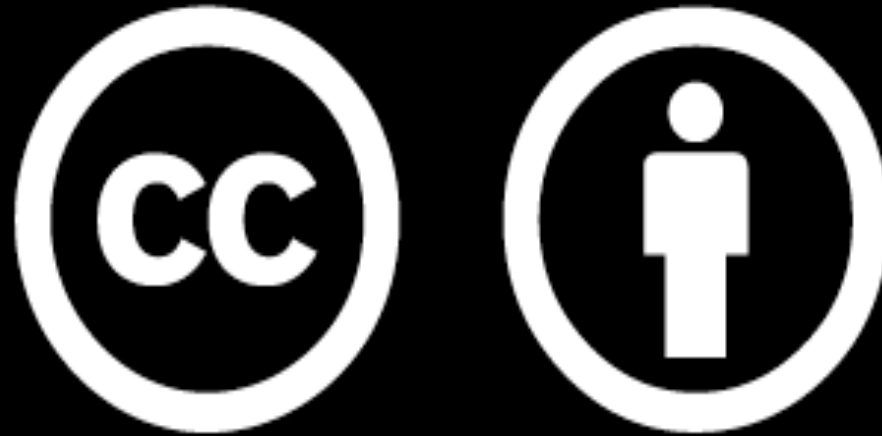


Hearables for Online Learning

Rory McGreal
Athabasca University





Except where otherwise noted, this work is licensed under

<https://creativecommons.org/licenses/by/4.0/>

Some images fair dealing or fair use

What are hearables?

- **wireless smart micro-computers** (Bluetooth)
- **artificial intelligence**
- **speakers & microphones**
- **fit in the ears**
- **connect to Internet & other devices**
- **designed to be worn daily**

(Hunn, 2014)

Hearable Features

- * **tiny, nearly weightless**
- * **perfect fit in ear canal**
- * **comfortable over time**
- * **sufficient battery power**
- * **strong antenna**
- * **microphone**
- * **micro-processor**



[Photo](#): Nicolas Sadoc

Headphones



PSAPs: Personal Sound Amplifiers



Hearing aids



Earbuds

Headphones



PSAPs: Personal Sound Amplifiers



Hearing aids

[Photo](#) Phonak



U.S. FOOD & DRUG ADMINISTRATION



- **Approval no longer required**
- **No longer considered medical devices**

(Over the Counter Hearing Aid Act, 2017)

X



- * cancels out unwanted background noise,**
- * amplifies voice of a particular person**
- * converse in another language.**

Stigma





Voice Control Your Music

Standalone HiFi Music Player



Gesture Interface

Up to 32G storage



WiFi, 3G, Bluetooth 4.1

Fitness Tracker &
Heart Rate Monitor



3D Sound Recording

* Wireless Charging



Active Noise Cancelling *



Starting at **\$99** ~~\$199~~





Bone conduction





Earin



Music listening only



Wire-Free

Accurate real-time feedback for achieving optimal performance.



Heart Rate & Fitness Tracking

Accurate real-time feedback for achieving optimal performance.



Perfect Fit

Designed by an ENT Doctor for perfect fit & function.



Dust, Water & Sweat Resistant

Go ahead and sweat; exercise with confidence!



Easy to Use App

Quick easy interface allows completely customizable and inspiring workouts!



Audibles



INTRODUCING
amazon echo

Always ready, connected,
and fast. **Just ask.**



An interface revolution?

