
EDvantage
Where startups make the leap

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Can Machine Learning Empower Learning ?

A quick review - Edtech

- Technology as enabler for the changing learning needs
- Main stake holders

The opportunity in Edtech (as we see it)

- Market size
- Market Readiness

Edtech – It's all about facilitate learning

Learning anything (or everything), anywhere, anytime by anyone

Anything

- From knowledge to skills
- New professions
- New skills
- Leisure

Anyone

- K-12
- Higher-Ed
- Corporate
- Vocational
- Life long learner

Anywhere

- Distance learning
- Blended learning
- Institutions: schools, university, corporates

Anytime

- On demand

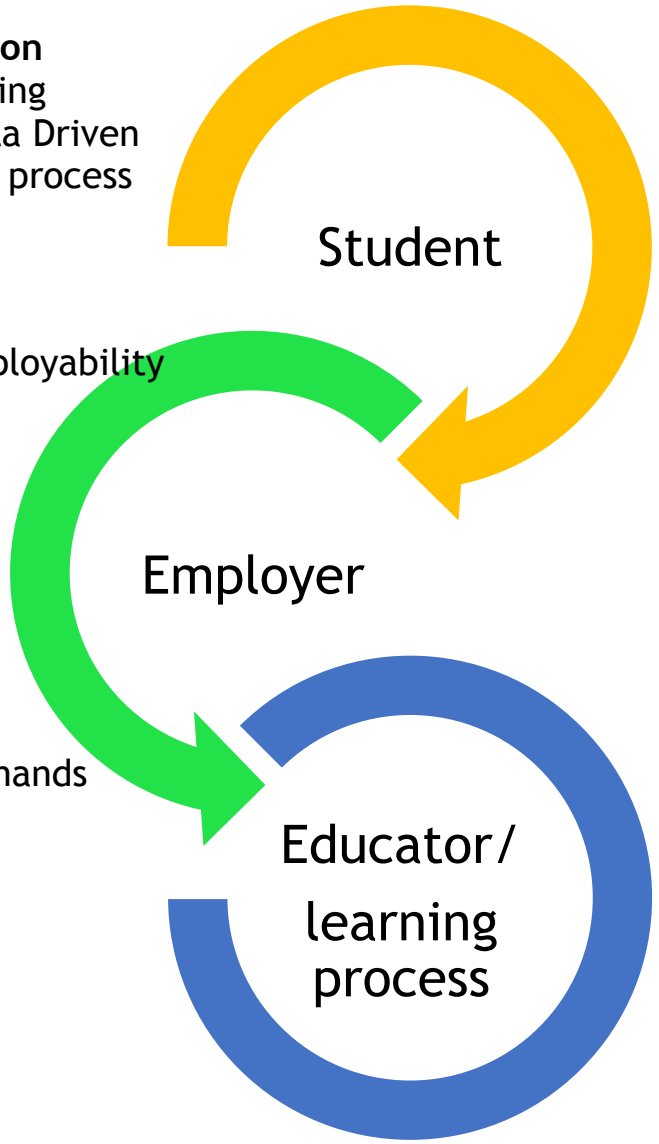
The Learning process main stake holders' needs

Expected education
-On demand learning
-Personalized, Data Driven
-Ownership of the process

Greater employability
-Targeted education to meet career goals
-Quick micro competencies to improve employability

Bridge **employment skill gap**

Evolving and Dynamic -4th revolution
- Industry needs before academy
- New roles
- New recruitment procedures and demands



K-12

Unbundle **higher education**

Vocational

Corporate learning

Life long learning:
-Inspirational learning
-Avoid being irrelevant and left behind

