



METAARI

Advanced Learning Technology Research

The 2017 Global Learning Technology Investment Patterns

Analysis by: Sam S. Adkins

Published: January, 2018



Table of Contents

List of Tables	3
List of Figures.....	3
About Metaari	4
About the Analyst	4
Scope of this Whitepaper	5
Metaari's Advanced Learning Technology Research Taxonomy	6
Sources of Investment Activity Information	8
Another Historic Record: The 2017 Investment Patterns	9
Shapes in the Investment Patterns	10
2017 Investment Reaches Historic High (Again)	12
A Spike in the Number of Deals Made in 2017	13
Investment Patterns by Customer Type	13
The Steady Rise of Retail Education: Consumer-facing Now Companies Dominate the Learning Technology Investment Ecosystem	16
Corporate-facing Advanced Learning Technology Companies Lead the Way in Global Innovation	17
Country Investment Analysis	20
All Roads Still Lead to China.....	20
Investments Decline In India-based Learning Technology Companies	21
Headwinds in Latin America: Not a Good Time for Edtech Startups	22
Surge in Investments Made to Companies in the UK, the Nordic Cluster, and Israel.....	24
The UK is a Vibrant Edtech Startup Hub.....	24

Innovation (and Strategic Vision) are the Hallmarks of Learning Technology Companies in the Nordic Cluster	25
--	----

Israel Home to Several New EdTech Startups	27
--	----

Investors Keen on Next-generation Advanced Learning Technology Products	27
--	-----------

List of Tables

Table 1 – 2014-2017 Private Investment Totals by Quarter (in US\$ Millions).....	12
Table 2 – 2014-2017 Number of Investment Deals by Quarter	13
Table 3 – 2017 Total Global Learning Technology Deals Investments by Target Customer Type	15
Table 4 -2017 Investments Made to Corporate-facing Advanced Learning Technology Companies	18
Table 5 – 2012-2017 Total Number of Deals and Investments Made in China	20
Table 6 - 2012-2017 Total Number of Deals and Investments Made in China	22
Table 7 – 2017 Investments made to Companies in the UK, the Nordic Cluster, Israel, and Canada	24

List of Figures

Figure 1– Metaari's Advanced Learning Technology Research Taxonomy	7
Figure 2 – 1997-2017 Annual Totals for Global Private Investment in Learning Technology Suppliers (in US\$ Millions)	9
Figure 3 –2017 Dominant Trends in the Global Investment Patterns	11
Figure 4 - 2014-2017 Total Global Learning Technology Investments by Target Customer Type	14

About Metaari

Metaari (formerly Ambient Insight) is an ethics-based quantitative market research firm that identifies revenue opportunities for advanced learning technology suppliers. Metaari publishes quantitative syndicated reports that break out revenues by customer segment (demand-side) and by product category (supply-side) based on our industry-leading learning technology taxonomy and our Evidence-based Research Methodology (ERM).

We track the learning technology markets in 122 countries. We have the most complete view of the international learning technology market in the industry. Metaari focusses solely on advanced learning technology research on products that utilize psychometrics, game mechanics, robotics, cognitive computing, artificial intelligence, virtual reality, and augmented reality.

About the Analyst

Sam S. Adkins is the CEO and Chief Researcher at Metaari. Sam has been providing market research on the IT Training and learning technology industries for over twenty years and has been involved with electronic training technology for over thirty-five years. Sam is an expert at identifying revenue opportunities for global learning technology suppliers.

Sam specializes in advanced learning technology research across several technologies including mobile, augmented reality, virtual reality, artificial intelligence, cognitive systems, psychometrics, simulation platforms, robotics, and game engines.



Dubai, United Arab Emirates, 2013 (Photography by Tyson Greer)

Sam is the only analyst in the industry that focuses exclusively on learning technology trends across all the major customer segments including businesses, government agencies, academic institutions, and consumers.

Sam was the co-founder and Chief Research Officer for Ambient Insight between 2004 and 2016 before rebranding the company to Metaari in early 2017. Sam was a business development manager for Microsoft's Training and Certification group. During his eight years at Microsoft, he managed the Advanced Knowledge Engineering team that built the world's first commercial online learning business (The Microsoft Online Learning Institute). Prior to that, he was a Senior Instructional Designer at United Airlines.

Before United Airlines, Sam was the manager of the Instructional Animation and Graphics Lab at AT&T's central computer-based training (CBT) facility for four years.

Sam Adkins and Tyson Greer founded Ambient Insight in 2004. Ambient Insight ceased operations in late 2016 and rebranded as a new company named Metaari that launched in January 2017.

"Ambient Insight has been in operation for twelve years and we have a well-respected brand and a very successful company," comments Adkins. "The global learning technology market has changed dramatically in the last few years and the new advanced learning products coming on the market essentially represent a 'brave new world' in education. We want to be an active part of this new world and launched our new company to focus on these incredible innovations."

Scope of this Whitepaper

This analysis includes investments made to three legacy learning technology products and seven advanced learning technology product types. The three legacy products include self-paced courseware (eLearning), reference-ware (digital audio, video, and eTextbooks), and collaboration-based products (live online classes and live tutoring). Metaari discontinued commercial forecast analyses for these legacy products in late 2016, but still tracks the funding going to the companies that sell these products.

The global five-year compound annual growth rates (CAGRs) for these three products are now quite negative (particularly in the US) and while the investments are still relatively high, the growth rates and the investments being poured into advanced learning technology are far outpacing the activity surrounding the legacy products.

This whitepaper includes investments made to companies that develop the seven advanced learning technologies defined by Metaari's Advanced Learning Technology Research Taxonomy: AI-based-based Learning, Mixed Reality Learning (virtual reality and augmented reality), Game-based Learning, Mobile Learning, Cognitive Learning, Location-based Learning, and Educational Robots. Several of these products are quite new on the market. For example, commercial AI-based Learning products did not exist prior to 2015.

The investment totals in this whitepaper include crowdsourced, seed, angel, venture capital, private equity, accelerator/incubator cash awards, and initial coin offerings (ICO). The totals do not include government grants (such as SBIR grants), government-funded accelerators (like Start-Up Brasil) or corporate foundation grants. This whitepaper does not include investments made by non-profit educational institutions unless the investments are made to commercial spinoffs.

This analysis does not include leveraged buyouts or acquisitions made by investment firms. Once an investment firm takes a majority stake in a company, Metaari defines that as an acquisition, not an investment.

Metaari's Advanced Learning Technology Research Taxonomy

Metaari's analysis of global learning technology investment is unique in that we only track products directly related to knowledge transfer and learning transfer. In educational psychology, there are two phases of the learning process; knowledge transfer and learning transfer.