Knightlab



Hey Siri



Assistant

In +63% of US homes by 2023

Wearables



GLASS



REVOLUTIONARY
SELF-LACING SHOES



CoolShirt

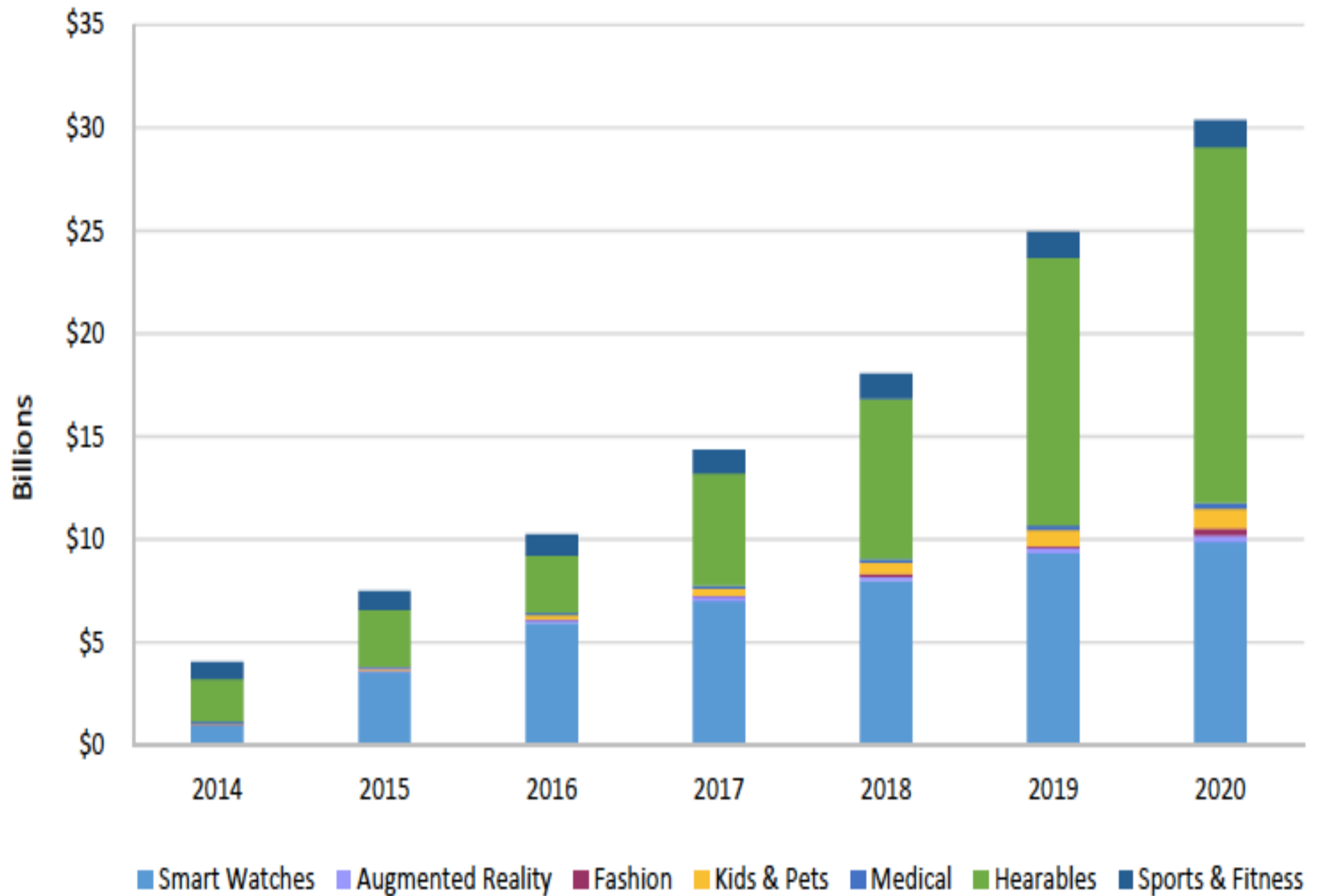


Figure 21. Global Revenue from Smart Wearables

[Graph](#) Nick Hunn

Mobile devices



[Photo:](#) Solutions Review

Wireless Access

Mobile Learning



OPENNESS

Digital convergence:



Electronic book

Radio

Telephone

Computer

PDA

Game player

Fax

Handy 21 Oxygen project MIT



Camera

WWW

Email

Clock

Pervasive computing

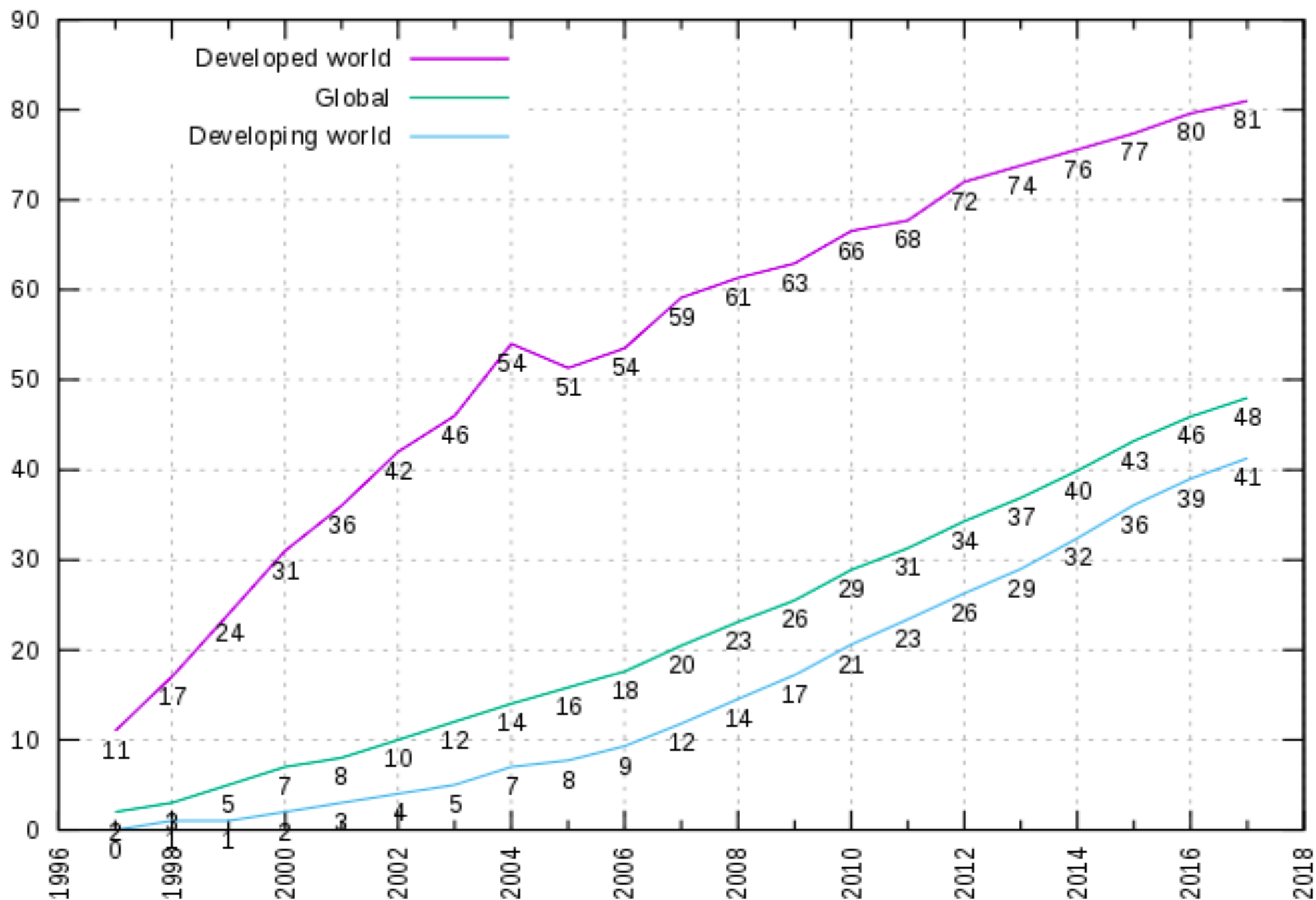




51% of the world's population

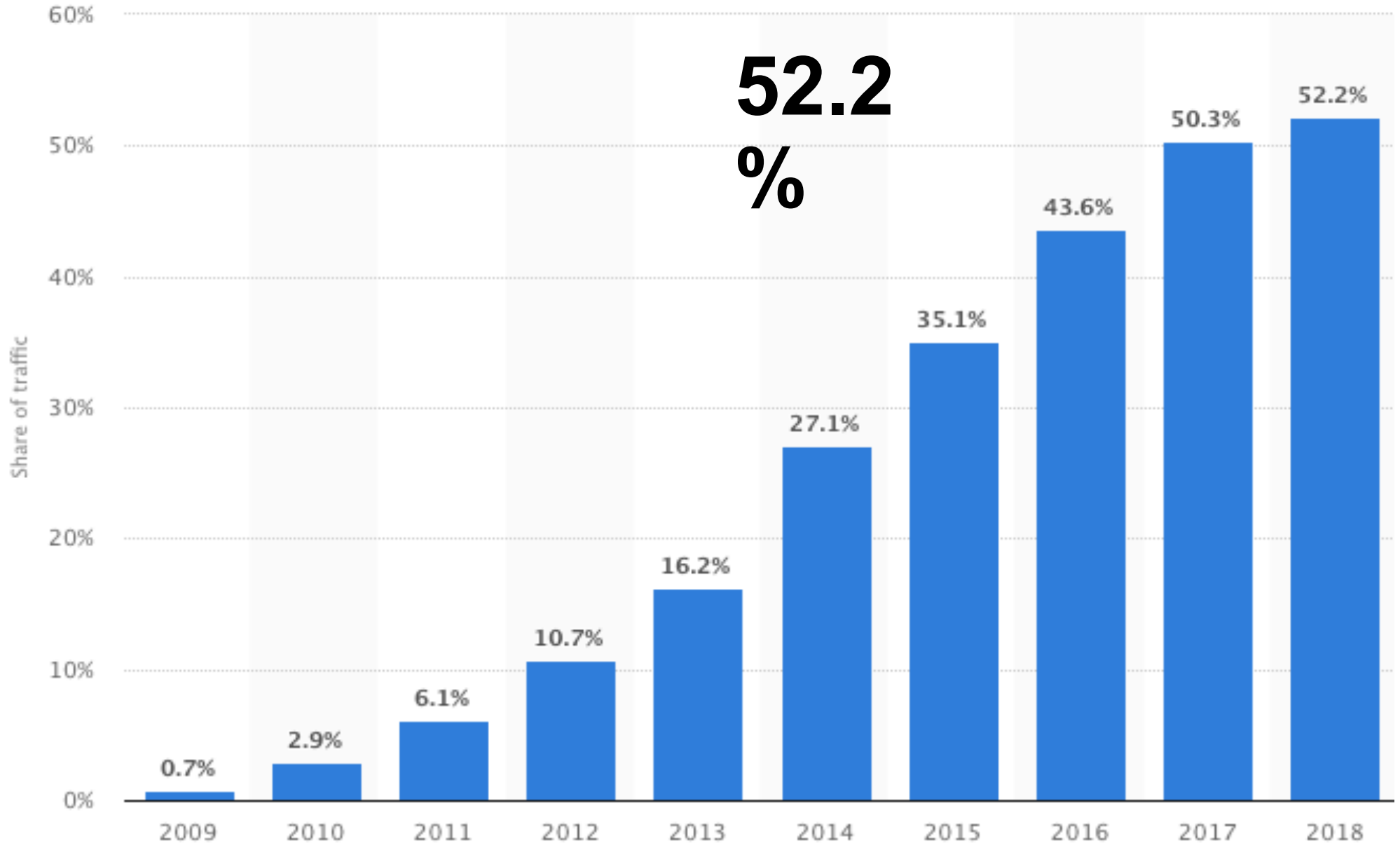
+3.7 billion Internet connexions
World population: +7.4 billion