Maximize satisfaction

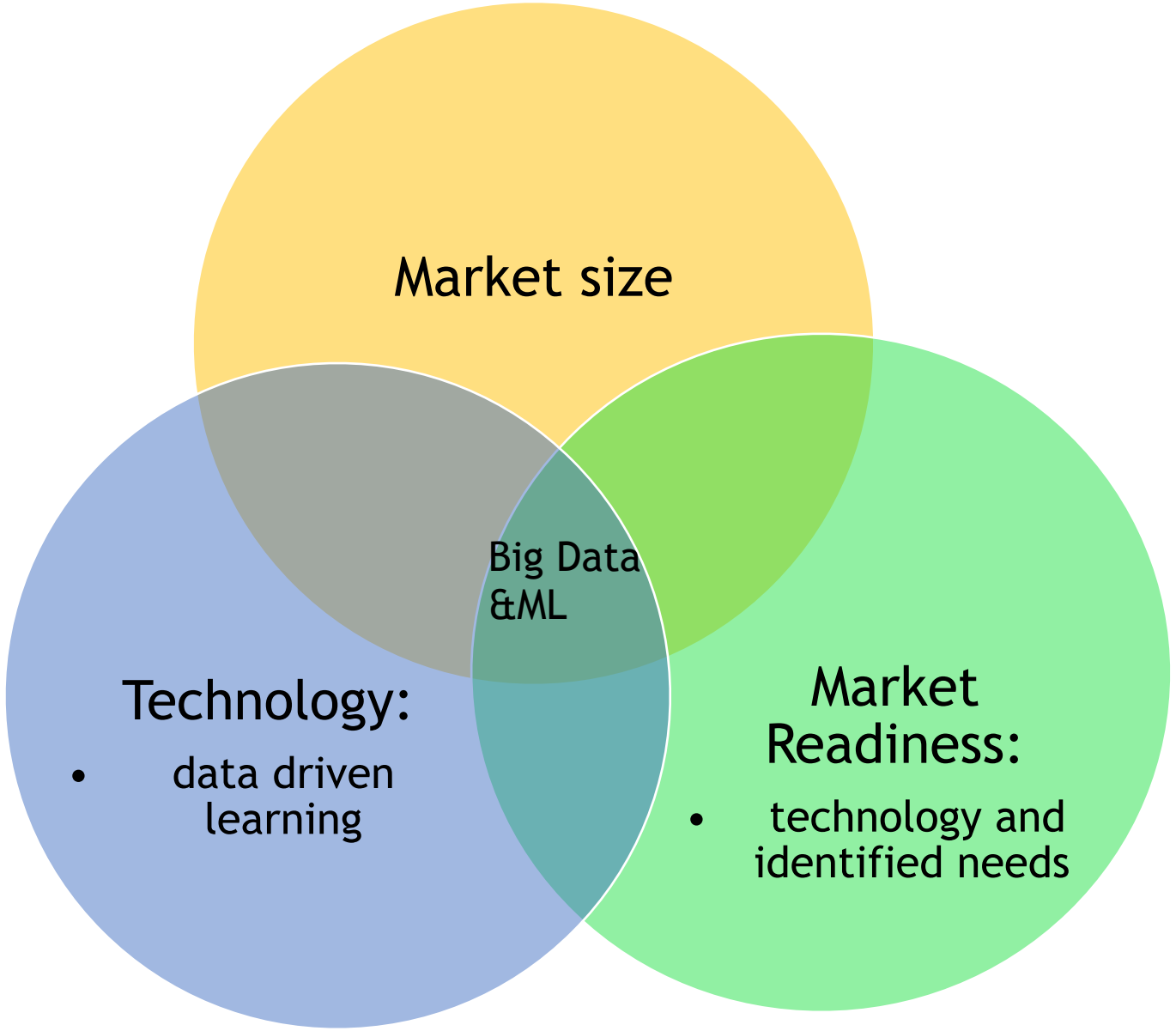
Deliver better outcome

Teach student what they really want to learn

Nurture specific talents and interest

Bottom-up

The Opportunity in Edtech



Market Size

- Education Technology companies sell products and services in more than $1.3T yearly
- There are 740M students that are using Edtech product and services
- 30M world wide are purchasing Edtech products and services