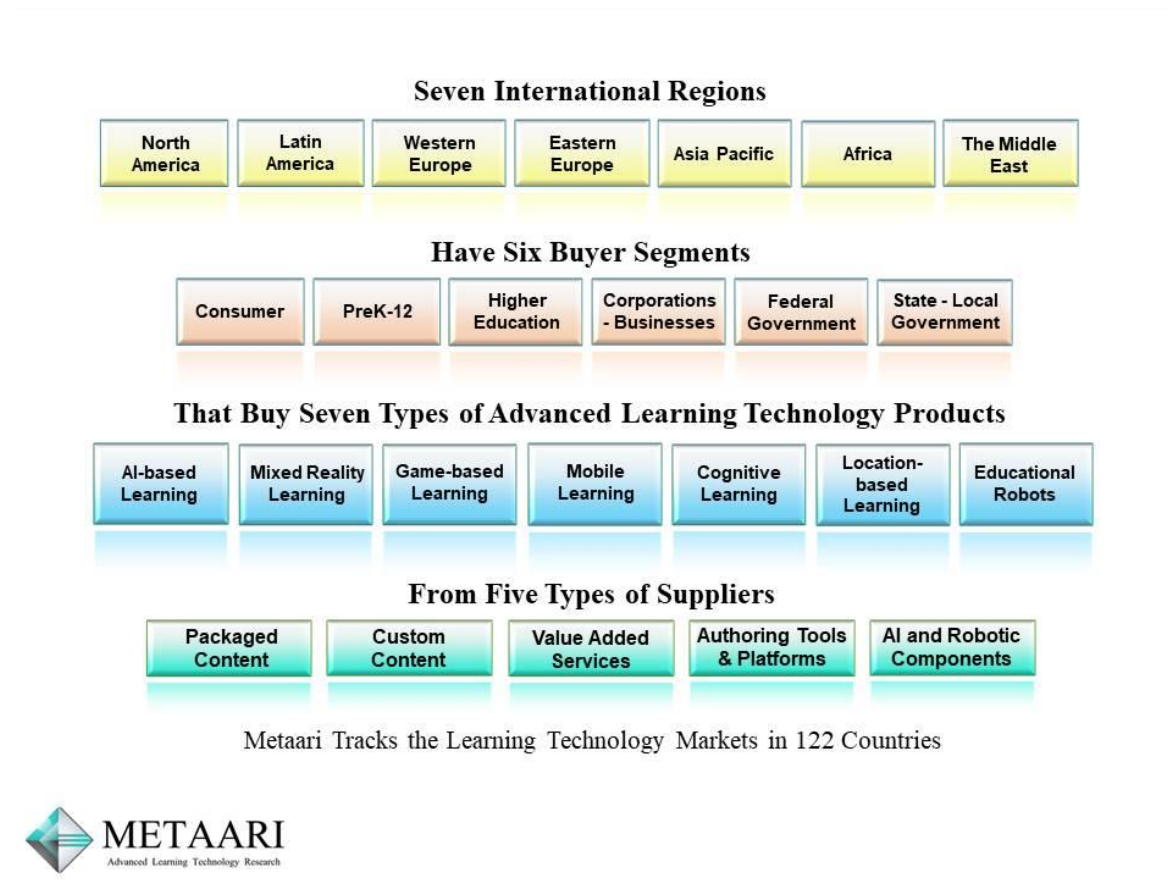
Knowledge transfer is the transmission of information and skills to the learner. Learning transfer is the ability of the learner to demonstrate mastery in a real world setting.

The whitepaper only covers digital learning technology companies that sell products directly related to instruction and training and does not deal with investments made to print-based, brick-and-mortar, classroom equipment companies, or non-instructional software (such as fintech, HR systems, student retention systems, academic messaging platforms, or student information systems). Metaari does not define these peripheral academic products as learning technologies.

This whitepaper does not include investments made to so-called talent management or human capital management platforms, that often include eLearning modules, but not as stand-alone products. Companies that sell these platforms (i.e., Cornerstone OnDemand) are attracting substantial investment, but these companies rarely disclose

the breakout of funding utilization for particular modules. These platforms are outside the scope of Metaari's Advanced Learning Technology Research Taxonomy.

Figure 1– Metaari's Advanced Learning Technology Research Taxonomy



Over several decades, Metaari (formerly Ambient Insight) principals have continually refined a sophisticated and precise learning technology product categorization schema based on established pedagogical models, knowledge engineering systems, empirical research on learning and knowledge transfer, behavior modification (i.e., learning), educational psychology, cognitive science, data science, and information architecture.

We monitor the learning technology markets and investment patterns in 122 countries across seven international regions. We track six buying segments in each region that buy seven types of advanced learning technology products from five types of suppliers. We have the most complete view of the international demand for learning technology in the industry.

Our research taxonomy is the backbone of our quantitative data repository. It is the foundation of our classification system that enables us to identify, catalog, and index addressable revenue opportunities for suppliers marketing specific products to discrete

buying segments in particular countries across the planet. The purpose of our taxonomy is to provide tactical precision to suppliers competing in a complex global market.

Sources of Investment Activity Information

Metaari tracks private investments made to learning technology suppliers across the planet via a wide range of secondary sources including press releases, financial reports, investment firm sites, edtech funder sites, edtech accelerator sites, startup news portals, and targeted searches.

We constantly monitor public-domain investment tracking sites including CrunchBase, peHUB, the PE Hub Network, Xconomy, DealStreetAsia (Singapore), VCCircle (India), VatorNews, EducationInvestor (UK), China Money Network, Tech in Asia, AltAssets, VC4Africa, FinanceAsia, VentureVillage (Germany), the Latin American Private Equity & Venture Capital Association (LAVCA), the Nordic Web, the Wall Street Journal's Venture Capital Dispatch, FinSMEs (UK), the Asian Venture Capital Journal (AVCJ), DealCurry (India), and VentureBeat.

All the major educational publishers periodically invest in other edtech companies. Those investments are reported in the financial statements. One of the largest education investors is Bertelsmann. Their education group became a stand-alone division at the start of 2016. They also acquire edtech companies usually through their Relias Learning subdivision. They report their investments in their financial reports.