Internet Users Per 100 Inhabitants



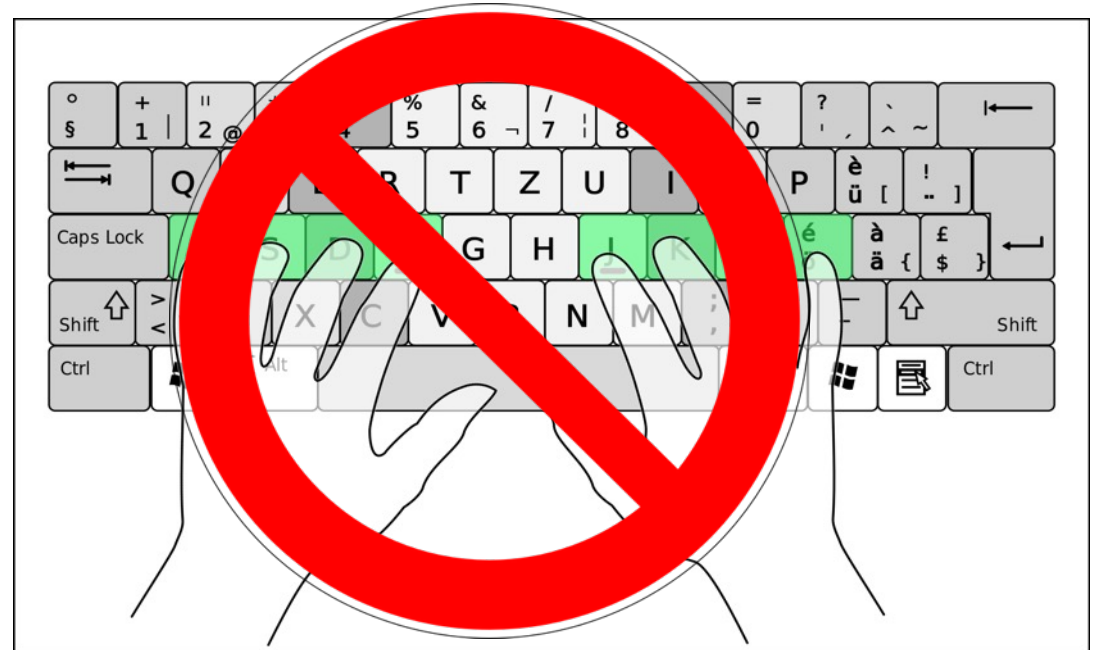
Graph: ITU

Percentage of all global web pages served to mobile phones from 2009 to 2018



Speak or type 2023?

Google Searches





The world is going mobile



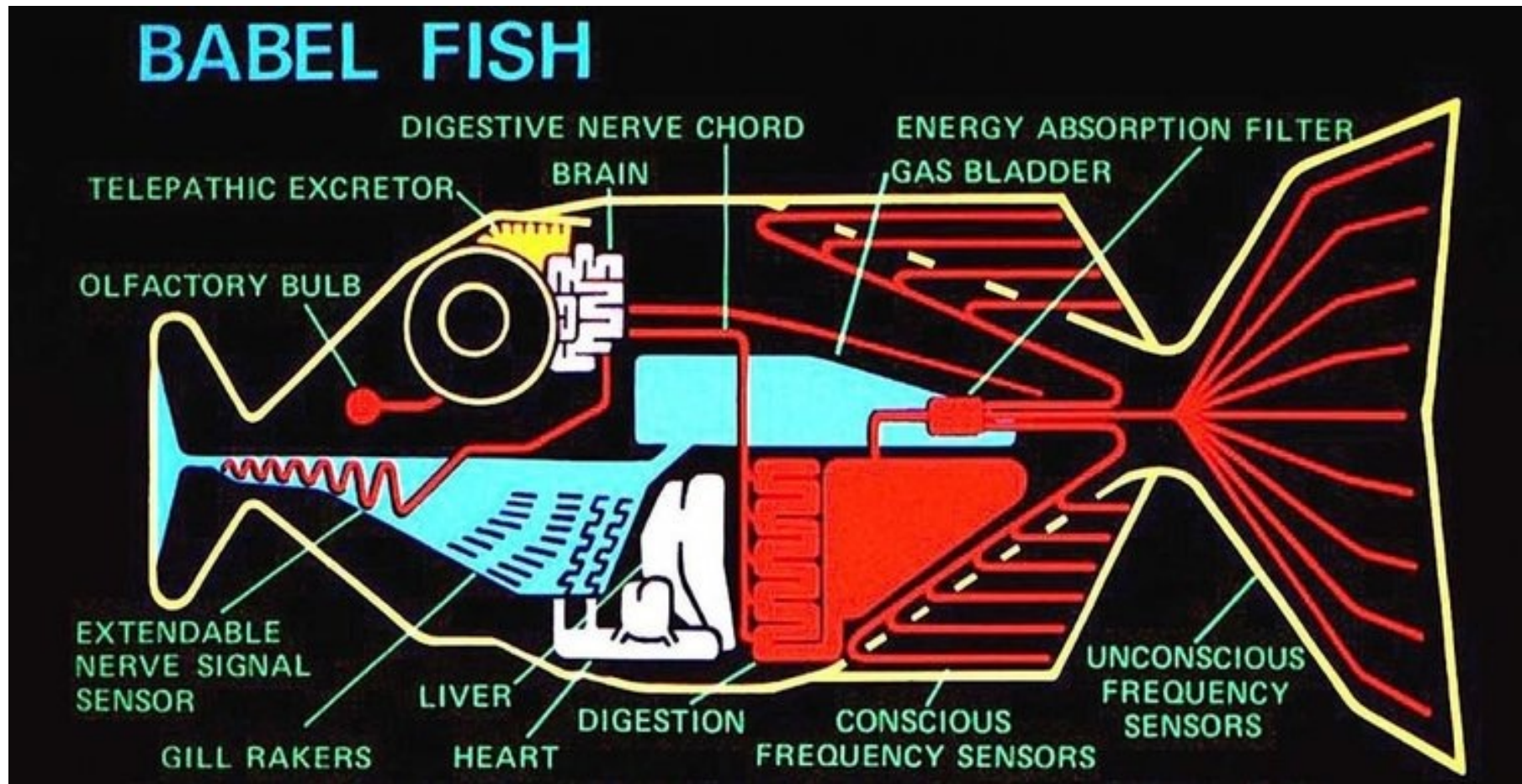
Mobile Learning

**Internet is the
biggest
commons**

**Public domain is
a priceless,
shared heritage**



THE HITCHHIKER'S GUIDE TO THE GALAXY





iTranslate



Bragi Dash



[Photo:](#) Happy Puppy

Intelligent Voice Recognition (IVR)