Market Size

Investment peaked in 2015

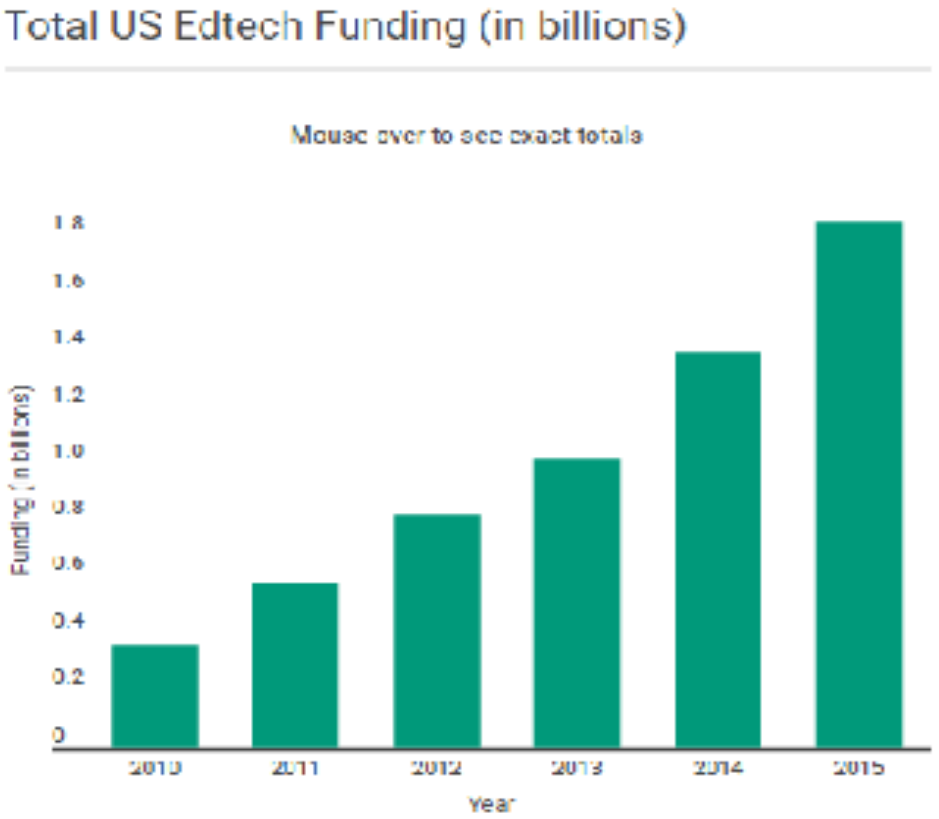
over **500** deals worth nearly

$3.3B* in aggregate

Edtech goes global,

driven mainly by activity in **India** and **China**

US from 80% in 2011 to 60% in 2015



* source: CBinsights
** EdSurge counts all investments in technology companies whose primary purpose is to improve outcomes for all learners, regardless of age there fore indicates a number of $2.8B

Market Readiness: Technology and identified needs

- Focus on HW
- Infrastructure & Devices, BYOD
- Mobile
- Cloud
- IoT, VR

- OER
- Digitized content
- Simple UX, easy to navigate
- Engagement – games, interactive
- MOOCs
- **“One solution fits all”**

- **Personalized=** Pace & performance driven
- Personalized = different level of content
- Personalized = Discovery