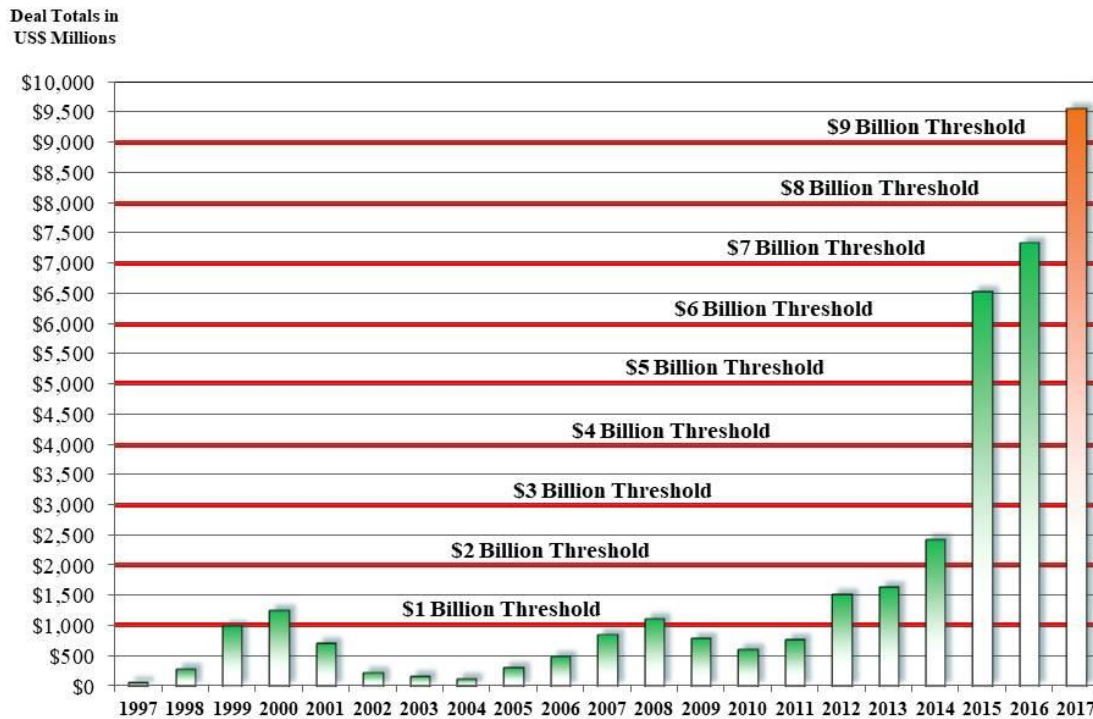
We also track public domain investment sources that focus on particular countries. For example, the top information source for learning technology investment in China is an educational portal called Jiemo Media (JMDedu). The majority of investment activity posted on JMDedu never gets mentioned in the Western media.



Another Historic Record: The 2017 Investment Patterns

The total global investment funding going to global education technology companies in 2017 spiked to a breathtaking \$9.56 billion dollars. This broke the previous record of \$7.3 billion set in 2016 by a wide margin. Funding in 2017 was a striking 31% increase over investment totals in 2016 and a dramatic increase of 47% over the \$6.5 billion record set in 2015. Investments blazed past the \$8 billion threshold and easily reached the \$9 billion threshold, which is unprecedented.

Figure 2 – 1997-2017 Annual Totals for Global Private Investment in Learning Technology Suppliers (in US\$ Millions)



In 2017, a total of \$9,562,655,014.00 went to 813 learning technology companies across the planet. *A total of \$37.8 billion was invested in educational technology companies between 1997 and 2017, and a full 62% of that funding was in just the last three years between 2015 and 2017.* Clearly the industry has entered a new phase.

Shapes in the Investment Patterns

There were seven trends that were clearly evident in the 2017 global learning technology learning investment patterns:

- A massive amount of funding, surpassing the historic records set in 2015 and 2016
- A spike in the number of deals made, particularly in the fourth quarter of 2017
- Strong investor interest in consumer-facing learning technology companies
- The continued flood of investment going to Chinese companies
- A dramatic spike in the investments made to companies in the UK, the Nordic Cluster, and Israel
- The third year of very weak investor activity in Latin America and Brazil
- And the clear investor preference for next-generation edtech companies that are selling products that integrate a range of new technologies including cognitive science, artificial intelligence, Mixed reality (augmented reality & virtual reality), and neuroscience.

It is interesting that there are entirely new types of learning technology products on the market including AI-based Learning products and Educational Robots. There has been a surge of innovation in products that have been on the market for some time. For example, New Game-based Learning products based on psychometrics are experiencing rapid uptake in the corporate sectors across the planet. Corporations have been resistant to Game-based Learning until now.

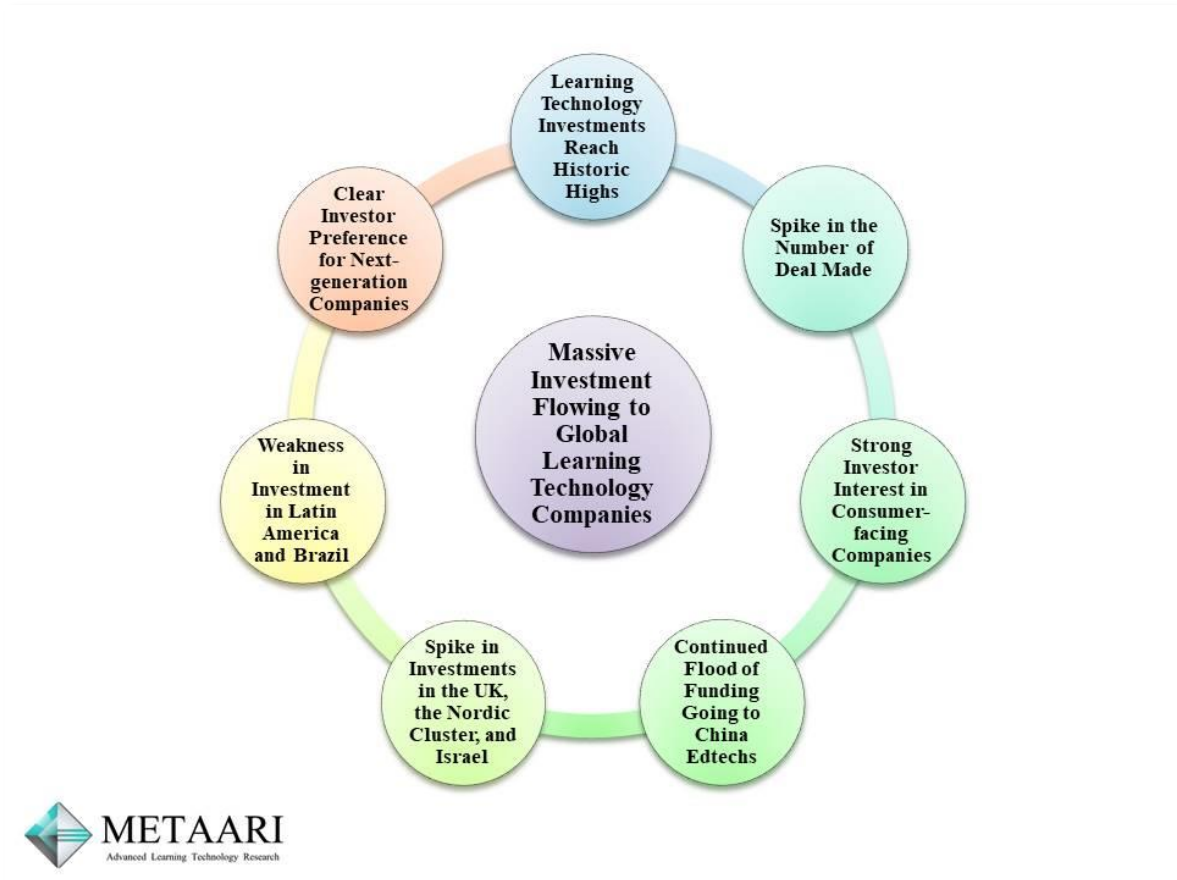
New Cognitive Learning products that incorporate the concepts of brain plasticity and the latest finding in cognitive science and neuroscience are hitting the market at a steady pace. Mixed Reality Learning products are relatively new on the market and are now incorporating advanced simulation, virtual reality, and simulation technologies. And while both Mobile Learning and Location-based Learning products have been on the market for over a decade, they are now taking advantage of cutting-edge device capabilities and advances in Location-based Services.