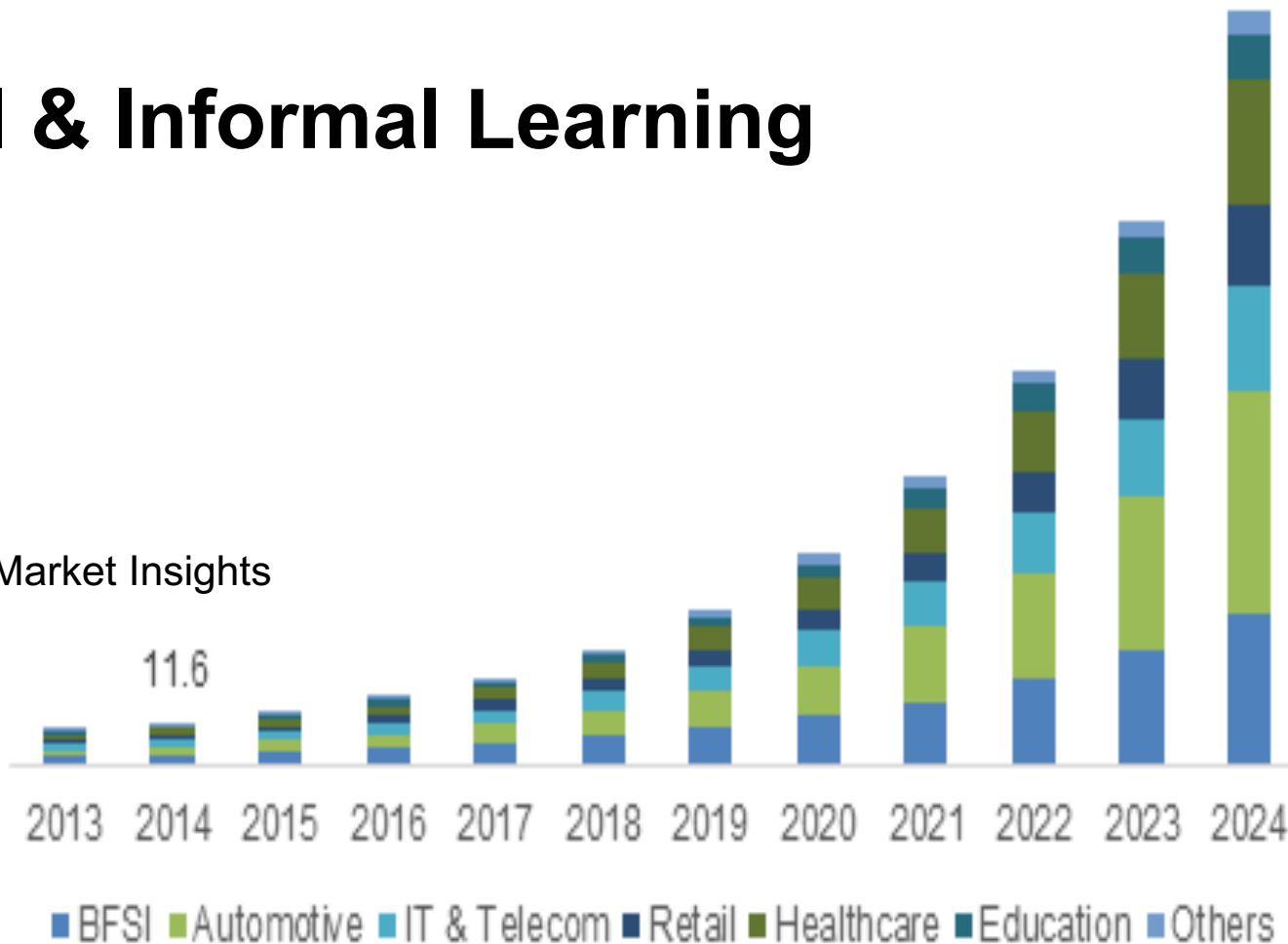
Intelligent Virtual Assistant (IVA)

Intelligent Virtual Assistant Market

U.S. Intelligent Virtual Assistant (IVA) Market size, by application, 2013-2024 (USD Million)