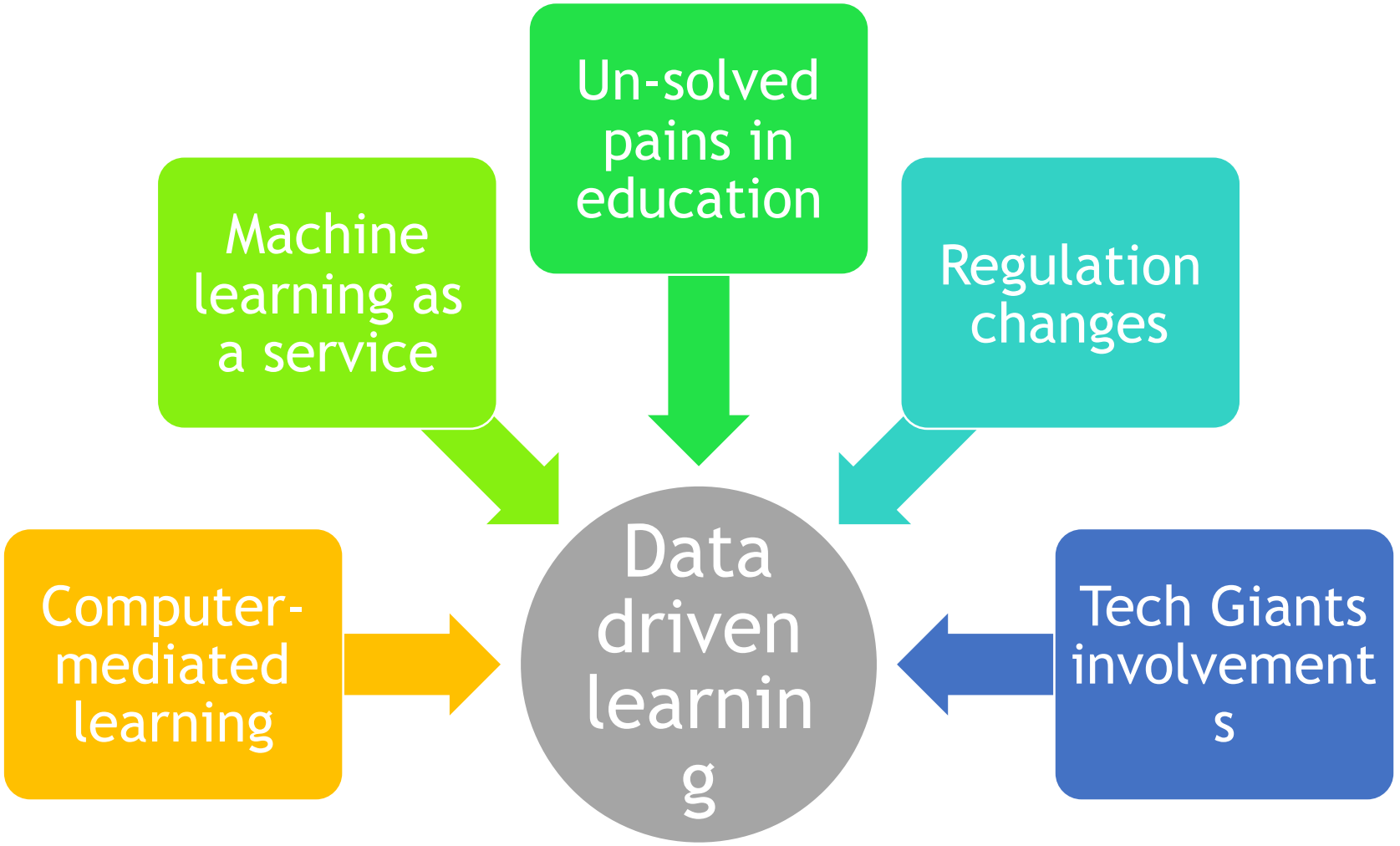
- Personalized = Ownership of the learning process
- Learning paths
- Predictive
- More to come

Google Microsoft Teachers Pay Teachers udemy coursera NEWSELA Time To Know KNEWTON declara bibblio

5 phases of Evolution

- From Print to Digital
- From Knowledge to Skills
- From one fits all to Personalized and Data Driven
- From Distribution to Discovery
- From Diagnostic to Predictive