For example, First-generation Location-based Services (LBS) emphasize the position of the object (triggers, markers, beacons, anchors). Second-generation Indoor Positioning Systems (IPS) emphasize the position of the user via smartphone sensors including the gyroscope, compass, altimeter, and the accelerometer.

Location-based Learning can occur on physical locations and in virtual locations. It can also occur in a past or future time (temporal experiences). Many products on the market combine all three modalities. Temporal Location-based Learning in time essentially accomplishes virtual time travel. It is one thing to visit the Coliseum in Rome today and walk through the ruins. It is an entirely different thing to walk

through it when it was new two thousand years ago, The learning technology industry is in a period of profound innovation and transformation.

Figure 3 –2017 Dominant Trends in the Global Investment Patterns



These trends are iterative and may or may not remain stable in 2018 and beyond. Considering the dramatic spike in funding in the last three years it might be tempting to determine that this is "the new normal", but investment patterns are inherently unpredictable.

And while so-called "rear-view mirror" analysis can be made, investment patterns in any given year cannot be used to predict subsequent patterns. That said, investors are now very interested in next-generation learning products. Metaari views investment patterns as leading indicators and can be used to isolate product trends and buying behavior.

2017 Investment Reaches Historic High (Again)

The investments made to learning technology companies in 2017 were the highest in the history of the learning technology industry by an extraordinary margin and broke the records set in 2015 and 2016. Investments totaling \$9.52 billion flowed into educational technology companies across the planet in 2017.

Table 1 – 2014-2017 Private Investment Totals by Quarter (in US\$ Millions)

Quarter	2014 Investment Totals	2015 Investment Totals	2016 Investment Totals	2016 Investment Totals
First	\$685,752,300	\$1,414,184,500	\$1,647,774,500	\$1,397,708,010
Second	\$483,889,700	\$1,534,885,000	\$1,549,500,615	\$2,795,427,000
Third	\$774,527,000	\$1,234,974,100	\$2,201,935,897	\$2,580,695,172
Fourth	\$496,309,700	\$2,358,561,918	\$1,940,404,408	\$2,788,824,832
<i>Total Annual Investment</i>	<i>\$2,440,478,700</i>	<i>\$6,542,605,518</i>	<i>\$7,339,615,420</i>	<i>\$9,562,655,014</i>

In 2017, there were ten learning technology companies that obtained over \$100 million in funding including DAQRI (a leading Mixed Reality Learning company) at a breathtaking \$260 million, China's VIPKID at \$200 million, EverFi at \$190 million, Gaosi Education, which raised \$198.8 million in three rounds in 2017, 2U at \$189 million, Zuoyebang at \$150 million, Hero K12 at \$150 million, Yuanfudao at \$120 million, Liulishuo at \$100 million, and Xuebajun (Zhihu) at \$100 million. Combined these ten companies accounted for \$1.62 billion in funding in 2017.

As impressive as this, there were 112 companies that obtained between \$20 million and \$100 million that raised a combined total of \$4.17 billion in 2017. There were 217 companies that garnered between \$5 million and \$19.99 million in funding and raised a combined total of \$2.04 billion in 2017. There were 311 learning technology companies that obtained between \$1 million and \$4.99 million in funding amounts in 2017 for a combined total of \$724.2 million.

It is tempting to view the current investment patterns in light of the massive amounts going to a handful of companies. The real story is in the smaller amounts going to a large number of companies.

A Spike in the Number of Deals Made in 2017

The total number of deals made with learning technology companies in 2017 was the highest on record at 813, breaking the previous record of 728 set in 2015. It is interesting that in terms of deals made, 2017 seemed to be on par with 2016 until the fourth quarter.

Table 2 – 2014-2017 Number of Investment Deals by Quarter

Quarter	2014 Number of Deals	2015 Number of Deals	2016 Number of Deals	2017 Number of Deals
First	91	135	168	160
Second	72	178	174	179
Third	77	199	189	192
Fourth	76	216	164	282
<i>Total Annual Deals</i>	<i>316</i>	<i>728</i>	<i>695</i>	<i>813</i>

There was a spike in the number of deals made in the fourth quarter of 2017. This is unusual as fourth quarter investment tends to slow down or remain stable compared to the third quarter.

Metaari principals have been tracking learning technology investment patterns since 1997 and this is the first time a spike in the number deals occurred in the fourth quarter. It is too soon to tell, but this is likely an anomaly.

Investment Patterns by Customer Type

The investment patterns can expose "customer-facing" trends if funding shifts to companies that serve specific buying segments. In terms of total investments made between 2014 and 2017, consumer-facing and corporate-facing companies dominated the funding. Combined, these two types of learning technology companies accounted

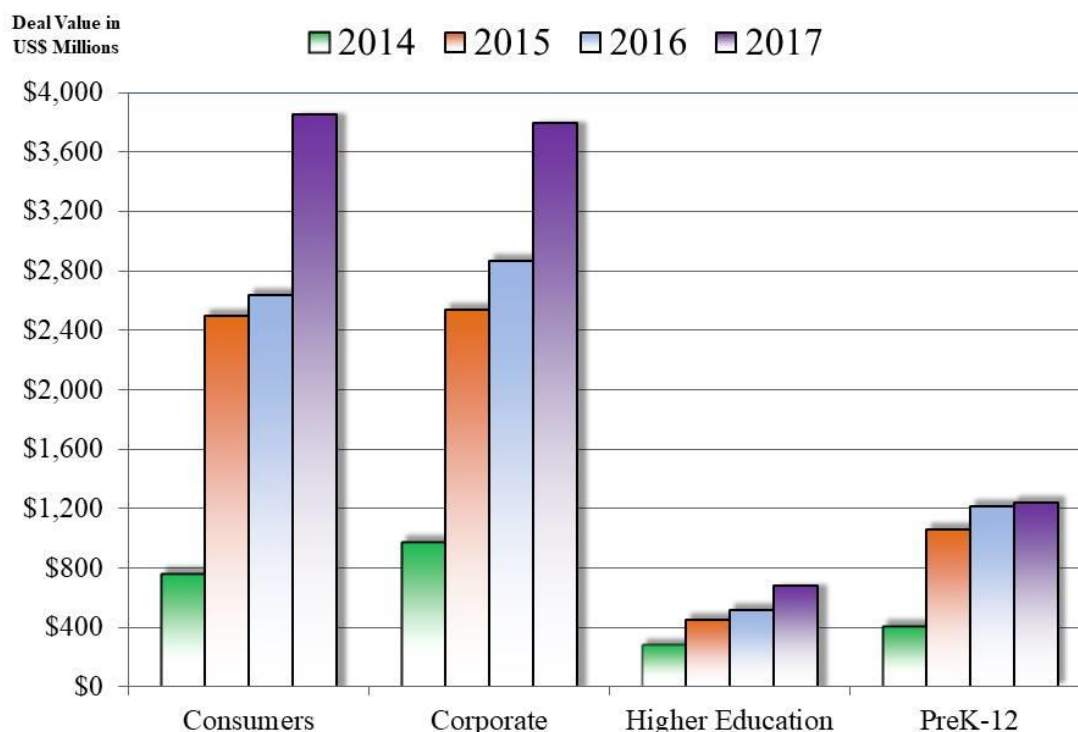
for just under 80% of all investments made to edtech companies across the planet in 2017.