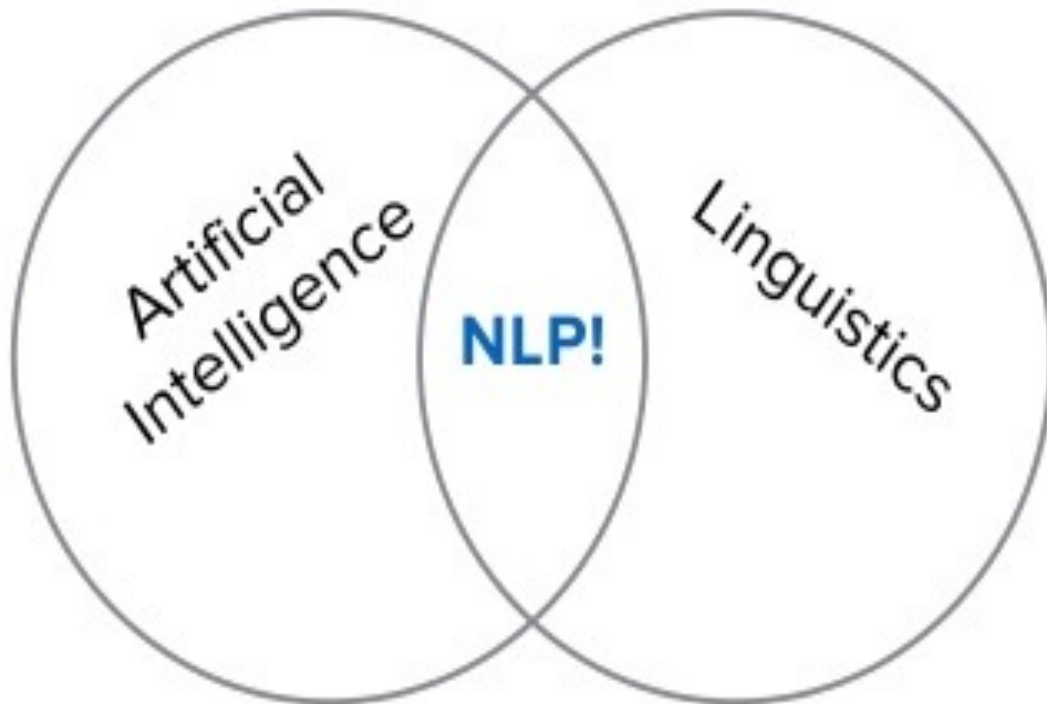
Formal & Informal Learning

[Graph:](#) Global Market Insights



Natural Language Understanding (NLU)

What is Natural Language Processing?



Artificial Languages: Java, C++, Binary...

Natural Language: Language spoken by *people*.

Motivation: Sophisticated linguistic analysis for human-like sophistication for a range of tasks or applications.

Goal: have computers *understand* natural language in order to perform useful tasks

IVA & NLU for Education

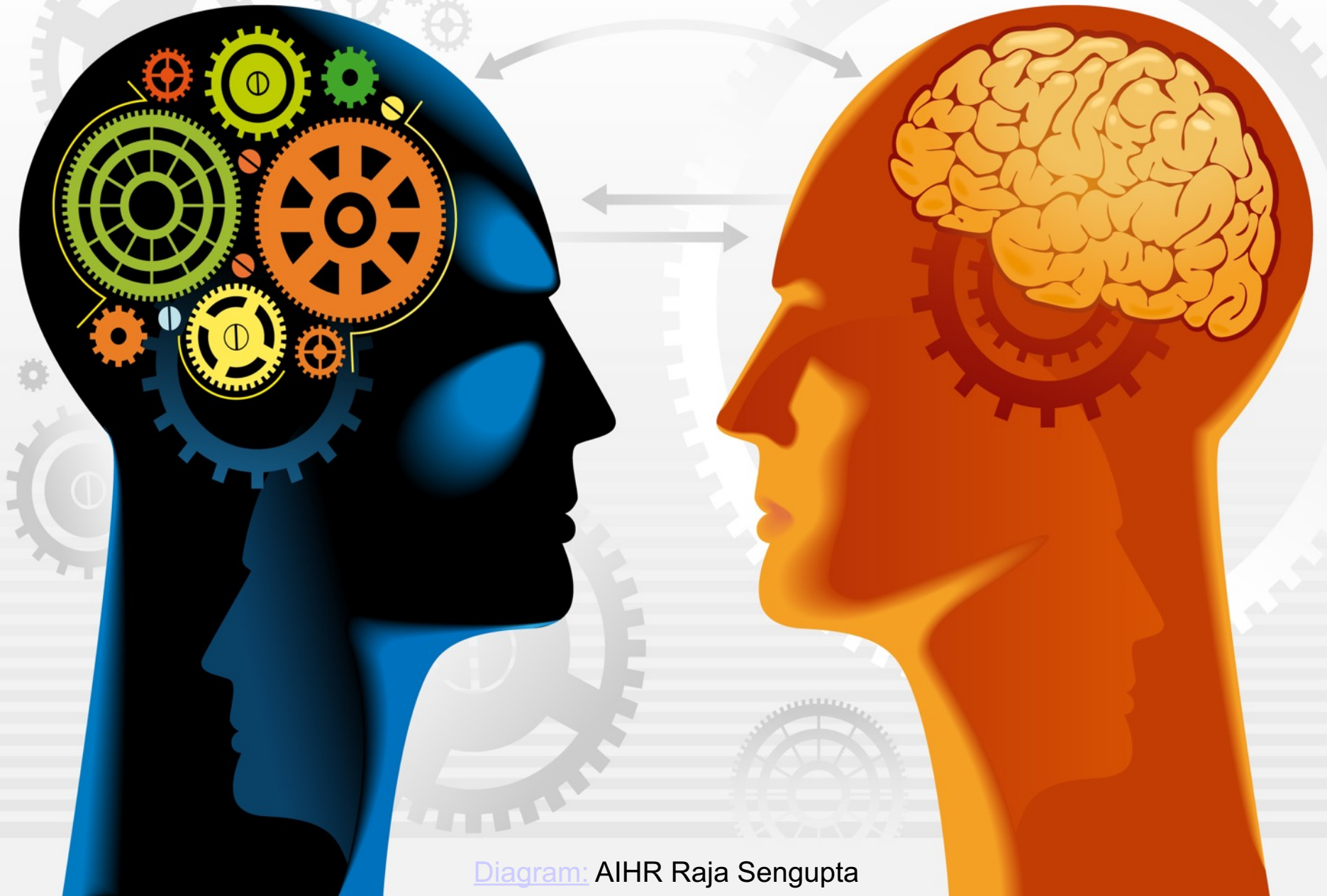
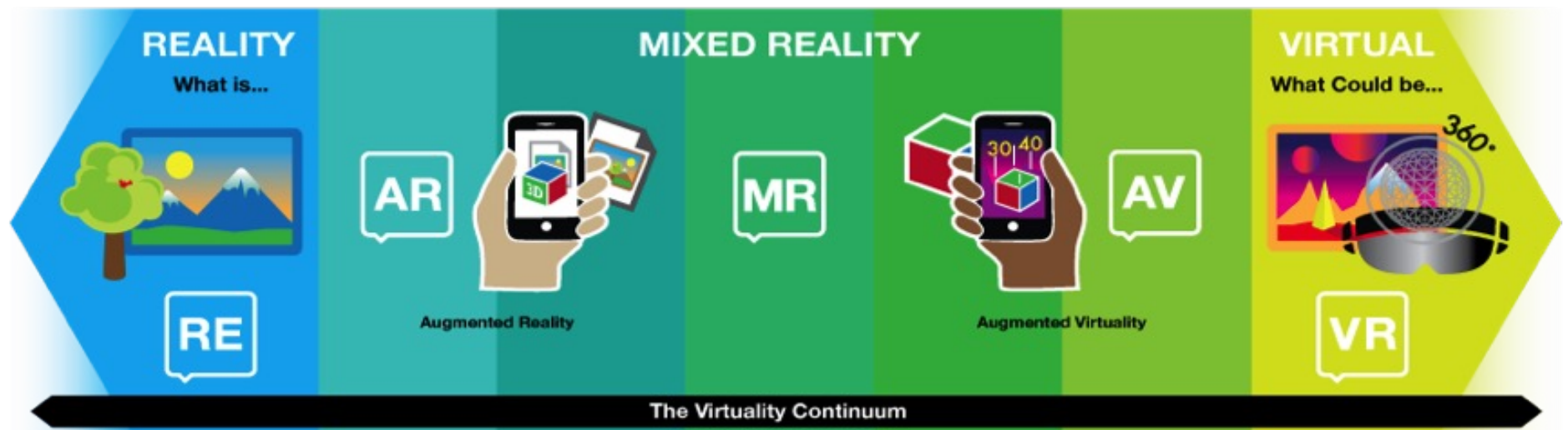


