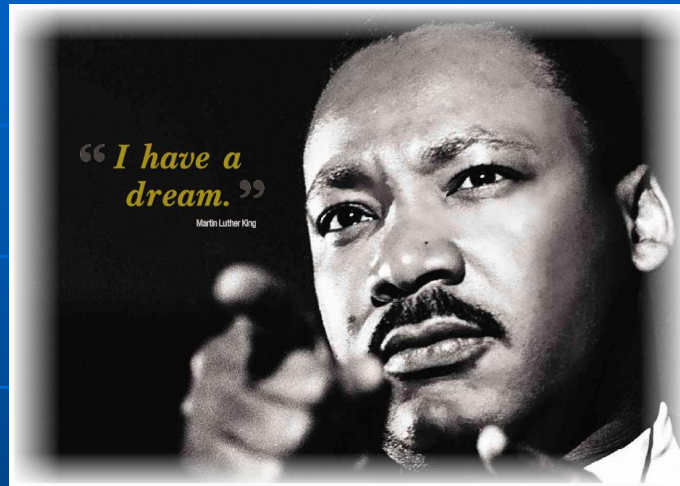
NAÏVE SOLUTIONS

- Learning from virtual communities

→ **Stop anonymousness**

→ **Learn moderation** as a high level job (not easy to pass to a robot)

→ **Add complexity learning** to Information literacy curriculum.

VERY NAIVE SOLUTION UTOPIA

An Internet were the <u>business model</u> is NOT based on advertisements but on pure information theory.

THE MODEL IS BASED ON INFORMATION THEORY AND THE REAL VALUE OF INFORMATION (AS OUR UNIVERSE).

CONSEQUENTLY

<u>WE PAY</u> FOR SERVICES AND INFORMATION

AS AN EXAMPLE
-1 US$ 10 000 mails sent
-1 US$ for 10 000 searches
- A fair price for each information instead of a swap with my personal data

I GOT THE (INTERNET) BLUES

IN THIS UTOPIAN MODEL

WE GET RID OF THE MOTHER OF THE FAKE NEWS :
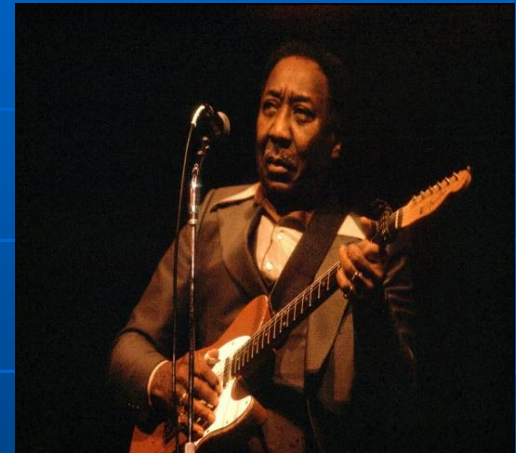INTERNET IS A FREE LUNCH

AND:

SPAM DISAPPEARS NATURALLY

SEARCH CORRUPTION DISAPPEARS

THE ECOLOGY OF INFORMATION BECOMES A VIRTUOUS CIRCLE

YET BUSINESS PLAYERS (SEARCH ENGINES, ISPs, NEWSPAPERS, INFORMATION PROVIDERS,...) MAKE THEIR FAIR AMOUNT OF BENEFITS WITHOUT PAYING THEMSELVES WITH OUR LOST PRIVACY.

I GOT
THE (INTERNET)
BLUES

➢ **INTERNET WAS AN ACTING UTOPY FROM ITS BEGINNING.**

➢ **THIS UTOPY WAS DESTROYED IN EARLY MILLENIUM WHEN GOOGLE IMPOSED ITS BUSINESS MODEL BASED ON ADVERTISMENTS REVENUES.**

➢ **EVERYTHING NOW RESPONDS TO THE LOGIC OF ADVERTISMENTS.**

➢ **NOT ONLY WE ARE NO MORE USERS BUT PRODUCTS (AND THEY ARE USING US)…**

➢ **…BUT MANY HAVE LEARNT NOW TO BEHAVE LIKE SELF-ADVERTISMENTS.**