The Times They Are a-Changin'…



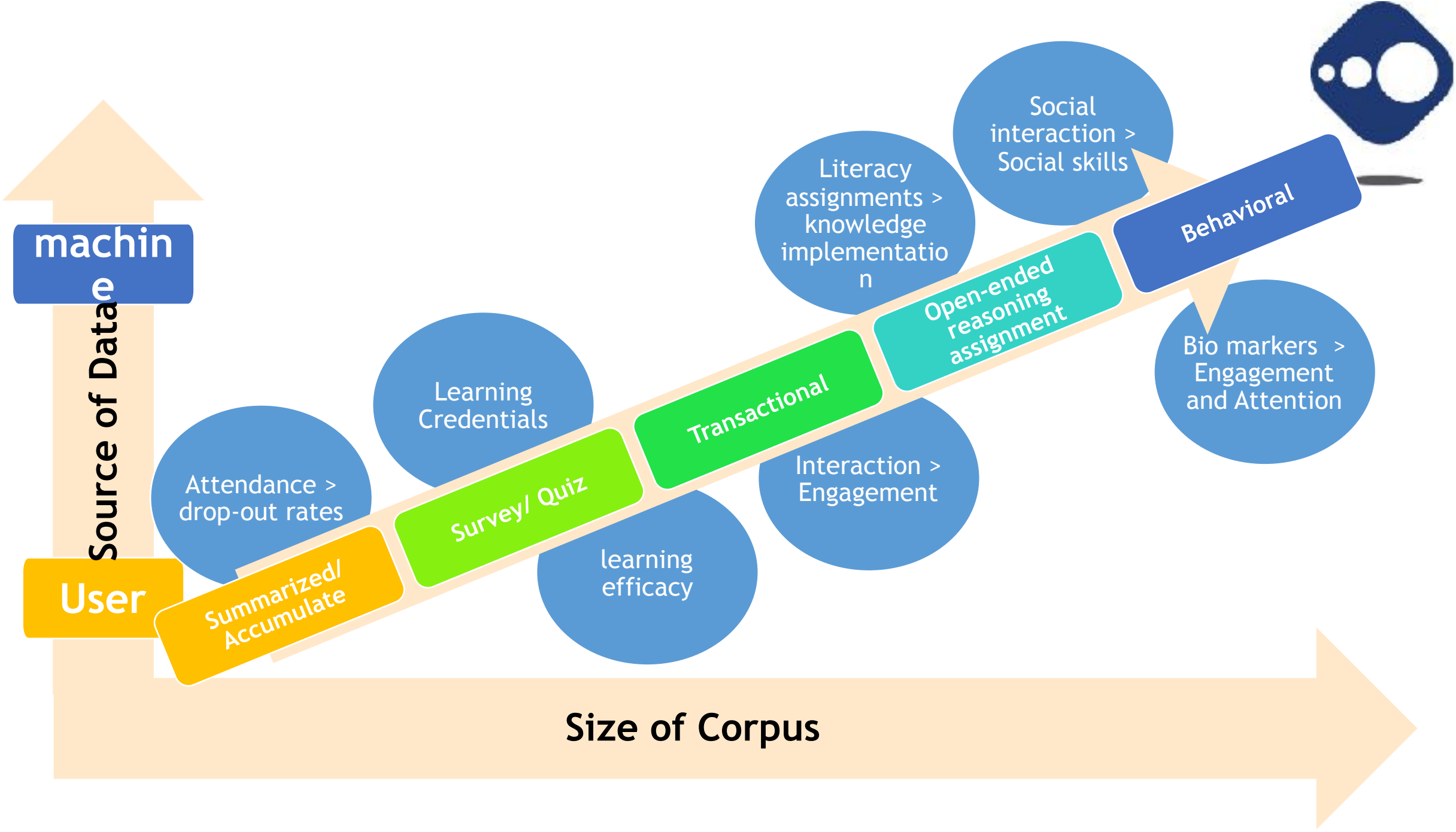
Big Data and Machine Learning - Challenges

Cultural Challenges

- Skepticism – does technology will fulfilled the promise ?
- Teachers' new role
- Fear of even more test-driven teaching
- Tension between didactic/ pedagogy theories and practice results driven out of data