Diagram: AIHR Raja Sengupta

Hearables for Education

- **Private & personal**
- **Super hearing**
- **Focused hearing**
- **Selected sounds**
- **Blend physical & digital**
- **Instant access**
- **Hands-free**

VR & AR Learning



Personal Digital Assistant



Hearables: Technical Challenges

- **Power usage**
- **Battery life**
- **Connectivity (HBw)**
- **Cloud processing**
- **Computing power**
- **Memory**
- **Not there yet!**



Hearables: Benefits

- **Portable (anywhere/any time)**
- **Easy to use**
- **Connectivity (HBw)**
- **Highly personalizable**
- **Accessible**
- **Integrated in normal life**



Hearables: Benefits for Learning

- **Elearn/Mlearn/Hlearn**
- **Control/ownership**
- **Fun**
- **In-context learning**
- **Contact -interactive**
- **Links**



Hearables: Benefits for Learning

- **As one aide to learning – not standalone**
- **Blended learning**
- **Podcast lectures**
- **Text-to-Speech**
- **Accessible on the move**



Just-in-Time Learning

- Training wherever/whenever
- Integrated into workday
- Continuous learning
- Instruction on fixing problems
- Access to manufacturer
- Hands-free



Just-in-Time



Salesperson Learning on the Job



[Photo:](#) Gulf News

Bite-sized content (3 – 5 minutes)



