

Children and Technology

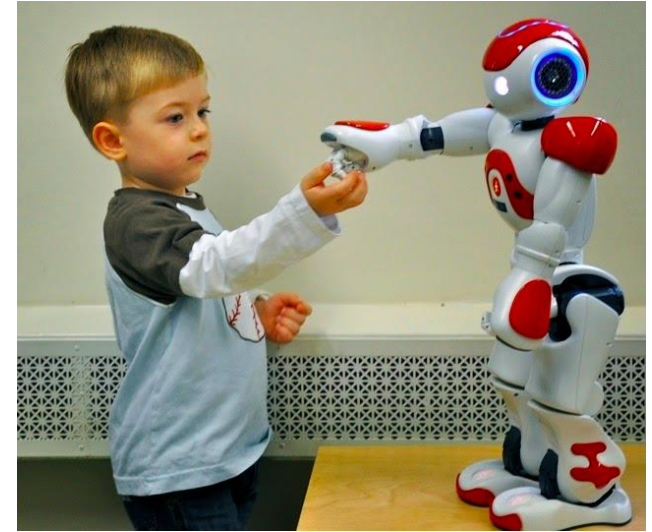
Benefits, risks and current debates

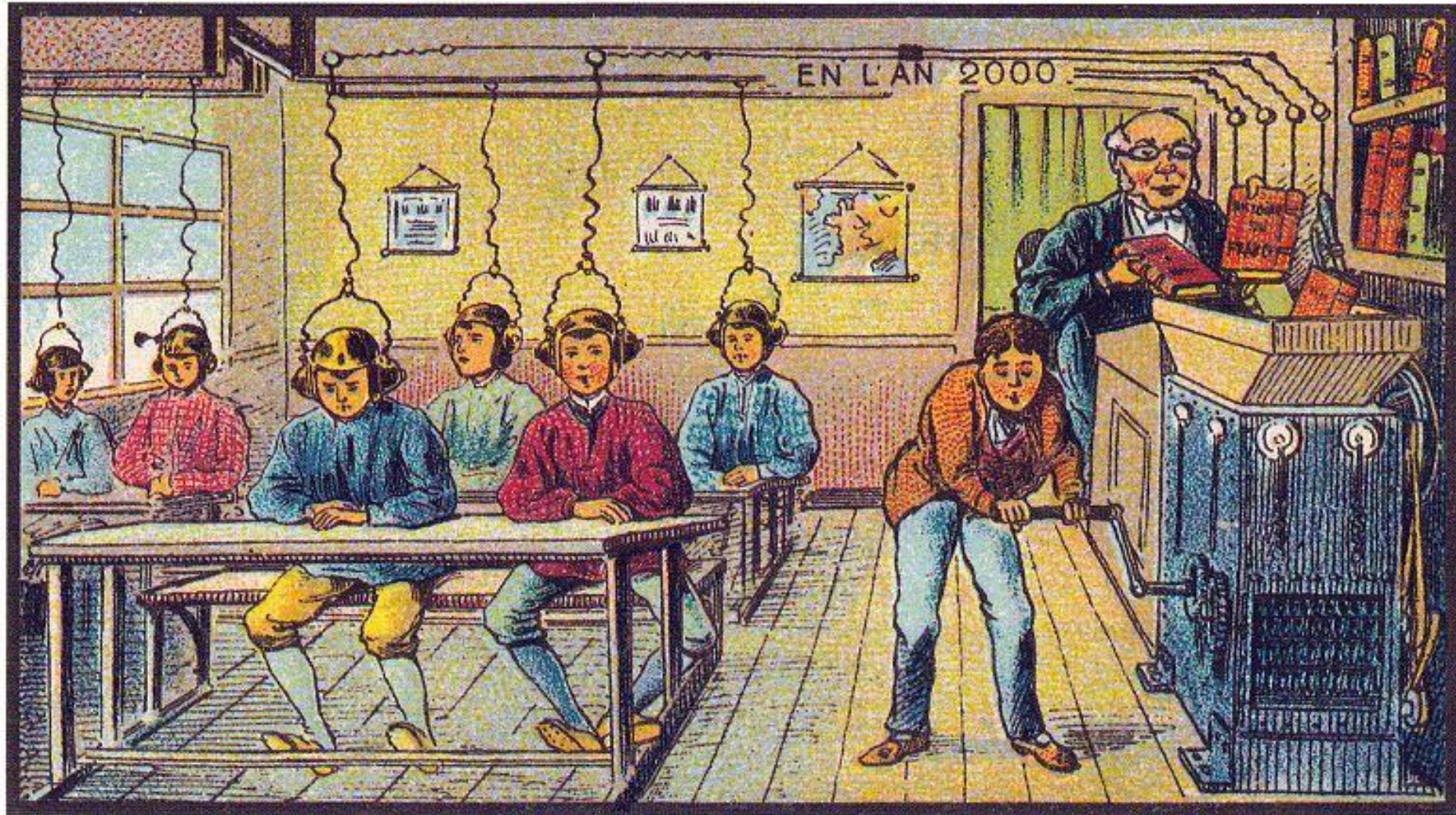
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Agenda

- Technology in education
- Risk and benefits debate
- Technology addiction
- Opportunities and Protective factors