Technical Challenges

- Need to Redesign content – micro chunks, multi learning paths, open sources
- Data – Quality, Ownership, Accessibility, Standardization and Interoperability, Privacy (COPPA)
- Training phase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Source of Data
User
Summarized/
Accumulate
Attendance >
drop-out rates
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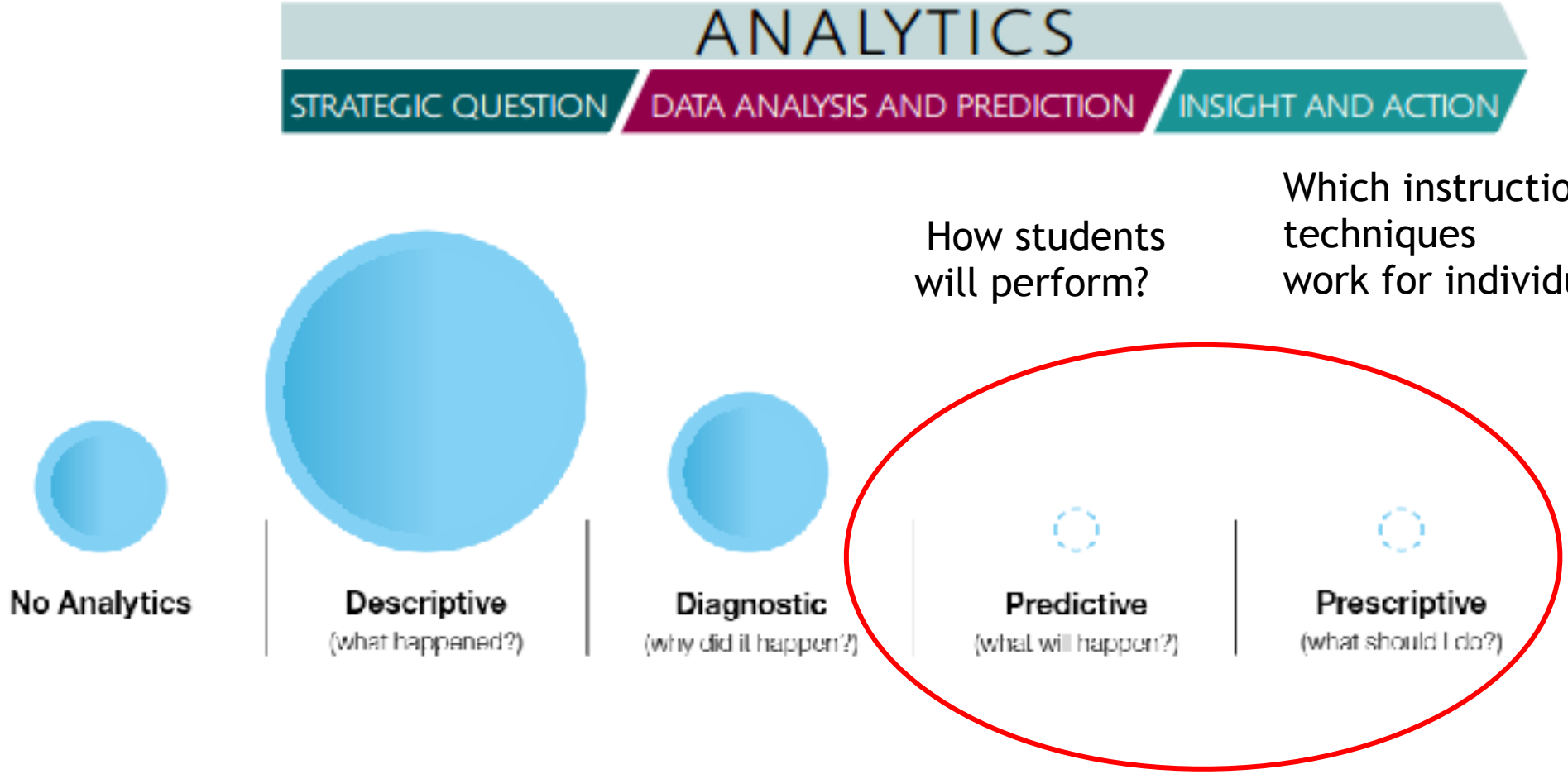
Social
interaction >
Social skills
Behavioral
Bio markers >
Engagement
and Attention
Size of Corpus

Where are we now?

limited analytics capabilities



Where are we going?

Data- driven cognitive systems

- Learner predictive
  - Better candidate selection
  - Predict and reduce drop-out rates and students at-risk
  - Carrier enhancements & career advisers systems

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Georgia State University

https://vimeo.com/119487844

Where are we going?

Data- driven cognitive systems

- Personalize learning
  - Personal learning curve/ learning sequences/ learning path
  - Automatic feedback (hints, mastery validation, motivation)
  - Identify skills gaps and improve performances - competency based education
    - communication, leadership, teamwork, problem-solving, critical thinking
  - Adaptive engagement
  - Personality based learning




Where are we going?