Both consumer-facing and corporate-facing learning technology companies experienced sharp spikes in funding in 2015 compared to the years before. Investments in consumer-facing learning companies more than tripled in 2015 to \$2.49 billion compared to 2014. Investments made to corporate-facing learning companies surged to \$2.53 billion in 2015, up from \$977 million in 2014.

Investments to both consumer and corporate-facing rose again in 2016 but spiked dramatically in 2017, rising to \$3.85 billion and \$3.79 billion, respectively.

Investments made to global higher education companies have been rising steadily since 2014 driven in large part by the demand for managed services in institutions across the planet. Investments made to PreK-12 companies spiked in 2015, but have leveled off in 2016 and 2017.

Figure 4 - 2014-2017 Total Global Learning Technology Investments by Target Customer Type



There is a significant amount of capital flowing to the companies serving the two academic markets, but they are dwarfed by the massive amounts being poured into consumer-facing and corporate-facing companies. Investments remained relatively steady for higher education and PreK-12-facing companies, but investors focused on companies selling legacy products (and managed services) in those two academic segments. That said, barely 13% of total global investment went to PreK-12 companies and only 8% went to higher education companies.

The academic segments are late adopters of advanced learning technology and investors rarely risk investing in academic-facing innovators. Across the globe, in 2017, over \$1.9 billion was invested in companies serving the two academic segments combined.

Investments made to higher education learning technology companies have been rising steadily over the last four years, driven mainly by investor interest in managed services suppliers, like U2, which garnered an impressive \$189 million in September 2017.

Table 3 – 2017 Total Global Learning Technology Deals Investments by Target Customer Type

Target Customer Type	Total Number of Deals Made in 2017	2017 Investment Totals (in US\$)
Consumer	295	\$3,851,252,804
Corporate	316	\$3,792,480,611
Higher Education	58	\$681,519,049
PreK-12	144	\$1,237,402,550
Total Annual Investment	813	\$9,562,655,014

Funding to PreK-12 learning technology companies spiked in 2015 to \$1.05 billion, more than double the \$407 million raised in 2014. Funding rose to \$1.21 billion in 2016 and rose slightly to \$1.23 billion in 2017.

Investments made to consumer-facing companies have lagged slightly behind investments made to corporate-facing companies until 2017. In 2017, consumer-facing companies garnered more funding than corporate-facing firms.

The Steady Rise of Retail Education: Consumer-facing Now Companies Dominate the Learning Technology Investment Ecosystem

A total of \$3.85 billion was invested in consumer-facing learning technology suppliers in 2017. This is 40% of the total investment made to learning technology companies across all the buying segments on the planet.

Products designed for consumers are the most concentrated revenue opportunities for suppliers and investors are clearly aware of this. Perhaps more interesting than the total investment amount is the type of products attracting funding,

Mobile Learning is essentially a consumer phenomenon across the planet and consumer-facing Mobile Learning suppliers across the globe raised \$568.3 million in 2017. In general, mobile brain trainers and edugames for young children dominate the consumer learning technology market. In China, mobile apps that map to PreK-12 curriculum are the most popular with parents. The Mobile Learning companies that obtained the highest investments in 2017 was China's Zuoyebang (that garnered \$150 million) followed by China's Xuebajun (Zhihu) that raised \$100 million. Both sell mobile-based "homework helpers", which are peer-based problem-solving apps.

Despite declining revenues, consumer-facing Collaboration-based Learning suppliers are still attracting investment. The firms tend to be on-to-one online tutoring companies and online language learning providers that use live teachers.

China's VIPKID has garnered \$325 million in funding since they launched in 2013. They offer online English classes to Chinese students using North American teachers. VIPKID offers classes in all subjects, but only in English. They raised an unprecedented \$200 million in August 2017.

Consumer-facing Educational Robot companies obtained \$286.4 million in funding in 2016 and \$335.6 million in 2017. In 2017, the highest amount (\$53 million) went to China-based ROOBO who sells the Pudding and Domgy educational robots. They claim to be the number one educational robot supplier in China. They announced their latest Robotic Tutor called Pudding Bean at the CES event in January 2017.

"PuddingBeanQ is an educational buddy that can help cognitive development and better encourage young children to be proactive learners and discover new knowledge through joyful play.

"PuddingBeanQ, scientifically proven to enhance cognitive development, answers questions and interacts with children aged eight and under, recognizes and responds to their vocabulary through the use of advanced AI. It tells stories and poems from an expanding range of online educational resources and teaches children about melody, rhythm, tone, intensity and pitch when it comes to music and singing."

US-based Wonder Workshop obtained \$41 million in October 2017 for their line of educational robots. While Wonder is US-based, the funding came from China powerhouse companies including TAL Education, the leading online education provider, and the Internet giant Tencent.

Corporate-facing Advanced Learning Technology Companies Lead the Way in Global Innovation

Over \$3.79 billion was invested in corporate-facing educational technology companies in 2017, trailing consumer-facing companies by \$60 million. Corporate training and education buyers across the planet are migrating rapidly away from legacy products like self-paced courseware and are now avid buyers of psychometric Game-based Learning, AI-based Learning, Cognitive Learning, and Mixed Reality Learning (that includes both VR and AR-based products). Companies that sell Educational Robots are also attracting the attention of investors.

A major innovation in learning technology is the real-time augmented performance improvement products designed for field and industrial workers. These products integrate physical reality with augmented reality (AR) and mixed reality (MR). They also produce impressive empirical performance improvement.

In educational psychology, there are two phases of the learning process; knowledge transfer and learning transfer. Knowledge transfer is the transmission of information and skills to the learner. Learning transfer is the ability of the learner to demonstrate mastery in a real world setting. New learning technology products on the market now essentially merge these two phases. They are almost all Mixed Reality Learning products.