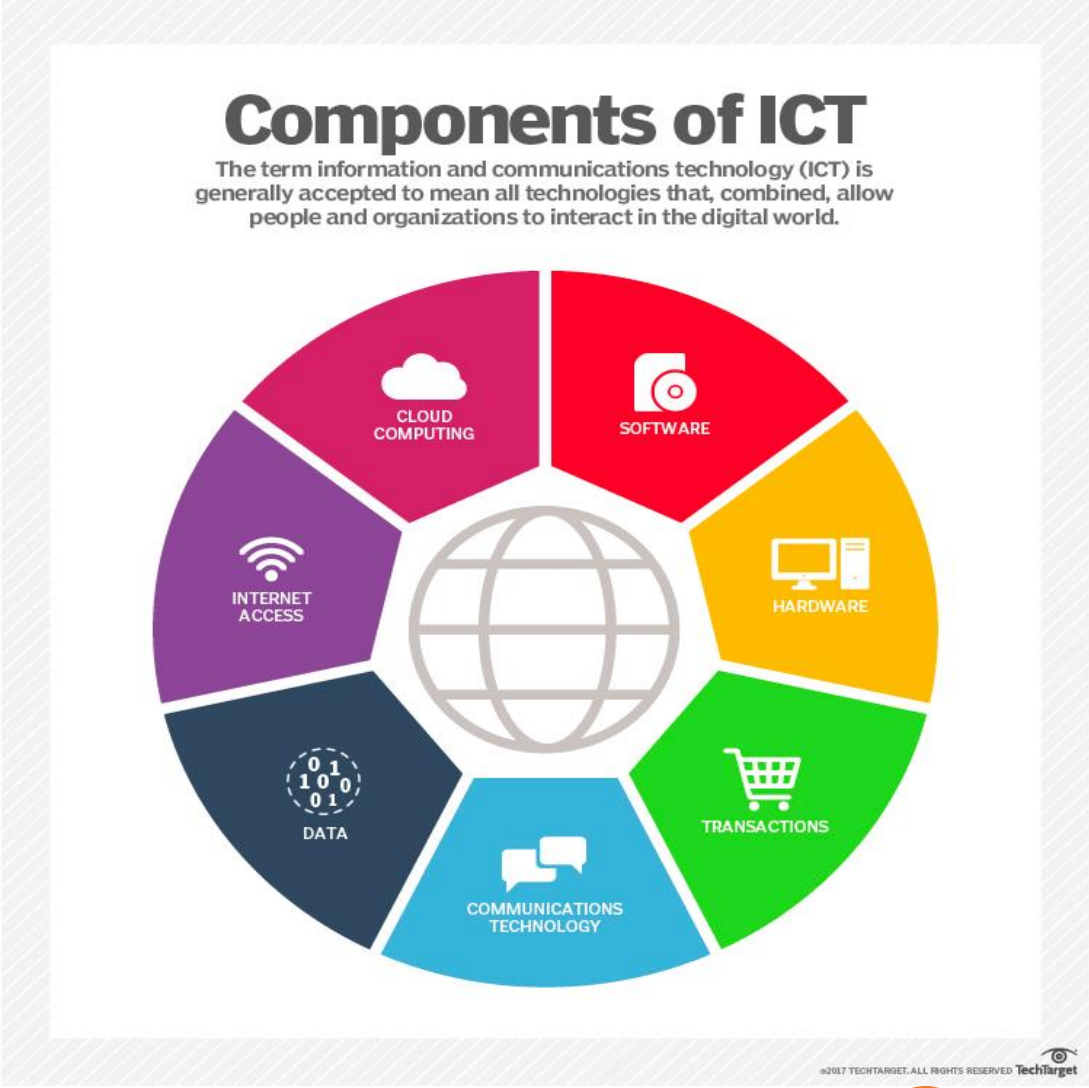




At School

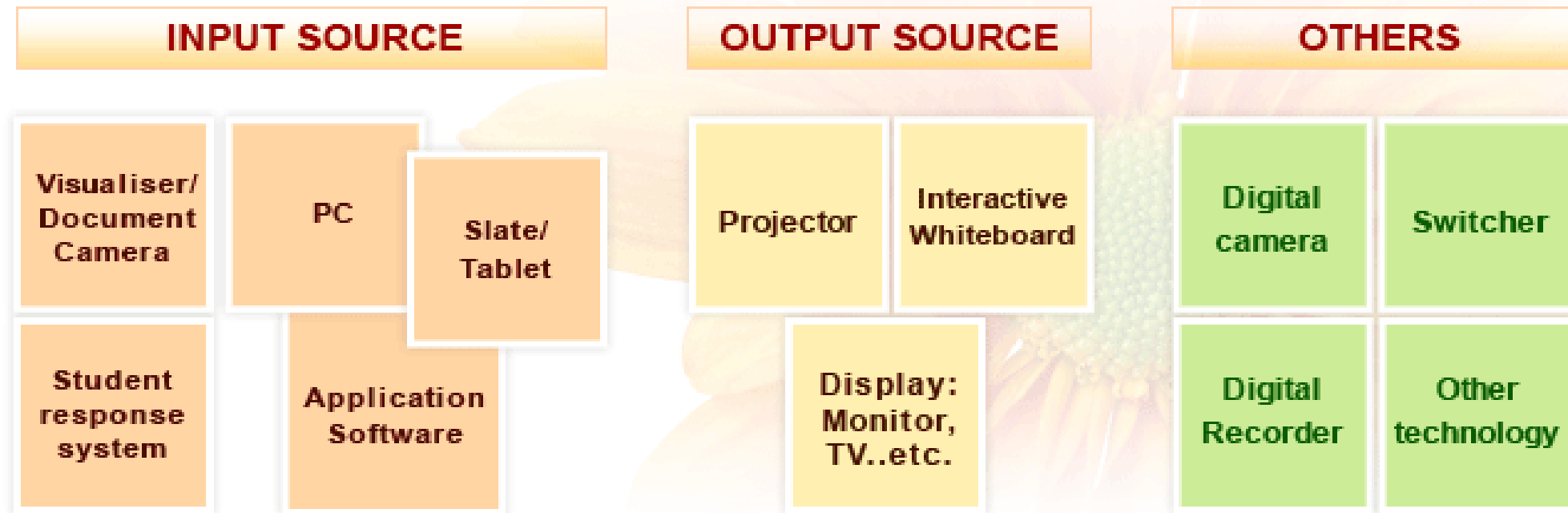
Jean Marc Cpte's (1899) vision of the year 2000

Information and **Communication** Technologies



IT → ICT → Computing

ICT tools



In 2017 pupils in UK were expected to use technology for 58 % of learning time



Department
for Education (2013)

“Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as **active participants in a digital world.**”



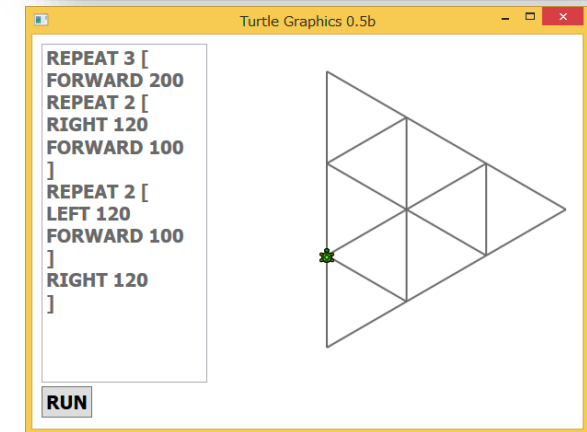
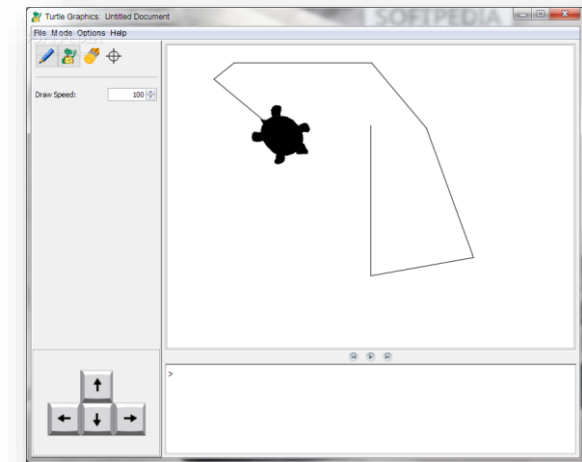
“A high-quality computing education equips pupils to use computational thinking and **creativity to understand and change the world.**”



“All pupils should be able to analyse problems in computational terms, and have repeated **practical experience of writing computer programs** in order to solve such problems.”