Data- driven cognitive systems

- Content improvement
  - Automatic Metadata extraction
  - Engagement
  - Content adjustments
- Content discovery/content recommendation – enabler for move learning out of the classroom

The Opportunity – Is your call for action!

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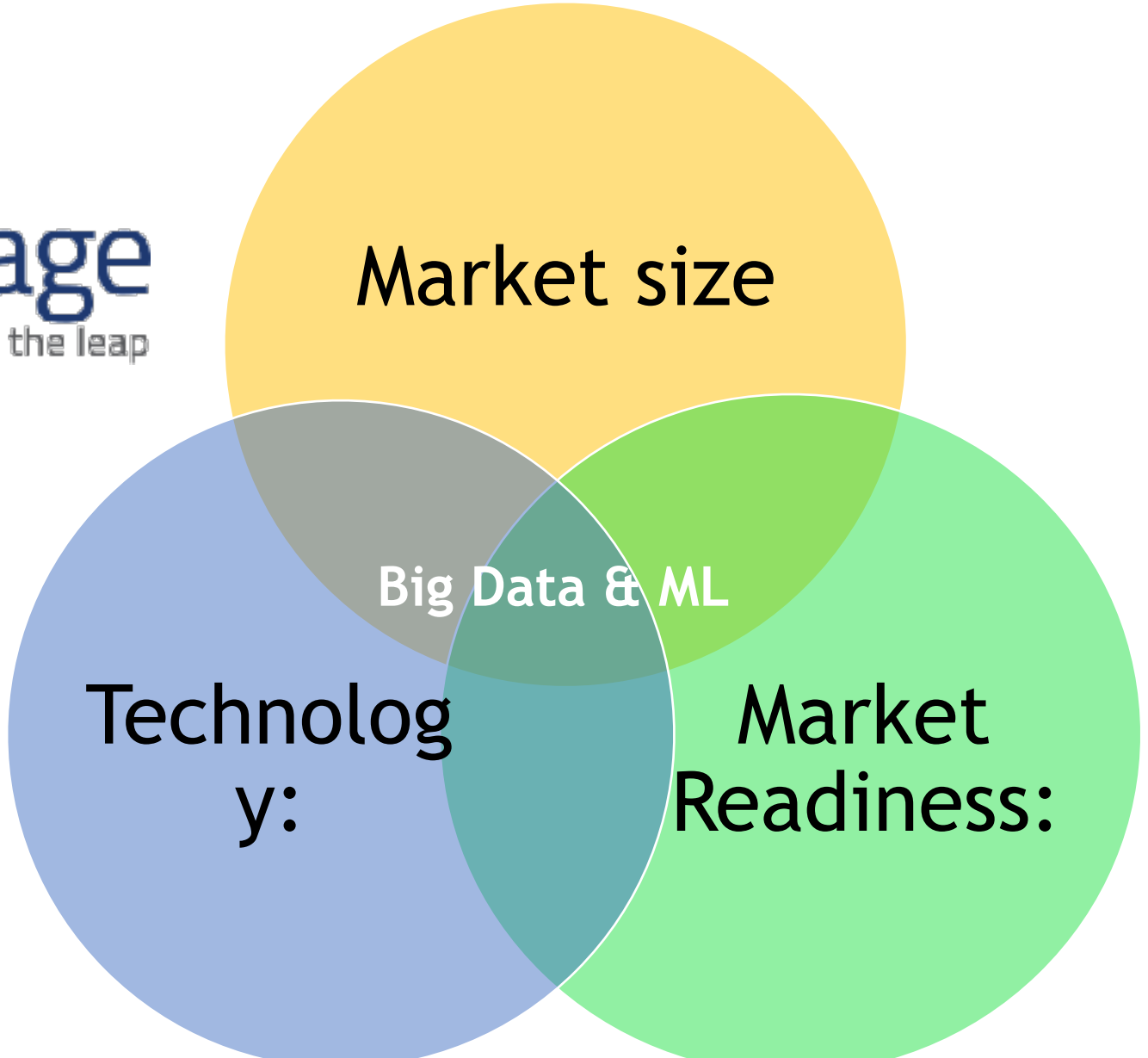

Thank you !