081127882



081 127 882



CHUNKING



Self-Directed Learning

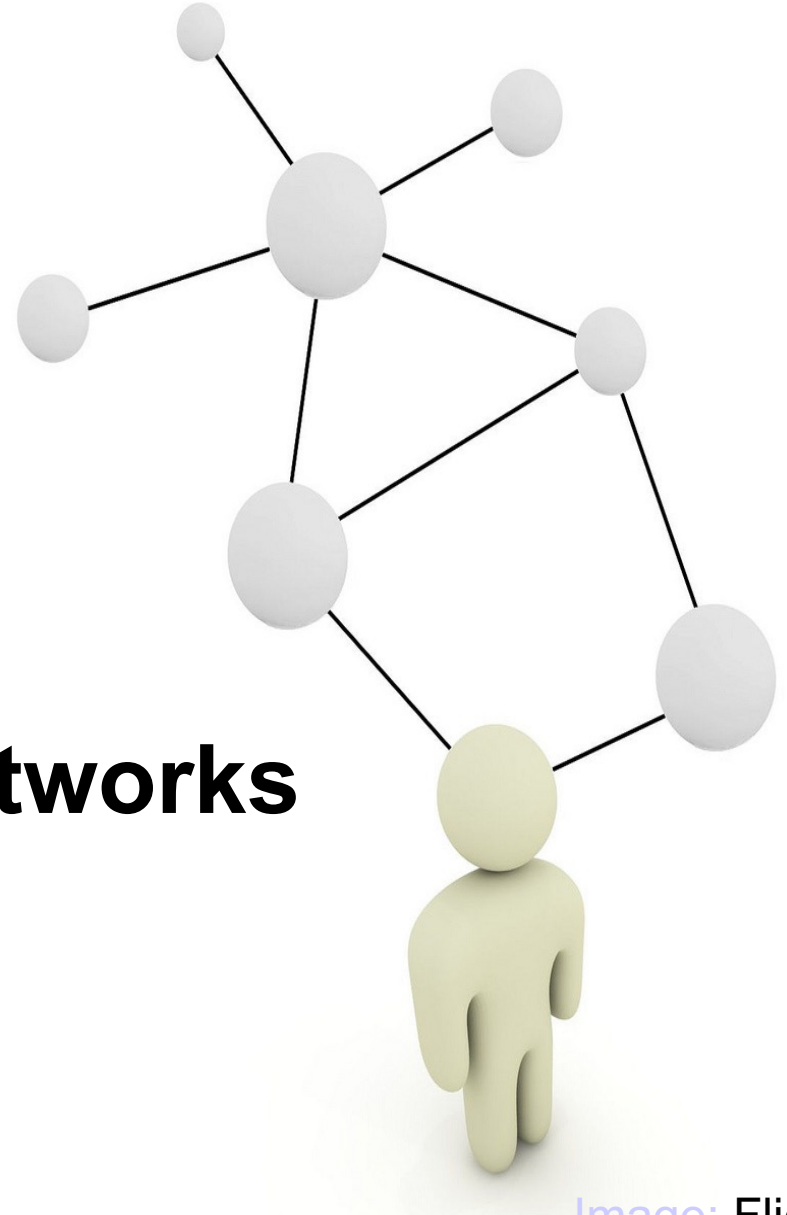
DEFINITION

- “Self Directed Learning is any knowledge, skill, accomplishment, or personal **development that an individual selects and brings about by his or her own efforts using any method in any circumstances at any time**”. GIBBONS (2002).

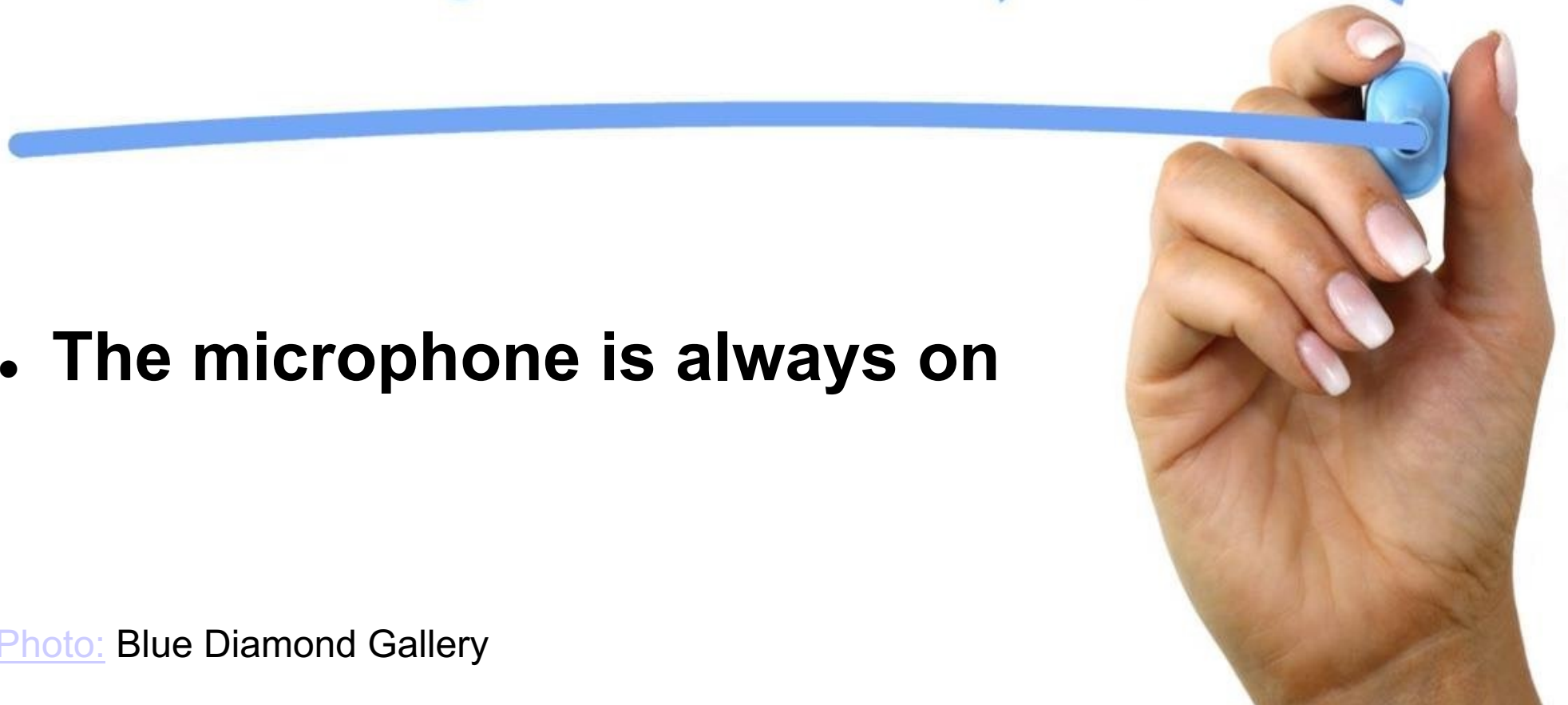


Personal Learning/ Connectivism

- **Context-aware**
- **Adaptive**
- **Individualised**
- **Personal Learning networks**



PRIVACY



- **The microphone is always on**

Will it know what you are thinking?



AI-enhanced hearables in the future will be able to understand more than the words we speak

Text while driving





World Health
Organization

1.1 billion children and young adults at risk of hearing loss, with earphones blasting away at point-blank range.



Photo: TextEd

Hearables

"Maybe instead of people staring at their screens, they are going to be staring off into the distance. What's it called? The thousand-yard stare" (Glazer, 2014)



Memento Homo