Turtle graphic - programming



“Children are attracted to technology, it’s engaging. I taught them to count by dragging fish in the tank”
(Nursery Teacher, London, 2017)

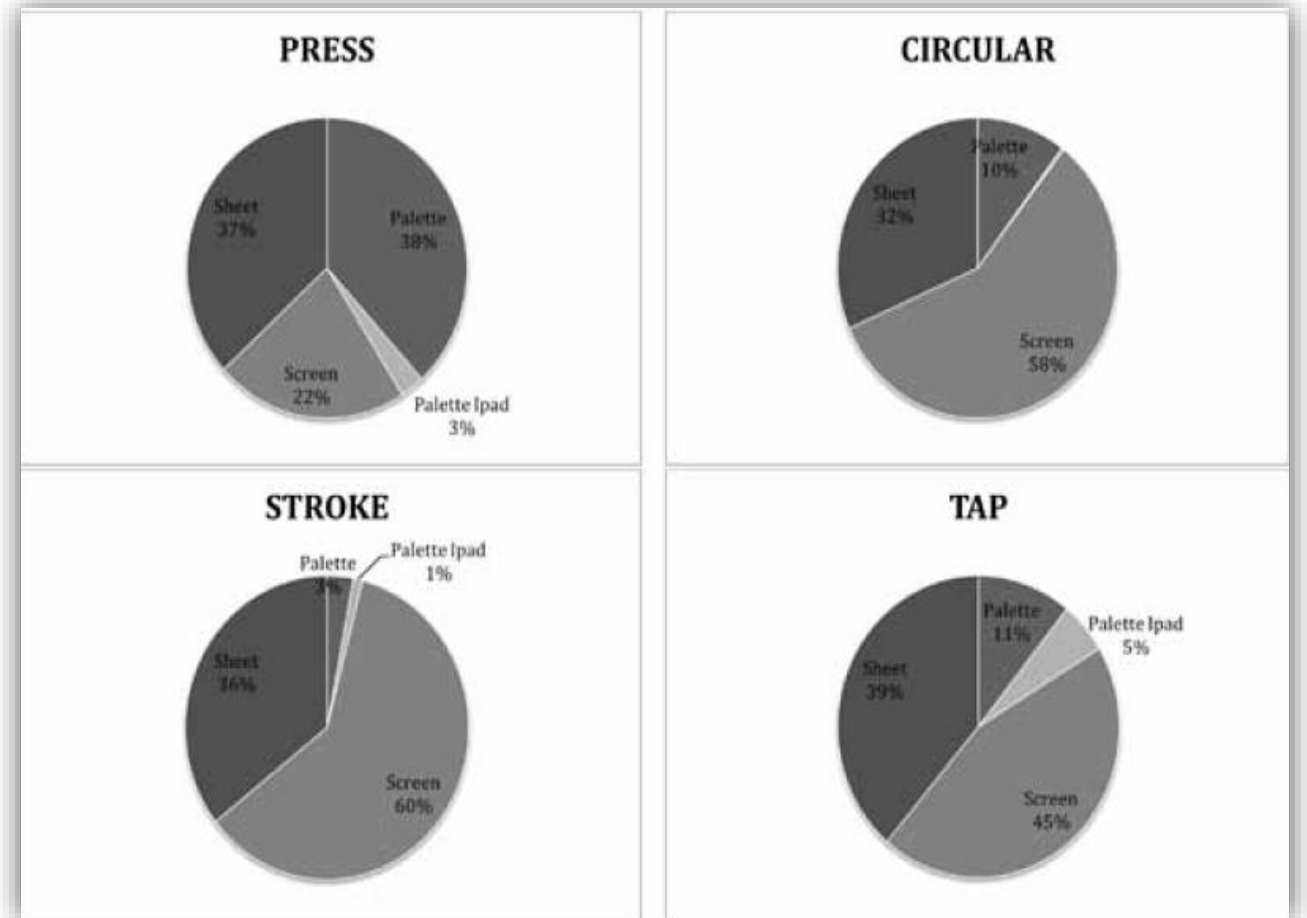
“I enjoy using technology with children. I think that it has lots of benefits if used in the right way and for the right length of time”
(Nursery Teacher, London, 2017)

The role of touch: Ipad vs paper finger painting

Participants were seven children aged between 27 and 37 months from a London nursery school.

Each child performed 5 individual activities; exploring the three applications on the iPad, and finger-painting on a blank sheet of paper and the sheet with a pre-drawn image.

Data was collected using video capture from a number of different perspectives, generating a total of 7 video streams (detailed in this section).