A good example is the Smart Helmet and the Smart Glasses products from DAQRI. Both display guided procedural instructional content over machines and physical locations in real time. The company markets products to the industrial verticals. They have a compelling value proposition. "Reduce the talent and experience gap with repeatable, fully modularized, and contextualized training capturing subject expert knowledge and experience." Their Smart Glasses for Professionals was launched in November 2017. DAQRI raised a breathtaking \$260 million in funding in July 2017.

An Israeli company called Augmedics launched in 2014 and sells what they call a "smart surgical system" they call ViZOR. They define the product as "an Augmented Reality Head Mounted Display equipped with various sensors and machine learning capabilities. The ViZOR provides surgeons with valuable information during the surgery in a comfortable and intuitive manner. With its various sensors, The ViZOR collects big surgical data to process and analyze using deep learning algorithms. The

ViZOR will make suggestions, provide alerts, and perform other surgical assistance during the procedure." The company obtained \$8.3 million in funding in September 2017.

Table 4 -2017 Investments Made to Corporate-facing Advanced Learning Technology Companies

Advanced Learning Technology Product Type	Total Number of Deals Made	2017 Investment Totals (in US\$)
AI-based Learning	95	<i>\$1.29 Billion</i>
Cognitive Learning	32	<i>\$237.8 Million</i>
Educational Robots	9	<i>\$125.3 million</i>
Mixed Reality Learning	56	<i>\$435.7 Million</i>

Apprentice.io launched in 2014. They provide augmented performance support primarily to three industries: biopharma manufacturing, biotech, chemicals. Their platform has three main modules: Tandem, Manuals, and BioCapture. "The modules provide a hands-free way to operate in laboratory and manufacturing environments. By using augmented reality to place critical data in one's direct line of sight at the appropriate time, workers can easily record data, manage batch records, assays and procedures with greater confidence, deftness and reliability while preventing process deviation." Their tagline is "We don't just augment reality; we augment human ability." The company raised \$2.5 million in investment funding in December 2017.

Spoke raised \$68 million in two rounds in 2017. They sell an AI-based knowledge management bot platform. "Our use of AI means employees can ask the friendly Spoke bot natural-language questions over Slack, email, SMS, and more and immediately get the information they need. Spoke can intelligently route service requests to the right team; you no longer have to wonder who to ask. It means Spoke can automatically identify outdated cruft in the knowledge base, saving support teams the effort and providing employees with only fresh, up-to-date information. And it means Spoke gets even smarter the more you use it, saving even more time and frustration over the long-run."

A Mixed Reality company called STRIVR (Sports Training in Virtual Reality) provides VR-based training to sports teams and more recently, to retail corporations.

Sports teams buy mental training apps for their players. STRIVR's NFL clients include the Vikings, the 49ers, the Bills, the Cowboys, the Jets, and the Cardinals.

In May 2017, Walmart announced that they had hired STRIVR to develop virtual training experiences to be used in Walmart's 200 employee training centers. In August 2017, STRIVR announced that they had a similar deal with United Rentals, "which will use virtual reality in the same way, training employees on safety and sales training in virtual construction sites."

A good example of a cutting edge Cognitive Learning company is MyBrainSolutions. They garnered \$20 million in funding in December 2017. Originally from Australia, they are now based in the US. MyBrainSolutions was founded by a medical doctor. It has over 45 corporate clients including Boeing, AARP, BrainSpan, Kaiser, and Aetna and reaches over 500,000 employees across 40 companies a year. They license four brain health products to corporations: Mindfulness Meditation, Happy Seeker, Thought Tamer (Cognitive Behavior Therapy), and Memory Maze (working memory). They license brain health products to clinics for ADHD, addiction, and depression.

In September 2016, MyBrainSolutions released the results in claims reductions for active users of the MyBrainSolutions brain training program. "In a data analysis conducted across a cohort of 800 employees that participated in MyBrainSolution's brain health assessment and brain training platform over 2014 and 2015, usage was correlated with a 39 percent reduction in prescriptions and nearly \$600 in annual health cost savings.

Happify launched their corporate-facing brand called Happify Health in August 2016 and a research wing on October 2016 called Happify Labs. The company stated in the press that "Through Happify Health, Happify will expand its evidence-based, highly engaging digital behavior interventions platform to large healthcare providers and employers." The Cognitive Learning company garnered \$9 million in funding in August 2017.

A Cognitive Learning startup called Thrive Global obtained \$30 million in investment in November 2017. "Thrive Global's mission is to end the stress and burnout epidemic by offering companies sustainable, science-based solutions to enhance well-being, performance, and purpose. Recent science has shown that the pervasive belief that burnout is the price we must pay for success is a delusion. We know, instead, that when we prioritize our well-being, our decision-making, creativity, and productivity improve dramatically."

Catalia Health sells a small conversation robot called Mabu designed to provide decision support and emotional support to the elderly. So far, they license the robot to

healthcare providers who distribute the robot to their patients. The company raised \$6.6 million in the tranches in 2017.

Country Investment Analysis

The US accounted for just over 58% (\$5.5 billion) of all investments made to learning technology companies in 2017. China accounted for the second-highest amount at \$1.7 billion, followed by India at \$397.6 million (a relatively steep decline from the year before).

All Roads Still Lead to China

Investment in learning technology companies in China are a relatively new phenomena. There were only six investments made to online education companies in China in 2012 for a total of \$33.2 million. In 2013, 47 online education companies in China received funding from investors and investment spiked to \$398.5 million.

Table 5 – 2012-2017 Total Number of Deals and Investments Made in China

Investment Year	Total Number of Deals Made	2017 Investment Totals (in US\$)
2012	6	<i>\$33.2 Million</i>
2013	47	<i>\$398.5 Million</i>
2014	36	<i>\$634.4 Million</i>
2015	63	<i>\$2.19 Billion</i>
2016	51	<i>\$2.06 Billion</i>
2017	67	<i>\$1.77 billion</i>

By the end of 2014, 36 companies operating in China had obtained funding. While 2014 saw a smaller number of deals, the investment total surged to \$634.4 million (the number of deals appeared to be shrinking in 2014, but the investment amounts were significantly higher).

In 2015, a total of 63 learning technology companies in China were funded, and in 2016, 51 edtech companies in China were funded. While deal flow is down slightly,

investment amounts still surpassed \$2 billion. That said, investment in 2016 was down 6% compared to 2015. In 2017, 67 learning technology companies in China obtained funding.

In 2017, the total investments made to companies in China reached a breathtaking \$1.77 billion. As impressive as this is, it is down from the \$2.19 billion reached in 2015 and the \$2.06 billion reached in 2016.

The highest investment in China in 2017 went to the popular consumer-facing online tutoring company VIPKID, which raised an astonishing \$200 million in August 2017 on top of the \$100 million they raised in 2016. The PreK-12 company called Gaosi Education raised \$198.8 million in three tranches in 2017.

This is not the highest amount obtained in China. The leading online learning firm HuJiang raised \$230 million in three tranches in 2015. Other companies have reached the \$200 million threshold. TutorGroup garnered \$200 million in November 2015 and Xuele (Xueleyan) obtained \$200 million in October 2016.