Sources

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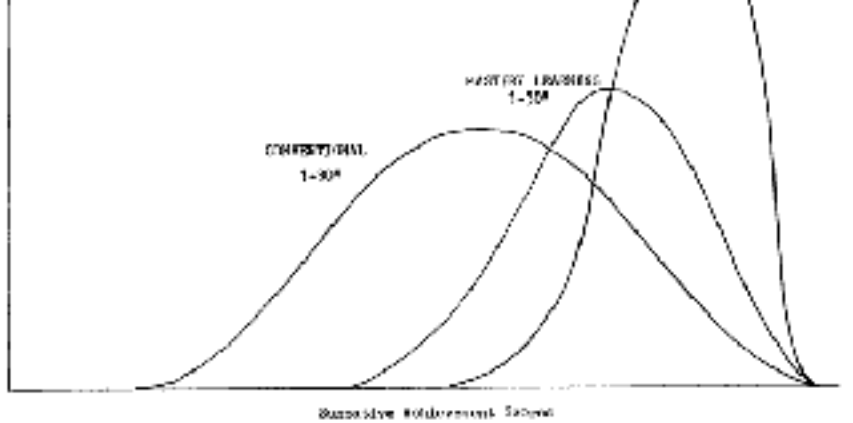
More quotes



- Bloom's Two Sigma finding (Conventional, Mastery Learning, one-on-one tutoring)
- Ericsson's framework of "Deliberate Practice" - elite performer on average takes 10 years or roughly 10,000 hours of sustained practice
  - Intentional Practice
  - Challenge Exceeds Skill
  - Immediate Feedback
  - Repetition to Automaticity
- One of the aims of data science research is to discover empirically the right insights that can make the insights **actionable**

We can deriv
conclusions f
First, given th
students are
learning. Sec

Benefits

- Arises to end the historical separation of instruction and assessment
- Quality learning at scale
- The learner as a self-educator - Technology Students to Take Charge of Their Own Learning Journeys
-

Data

- Data sources
  - #GoOpen and OER (open Educational resources)
  - Digital learning software
  - MOOCs and others online learning services
  - ELR (electronic learning records)
  - In the future – incentives for student records/academic certificatio
- Challenges – Quality, Ownership, Accesses, Standardization and I
  - Privacy and COPPA (Children's Online Privacy Protection Rule (under
  - access to data, ownership of data, clean data
  - intensification of didactic pedagogies
  - test-driven teaching
- Evolution of relevant data:
  - LMS based - attendance, test results, surveys, formative assessment ,,
  - Online predictive assessments
  - Interaction with digital content – engagement, learning paste…
  - Digital exercising – learning efficacy
  - Social interaction while learning
  - Micro Credentials
  - Bio markers - eyes movements, pupil size, brain activity, facial expression
- Summarized/ Accumulate data
- Transactional data
- Survey/ Quiz data
- open-ended reasoning (e.g. wirting)
- Self generated behavioral data

Children's Online Privacy Protection Rule
(under 13 years of age)

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FLAT WORLD
LEARN ON

competency-based learning through a combination of big data and algorithms, which credit hour model allows the student to operate outside the traditional credit

incorporate school grades, test scores, extracurricular activities and even internships into a complex algorithm that can determine a student's chances of acceptance.

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WriteLab

WriteLab combines machine learning and natural language processing with proven pedagogical principles to identify patterns in your writing, provide specific feedback, and

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by D2L

deliver the right
the right time, s
learn more and
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EWTON

Knewton makes recommendations in real time based on what that student knows, what they're struggling with, and what they are ready for, as well as the goals set for them by an

Collect & share knowledge fro
web in simple playlists for lea
Curate a library for your team
articles, videos, presentations
Github Repos and truly everyt

123 SESAME STREET

forming an interdisciplinary, cross-company team that will train [IBM] Watson to understand how kids learn that can engage and adapt to an individual child's skills and abil

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allows publishers, school distr
teachers to work together to d
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deep profiles of individuals to help employers match job vacancies

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