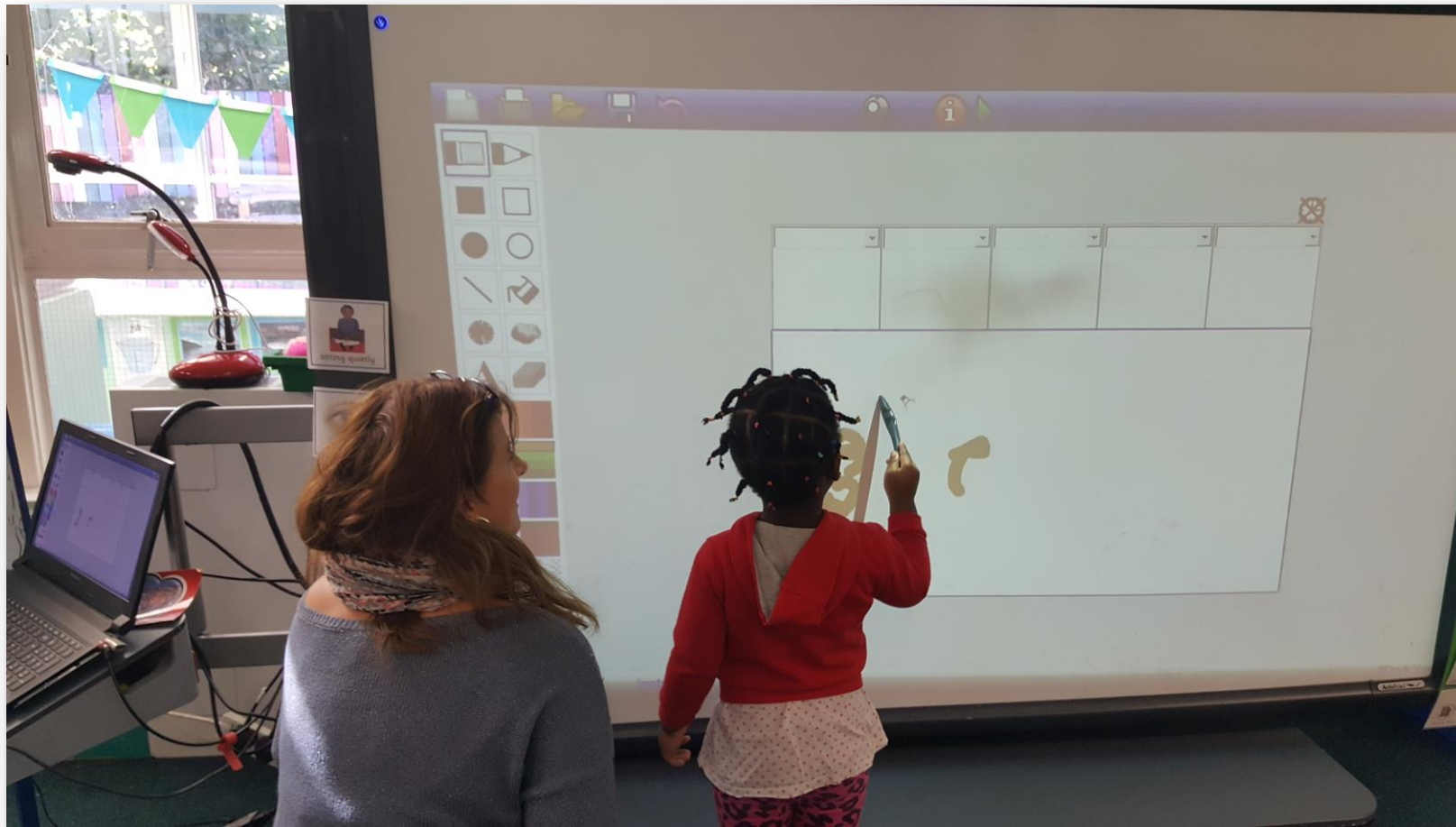
Ipad vs paper painting

GAINS

- The use of a **wider range of types of touch**
- **More touches** in a period of time – ‘faster’
- More **continuous touch sequences**
- **Longer sequences** of continuous touch
- **More complex** sequences/repertoires of touch

LOSSES

- The quantity and **range of fingers** used is restricted
- The **range of qualities of touch** used (i.e. differences in pressure) is limited
- **Several sensory features of touch are lost**, in particular, the haptic and tactile, textural experience of paint, which has been identified as an important aspect of infant development.
- Potential **periods of reflection** are reduced by removing the rhythm of movement from the paper to the paint-palette that create moments of distance and objectification



“Smart board painting apps can help children who are not confident in holding a pen or draw on paper, one child started to draw on paper after using touch screen painting apps” (Teacher at Gayhurst Nursery, London)

“Luminous tablet helps children with sensory disorders” (Nursery teacher, London)

Virtual reality



Ferry et al. (2004) state that “Whilst we acknowledge that a simulation is only a representation of real-life, there are features that can enhance real-life experience. For example, a simulation can provide authentic and relevant scenarios, make use of pressure situation that tap users’ emotions and force them to act, they provide a sense of unrestricted options and they can be replayed”



Robot education



[KASPAR the robot](#) has been created at the University of Hertfordshire in 2015 - been teaching autistic toddlers in the UK about human emotions and feelings.

A group of 54 multidisciplinary ASD practitioners confirmed that KASPAR can help with 'communication', 'social/interpersonal interaction and relations', and 'play', but also in objectives related to 'emotional wellbeing' and 'preschool skills'.

(Huijnen et al. 2016)

The MOnarCH project (Multi-Robot Cognitive Systems Operating in Hospitals), Lisbon

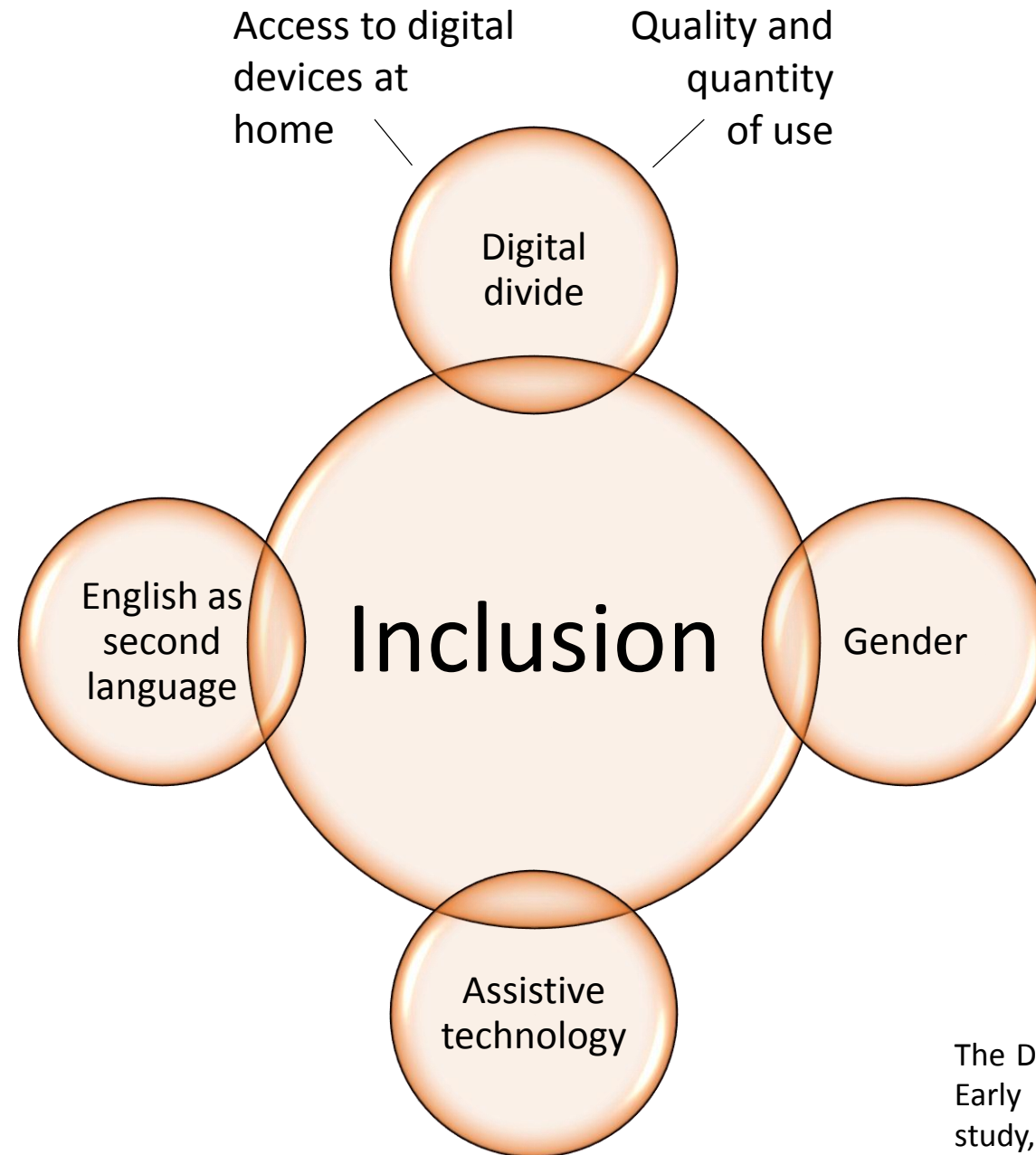
involves researchers from approximately ten European companies and research centers



Robots could help solve social care crisis, say academics (bbc, January 2017)

- In 3 years there will be culturally sensitive robots





The Development Appropriate Technology in Early Childhood (DATEC) European funded study, (Siraj-Blatchfor, J & J 2002, 2006)

When it comes to children's use of digital devices and videogames the debate is highly polarised



"Toxic childhood"
(Sue Palmer, 2007)



"Gaming can make a better world"
(Jane McGoing, 2010)

Natives' vs Immigrants (Prensky, 2001)



Digital Natives

- “Digital natives have a very different brain structure than digital immigrants”
- TV vs New technology
- Different style of learning: interactive, random access, visual, twitch speed...incompatible with old styles

Tasposcott (1998)

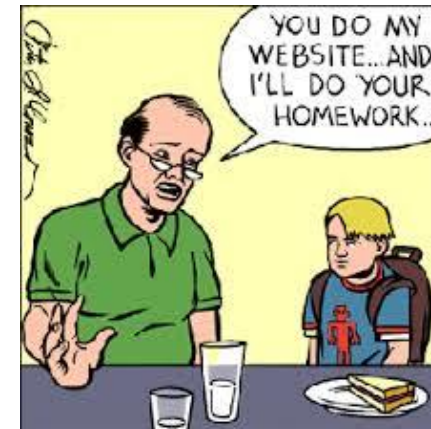
- More complex brain structures, Accelerated development
- Non-linear and learner centered learning
- new form of communication: independence, autonomy, emotional and intellectual openness, innovation, free expression, immediacy and investigative approach.