Four other learning technology companies in China raised large amounts of investment in 2017. Two so-called mobile-based "homework helper" companies called Zuoyebang and Xuebajun (Zhihu) raised \$150 million and \$100 million, respectively. Yuanfudao (formerly Yuantiku) raised \$120 million and an AI-based language learning company called Liulishuo (Lingo Champ) garnered \$120 million.

China is a fascinating market. On the surface, it appears that the economic conditions are quite similar to Brazil, but investment is booming in China and declining rapidly in Brazil.

The similarities between the economies are more apparent than real. Very few individuals are invested in the stock market in China (the figure is cited as 9-11%) and stock market activity has little impact on the broader economy.

Unlike Brazil, there is no recession in China, although growth has "slowed" to 6.9% – a growth rate the US would love to have. Likewise, the Chinese government has always manipulated the value of the yuan. They periodically devalue the yuan to boost exports.

Investments Decline In India-based Learning Technology Companies

Funding declined to \$397.6 million in India in 2017. In 2016, 105 learning technology companies in India were funded for a total of \$564.22 million, up dramatically from the \$297.4 million that went to a total of 62 Indian companies in 2015.

To put this in perspective, in 2012, only 10 learning technology companies in India were funded: a mere \$36.4 million went to these companies for the entire year of 2012. Investor interest picked up considerably in 2013 with a total of \$141.7 million going to 17 companies operating in India.

Table 6 - 2012-2017 Total Number of Deals and Investments Made in China

Investment Year	Total Number of Deals Made	2017 Investment Totals (in US\$)
2012	10	<i>\$36.4 Million</i>
2013	17	<i>\$141.7 Million</i>
2014	13	<i>\$83.0 Million</i>
2015	62	<i>\$297.4 Million</i>
2016	105	<i>\$564.2 Million</i>
2017	83	<i>\$397.6 Million</i>

A modest \$83.0 million went to just 13 Indian companies in 2014, which indicated a diminishing interest among investors. If the investment activity in 2015 and 2016 is any indication, investors are turning their attention to India again. Yet funding declined to \$397.6 million in 2017 and the number of deals declined as well (down to 83 from 105 the year before).

The primary beneficiary of the funding activity in India in 2017 was the PreK-12 company called Byju (a brand of Think & Learn). The company garnered \$70 million in two funding rounds in 2017. China's Internet giant Tencent invested \$40 million in Byju in August 2017. Byju has raised \$244 million since the launched in 2008. In July 2017, Byju acquired Pearson's TutorVista, an online tutoring company with a large international presence.

Headwinds in Latin America: Not a Good Time for Edtech Startups

Across all of Latin America, only \$61.4 million was invested in just nine learning technology companies in 2017. Six of the companies were in Brazil. Edtech

investment has been negatively impacted by the dramatic (and long lasting) economic downturn in Brazil despite the mild recovery that began in early 2017.

In the first three quarters of 2015, there was evidence of investor interest in Brazilian learning technology companies. This changed dramatically in the fourth quarter of 2015 with no investment made to any learning technology suppliers in Brazil and only four investments in the entire year of 2016.

Only 13 learning technology companies were funded in Brazil in 2015 for a combined total of \$107.45 million, a relatively small amount for the largest economy in Latin America. This pattern continued in 2016 with only four edtech companies funded for a total of \$93.57 million; \$40 million of this going to Movable that was obtained from South Africa's Napsters.

In 2017, only six learning technology companies were funded in Brazil for a total of \$57.1 million. This is despite the fact that Brazil came out of their worst recession in the country's history in the first quarter of 2017. Yet, in June 2017, the World Bank labeled Brazil as "the worst economy in Latin America." The investment environment is complicated in Brazil.

Investors are keeping their powder dry until they see a bottom in the currency valuation. For example, the German media conglomerate Bertelsmann and a domestic investment firm called Bozano are sitting on an edtech fund of roughly \$100 million since mid-2014 and only started investing in 2016, **but primarily in brick and mortar institutions**. They did invest an undisclosed amount in the online healthcare courseware company Medcel in early 2016.

Investments made to edtech companies in the rest of Latin America were equally anemic. There were only three other learning technology companies in Latin America that obtained funding in 2017.

- Peru's Laboratoria raised \$750 thousand in May 2017. They sell online coding classes and they market heavily to women.
- A company called Kuepo raised \$2.5 million in September 2017. They sell eLearning content to the PreK-12 schools and operate in Mexico, Colombia, and Chile.

Kinedu in Mexico raised \$1.1 million in December 2017. They sell a product that delivers early childhood learning content based on the cognitive abilities of the child. Parents enter information in the app about the child's development stage and the app adapts to the individual child.

Surge in Investments Made to Companies in the UK, the Nordic Cluster, and Israel

Investment activity is quite robust in Europe, particularly in the UK, and the countries in the Nordic cluster. Israel's edtech startup ecosystem attracted significant investor interest in 2017.

Table 7 – 2017 Investments made to Companies in the UK, the Nordic Cluster, Israel, and Canada

Country& Region	Total Number of Deals Made in 2017	2017 Investment Totals (in US\$)
The United Kingdom (UK)	48	<i>\$290.1 Million</i>
The Nordic Cluster	44	<i>\$240.9 Million</i>
Israel	17	<i>\$235.7 Million</i>
Canada	18	<i>\$109.0 Million</i>

The funding in Canada was dominated by the \$59 million that went to the LMS company Absorb in September 2017. In the current learning technology industry, it is unusual for a legacy company to obtain a large amount of funding like this. A legacy company called 2U raised a breathtaking \$189 million in 2017, but they provide managed eLearning services that are in high demand across universities on the planet.

The UK is a Vibrant Edtech Startup Hub

A total of \$290.1 million was invested in 48 learning technology companies in the UK in 2017 and 33 of these companies were startups. The highest amount went to Babylon Health, which raised \$60 million in April 2017 on top of the \$25 million they raised in January 2016.

Babylon is a unique company that sells a learning product that integrates AI with live consultation with healthcare professionals. Their goal is to achieve 100% AI-based technology. "Cutting edge artificial intelligence together with ever increasing advances in medicine means that the promise of global good health is nearer than most people realize." Babylon starting working with several government health services in London

in early 2017 to test their AI-based chatbot "triage" service as an alternative to the National Health Service (NHS) 111 telephone helpline that patients call to get healthcare advice. It is built on the AI-enabled "symptom checker" that Babylon released in July 2016. The company claims they have provided medical advice to over 250,000 people.

Including Babylon, a total of \$65.6 million went to AI-based Learning companies in the UK in 2017. A company called Artesian Solutions raised \$4.6 million in November 2017. They sell a sophisticated chatbot platform that can sift through vast amounts of sales data in minutes and then generates highly specific advice to sales personnel that map precisely to a customer's needs.