Digital Immigrants

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"THE COMPUTER SAYS I NEED TO UPGRADE MY BRAIN
TO BE COMPATIBLE WITH ITS NEW SOFTWARE."



Scottish Government (2015) *Literature Review on the Impact of Digital Technology on Learning and Teaching.*

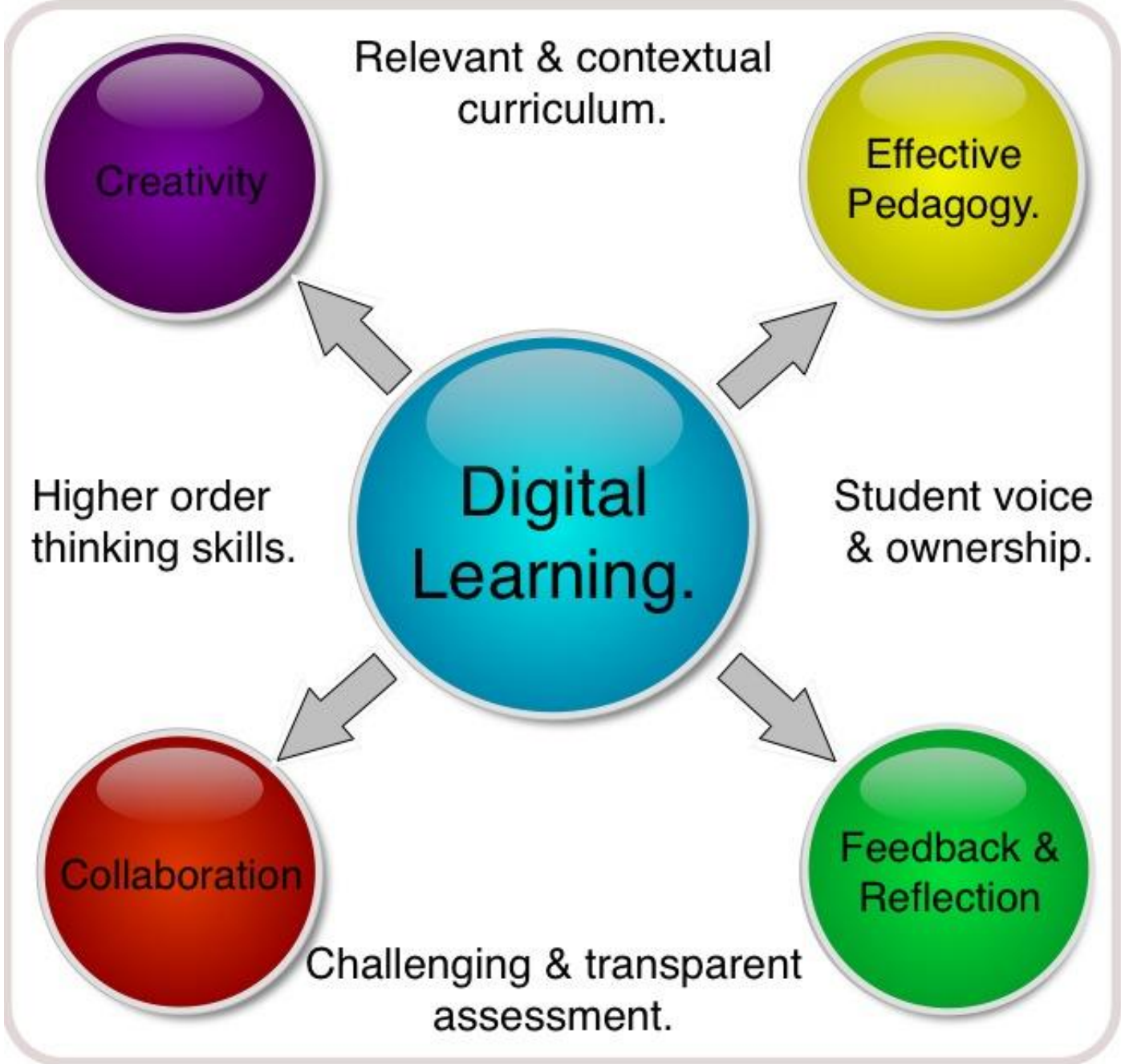
Thematic Area	No of Studies
Raising attainment	100
Reducing inequalities between children	48
Improving transitions into employment	15
Improving the efficiency of the education system	45
Enhancing parental engagement	9
Total	217

Thematic Area	Strength of evidence
Raising attainment	
General	Conclusive
Numeracy/mathematics	Conclusive
Literacy	Indicative
Science learning	Conclusive
Tackling inequalities and promoting inclusion	
Closing the gap in attainment between groups of learners	Indicative
Provide assistance to overcoming the challenges faced by some learners	Promising
Improving transitions into employment	
Improvements in employability skills and knowledge of career pathways	Promising
Enhancing parental engagement	
Improvements in communications with parents	Promising
Improving the efficiency of the education system	
Improvements in time efficiencies for teachers	Promising

Successful implementation of digital learning and teaching

- **Training** and support not only to use equipment but to exploit digital tools and resources for teaching;
- **Overcoming teachers anxieties** about digital teaching, not just about the use of the technology but also the use of different learner centred pedagogies;
- **Allowing teachers to experiment** with technology;
- **Networking with other teachers** and schools; and
- **Maintaining and upgrading equipment** and using tools that are compatible across many systems.

Transparent application



Be aware of health and safety issues

Role of the parents

The Effective Provision of Pre-school Education (EPPE) Project followed 3000 Australian children from 1999 to 2013 (Siraj-Blatchford and Mayo, 2012) and Bhangari et al. (2009) study involved 237 families

Benefits of parental involvement with children's use of technology were shown when they were actively involved, and when there was continuity between home and school, regardless of socio-economic status.

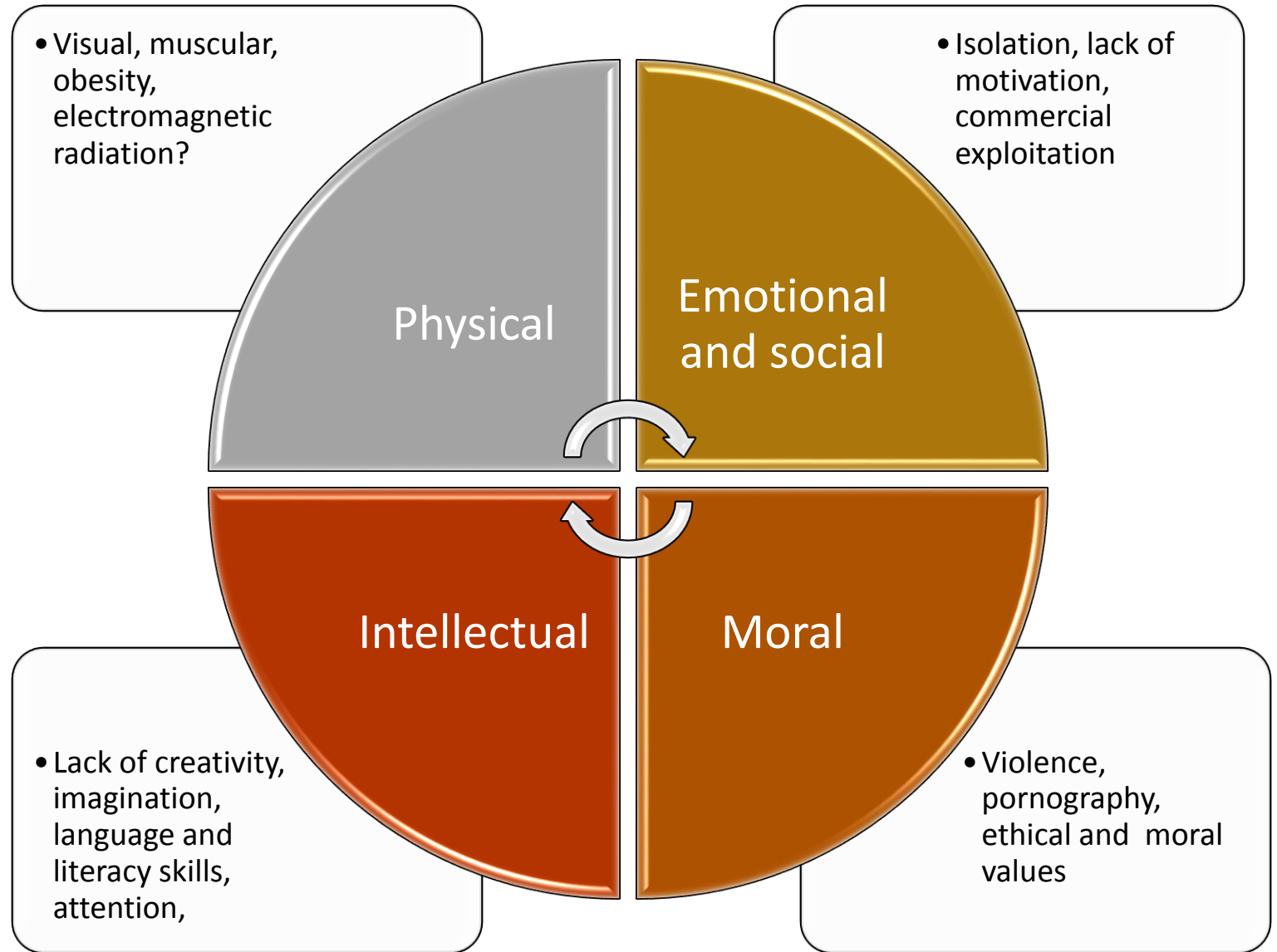
Pragmatic randomised control trial in Swansea, age 3-5 children, (Morgan et al., 2012)

When families were provided with software to use at home and limited pedagogic support children improved in language and numeracy.

DATEC Guidelines

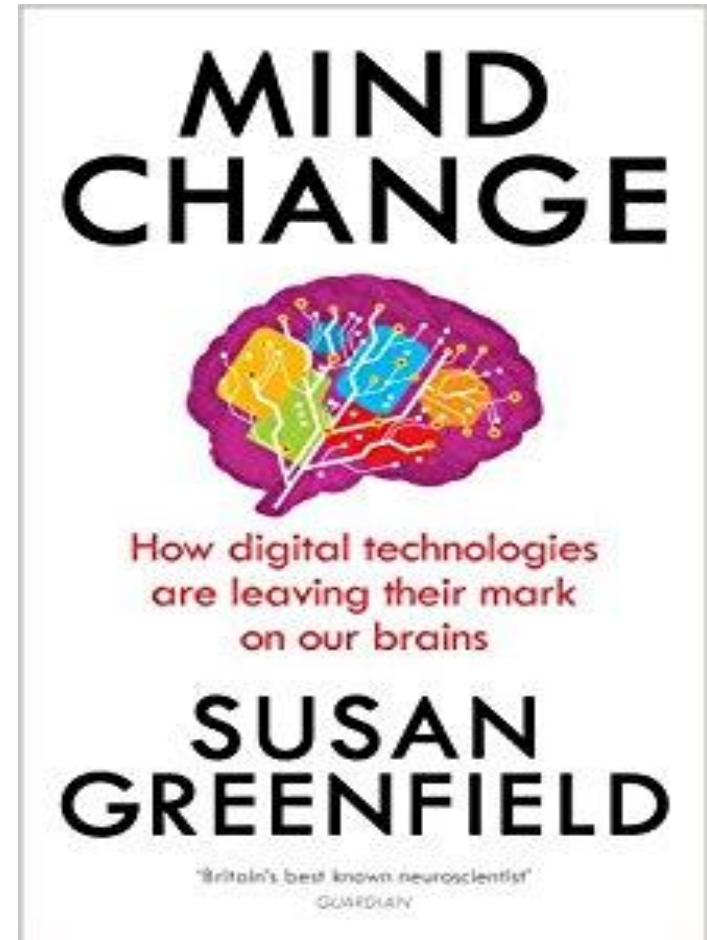
- Sedentary screen viewing no more than 10-20 min for 3 year olds
- No more than 40 minutes for 8 year olds, unless the activity requires more time.
- A study on 1323 children 6-12 year olds found that those who were spending more than 2 hours per day on screens were reporting attentional problems (Swing et al., 2010)





Mind Change (Susan Greenfield, 2014)

- Social Network - Identity
- Heavy internet use and Autistic traits
(ECHOES)
- Video games and attention
(focused vs sustained attention)
- Video games and aggression

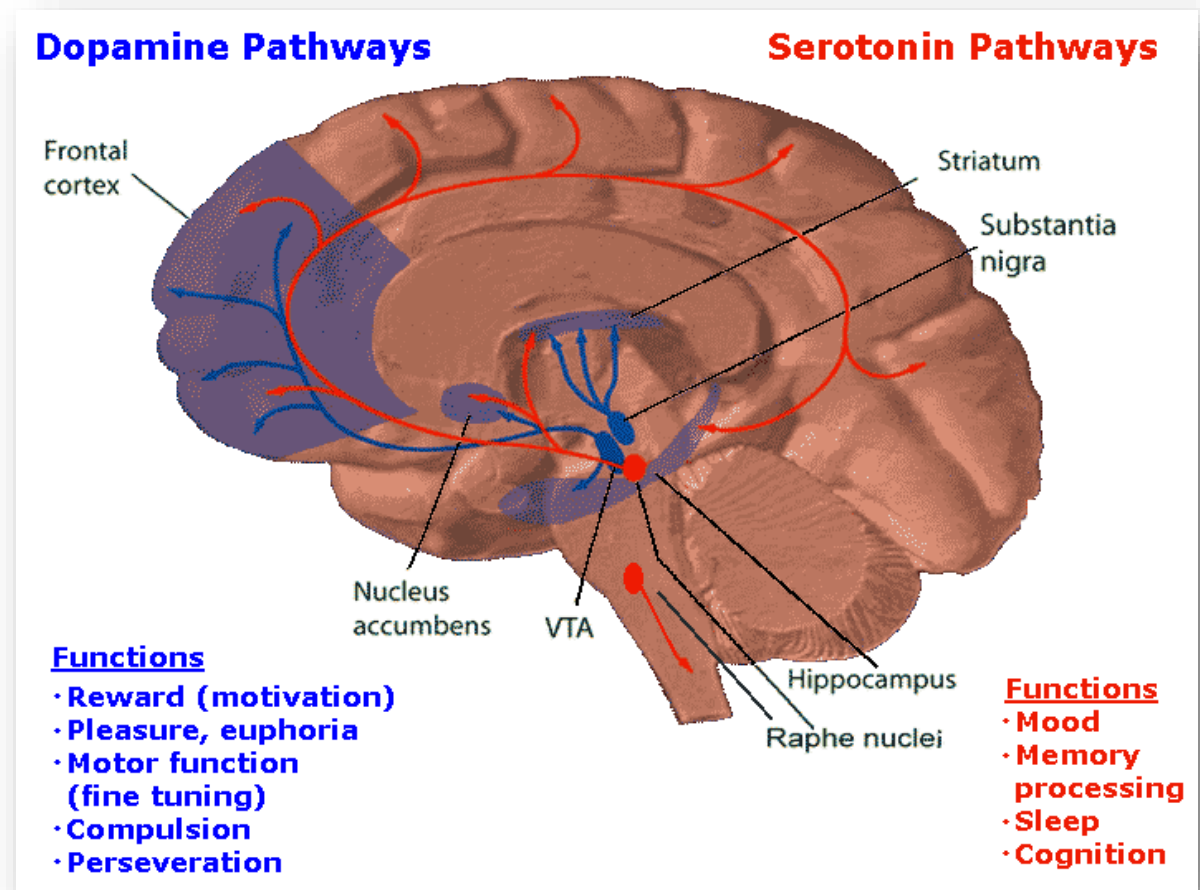


Addiction

- Anything that stimulates pleasure **stimulates dopamine release** in the **reward pathway** like alcohol and drugs and do
- Anything that stimulates the release of dopamine in the reward pathway has the potential to become addictive

What in technology gives us pleasure/stimulates dopamine release?

- Anticipation of winning
- Winning
- Likes
- Sharing
- Approval
- Instant messaging/**Snapstreaks** 🔥



Gamification uses the dopamine reward system

- Gamification is the application of game-design elements and game principles in non-game contexts.
- Gamification takes something that already exists – a website, a training tool, a CRM, an online community, or other enterprise system -- and **integrates game mechanics to motivate participation, adoption and loyalty.**
- Based on Operant Conditioning theory (Skinner, and the concept of "reward")
- Rajat Pahari (founder of [Bunchball](#))
"gamification is motivating people through data, we are walking data generators"
- Gabe Zichermann (1974)



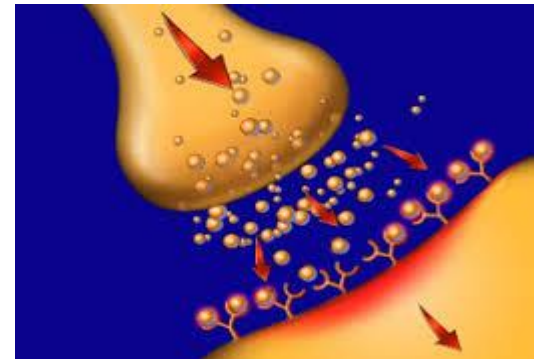
The dopamine lab

- “And so you could ask when these features are being designed, are they designed to most help people live their life? Or are they being designed because they’re best at hooking people into using the product?”

The Dopamine lab, Ramsey Brown

<https://usedopamine.com/>

<http://youjustneedspace.com/>



DSM -V Internet gaming disorders

Repetitive use of Internet-based games, often with other players, that leads to significant issues with functioning. [Five of the following criteria must be met within one year:](#)

- Preoccupation or obsession with Internet games.
- Withdrawal symptoms when not playing Internet games.
- A build-up of tolerance—more time needs to be spent playing the games.
- The person has tried to stop or curb playing Internet games, but has failed to do so.
- The person has had a loss of interest in other life activities, such as hobbies.
- A person has had continued overuse of Internet games even with the knowledge of how much they impact a person's life.
- The person lied to others about his or her Internet game usage.
- The person uses Internet games to relieve anxiety or guilt—it's a way to escape.
- The person has lost or put at risk an opportunity or relationship because of Internet games.

85.5% of children in England belong to a social networking site.

In England, the proportion of young people playing computer games for two hours or more a night during the week increased from 42% to 55% among boys and 14% to 20% among girls between 2006 and 2010.



“Increased screen time and exposure to media is associated with reduced feelings of social acceptance, and increased feelings of loneliness, conduct problems and aggression. Certain internet activity (social network sites, multi-player online games) have been associated with lower levels of wellbeing. Much more recent evidence suggests a ‘dose-response’ relationship, where each additional hour of viewing increases the likelihood of experiencing socio-emotional problems” (Public Health England, Children Mental Health report 2015)

Przybylski, A.K. (2014) "Electronic Gaming and Psychosocial Adjustment ", Pediatrics, 2014, Vol, 134 (3)

- 5,000 young people (10-15 years old), half male and half female, nationally representative study of UK households.
- were asked how much time they typically spent on console-based or computer based games.
- The same group also answered questions about how satisfied they were with their lives, their levels of hyperactivity and inattention; empathy; and how they got on with their peers.

Results: **young people who indulged in a little video game-playing** were associated with being **better adjusted** than those who had never played or those who were on video games for three hours or more.

Internet Gaming Disorder: Investigating the Clinical Relevance of a New Phenomenon (Przybylski et al. 2017)

- The American Psychiatric Association (APA) identified Internet gaming disorder as a new potential psychiatric disorder.
- Four survey studies (N=18,932) with large international cohorts.
- Among those who played games, more than 2 out of 3 did not report any symptoms of Internet gaming disorder
- between 0.3% and 1.0% might qualify for a potential acute diagnosis of Internet gaming disorder

The evidence of the extent and impact of online internet gaming on mental health is still mixed

Prevention of on-line addiction

(VONDRČEKOVČ, P. and GABRHELÊK, R., 2016)

- Systematic literature review
- 108 studies selected
- Content analysis

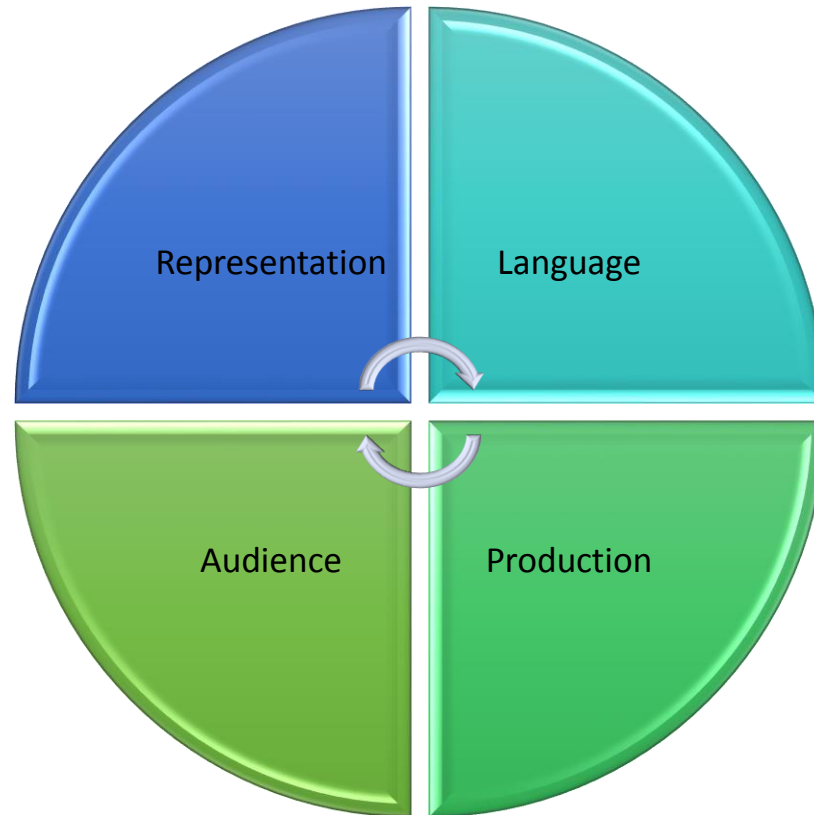
Results:

- 4 main areas:
(a) target groups, (b) the improvement of specific skills,
(c) program characteristics, and (d) environmental interventions

(a) the mere provision of information about the negative consequences of risk behavior is ineffective and it needs to be complemented by interactive interventions aimed at changing attitudes and the development of selected skills for life (Soole, Mazerolle, & Rombouts, 2008)

(b) the effective prevention interventions should be complex and focused on Internet addiction and other forms of risk behavior (Gong et al., 2009) and should be a combination of interventions targeting vulnerable people with an Internet addiction, their parents and other loved ones, and the community, school, or work environment (Frangos & Sotiropoulos, 2010).

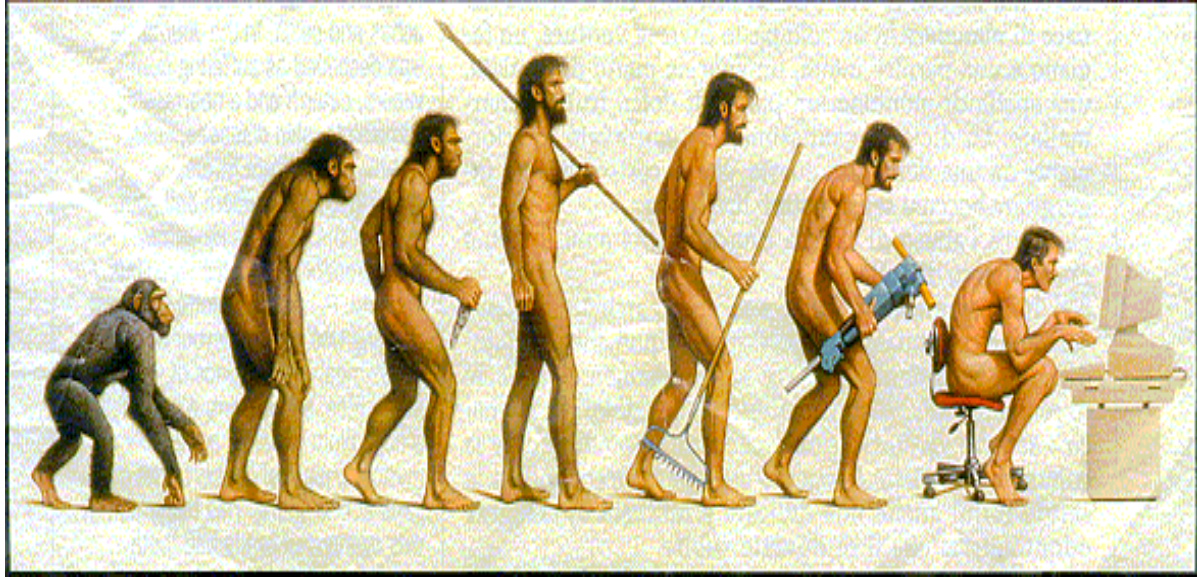
DIGITAL LITERACY – 4 domains



(Buckingham, 2003)

Conclusions

- **Quantity, quality** and parental support are important factors that determine if and to which extent technology can enhance children's cognitive and social abilities
- Technology addiction should be viewed in the more **complex context of individual vulnerability**
- **Technology can help** overcome cognitive, emotional barriers in children with difficulties
- The debate should focus on determining the boundaries between **harmless use and misuse** and should try and focus on enhancing protective as well as risk factors
- It's important to define **DIGITAL LITERACY**



Dreams rewired



https://www.youtube.com/watch?v=M2E_b8ULRHs

Useful resources

Buckingham, D. (2007) *Beyond Technology: Children's Learning in the Age of Digital Culture*. Polity Press, Cambridge.

Claire A. G. J. Huijnen, Monique A. S. Lexis, Luc P. de Witte (2016) Matching Robot KASPAR to Autism Spectrum Disorder (ASD) Therapy and Educational Goals.

Greenfield, S. (2014) *Mind Change: How digital technologies are leaving their mark on our brains*. London, Sydney, Oakland: Random House.

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Institute of Education and Social Research, University of London. Effective Pre-School and Primary Education 3-11 Project (EPPE 3-11) McGonigal, J. (2011) *Reality Is Broken*. Penguin Books.

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Siraj-Blatchford, J (2015) *More than ICT: Information and communication technology in the early years*. The British Association for Early Education.

Weinstein AM. (2010) Computer and video game addiction - a comparison between game users and non-game users. *Am J Drug Alcohol Abuse* 36:268-76

Useful resources

Przybylski, A.K., Weinstein, N. and Murayama, K. (2017) Internet Gaming Disorder: Investigating the Clinical Relevance of a New Phenomenon. *Am J Psychiatry*. 174 (3) 230-236.

Russ, SA, Larson, K, Franke, TM & Halfon, N (2009), Associations between media use and health in US children, *Academic Pediatrics*, 9 (5), 300-306.

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Yang, F, Helgason, AR, Sigfusdottir, ID & Kristjansson, AL (2013), Electronic screen use and mental well-being of 10-12 year old children, *European Journal of Public Health*, 23 (3), 492-498.