A total of \$36.4 million went to two Cognitive Learning companies in the UK in 2017. Ieso obtained \$24 million in September 2017 and Medigold Health raised \$12.4 million in December 2017. Both provide online mental health counseling and behavior modification therapy. They essentially teach people how to overcome mental health and addiction problems.

Eight Mixed reality Learning companies raised a combined total of \$17.9 million in the UK in 2017 including a startup called Sibro that develops immersive VR experiences. They raised \$1 million in May 2017. Their first product is an historical education app about Londoners during WW1. Two Game-based Learning companies obtained a total of \$24.3 million in funding in the UK in 2017. Both are PreK-12 companies. Zzish raised \$4 million in two funding tranches and SAM Labs garnered \$6.7 million in November 2017.

A legacy learning technology company in the UK called Learnlight garnered \$25 million in April 2017. They are corporate-facing and specialize in live language learning classes and also provide online soft skills training.

Innovation (and Strategic Vision) are the Hallmarks of Learning Technology Companies in the Nordic Cluster

In Metaari's taxonomy, the Nordic Cluster includes Finland, Denmark, Norway, and Sweden. In 2017, 44 learning technology companies in the Nordic Cluster garnered \$240.9 million. Learning technology companies in the Nordic Cluster tend to quite unique in both their product design and their distribution strategies. In general, learning technology companies in the Nordic Cluster design products for children and most of them are mobile and game-based.

Toca Boca was founded in Sweden in 2010 and is one of the world's most successful early childhood learning game developers. They launched their first app in March 2011 and by June 2017 had reached over 130 million downloads. They develop both

iOS and Android apps. They were acquired by Canada-based Spin Master in April 2016.

Founded in 2011, Finland-based SkillPixels develops and designs educational games for children 4-8 years old. The Finnish startup raised \$2.1 million in funding in late 2014 to build a “complete educational channel”.

Rovio (Angry Birds) closed down their education division in late 2015. The professionals that worked in the group left to create educational gaming startups. Lightneer launched in November 2015 and Fun Academy launched in January 2016. Both are based in Helsinki.

One major characteristic of the serious game industry in the Nordic cluster is the tendency for developers to target international markets even in startup phase. They focus on international expansion early in the development process.

Lightneer developed an ambitious game to teach particle physics to very young children and Fun Academy integrates the principles of the Finnish education system (often touted as the best in the world) into mobile games. Interestingly, Lightneer launched their first education game (Big Bang Legends) in Asia in May 2017 across seven countries in the region. Fun Academy also is targeting Asia, particularly China. This global strategy is a hallmark of Finnish game makers. The company raised \$5 million in funding in August 2017.

A quiz game platform called Kahoot! is widely used in the Norwegian schools. Launched in 2011 in Norway, as of 2017, the game now has over 50 million users across the planet including 32 million in the US. The company raised \$10 million in funding in July 2017. This is in addition to the \$16.6 million they raised in venture capital prior to 2017 including \$10 million obtained in September 2016.

Norway is home to WeWantToKnow, the company that developed the wildly popular math educational games under the DragonBox brand. DragonBox is now an international hit and consistently ranks in the top selling educational apps in countries all over the world, including Norway.

According to the Nordic Edtech Alliance, "Scandinavia attracts a lot of capital due to a high degree of innovation, usability, high technology, and scalability. A strong gaming industry and fintech scene are examples of this. With an internationally renowned education system, good at developing future skills like collaboration, creativity, and entrepreneurship. Leading in digitizing the education sector, Nordic Edtech has all the right ingredients.”

Israel Home to Several New EdTech Startups

Learning technology companies in Israel attracted a substantial amount of funding in 2017. In 2017, 17 educational technology companies in Israel obtained \$235.7 million. Out of the 17 companies funded, 14 were startups. The largest amount in Israel went to a company called WalkMe, which provides online procedural support and training for website operators. The company raised \$75 million in July 2017.

The second-highest amount went to a company called Iguazio that develop sophisticated AI-based Learning products. They garnered \$33 million in July 2017. This was followed by the \$23 million invested in Logz.io that also develop AI0based Learning products. These products are capable of analyzing very large amounts of data in seconds and provide detailed analysis of the data to humans using natural language process.

A unique company called Gong.io raised \$20 million in Israel in July 2017. The company sells an AI platform that trolls through massive amounts of audio content in customer relationship management systems in real time and has the ability to identify emotional states. It is a hybrid AI-based and Cognitive Learning product. A company called Coneuron is AI-based and sells so-called Social and Emotional Learning (SEL) products. They raised \$4 million in November 2017.

And finally, a company called Intuition Robotics sells an educational robot designed to provide decision support and life advice to the elderly. They sell a small robot called ElliQ. "ElliQ is an artificial intelligence-based robot companion that aims to keep older adults active and engaged with family members by helping make technology use easier. The robot, named after a Norse goddess, *is designed to learn an owner's personality and preferences*, and uses machine learning and natural language processing to suggest things like taking a walk or Skyping a grandchild." The company raised \$15 million in funding in two rounds in 2017 on top of the \$2 million they obtained in early 2016.

Investors Keen on Next-generation Advanced Learning Technology Products

Metaari considers learning technology investment patterns to be leading indicators. Those patterns can show a shift away from legacy product types toward different or even new product types.

This is clearly the case in between 2015 and 2017, with investors shifting their interest away from legacy products like Self-paced eLearning to next-generation companies selling Cognitive Learning, AI-based Learning, Mixed Reality Learning (AR-based

Learning and VR-based Learning), 5G Mobile Learning, Game-based Learning, and even Educational Robots. In 2016 and 2017, investors began shifting the funding to new types of advanced learning technologies including AI-based Learning, which is a very new type of learning technology product

- Over \$1.7 billion was invested in 124 AI-based Learning companies in 2017. The vast majority of the firms were corporate-facing companies, but there were investments made to consumer and PreK-12 suppliers. This is all the more extraordinary since barely \$122.4 million was invested in this type of company in 2016 and that was only to seven companies. A mere \$2 million went to a single AI-based company in 2015 and there was no investment in this type of company prior to 2015. This is an entirely new type of learning product.
- Over \$918.9 million was invested in 84 Cognitive Learning companies in 2017. Over half (50) of the companies were consumer companies, yet 29 corporate-facing Cognitive Learning suppliers garnered investments. Five PreK-12 Cognitive Learning companies were also funded.
- Over \$487.5 million was invested in 77 Game-based Learning companies in 2017. Most of the firms that obtained funding were consumer-facing and academic-facing companies although ten corporate-facing Game-based Learning companies were funded.
- Over \$728.6 million was invested in 80 Mixed Reality Learning companies in 2017. Half of the firms funded were consumer and academic companies. There were 40 corporate-facing Mixed Reality Learning companies funded in 2017.
- Over \$568.3 million was invested in 37 Mobile Learning companies in 2017. The funding was dominated by the \$150 million that went to China's Zuoyebang and the \$100 million raised by China's Xuebajun (Zhihu). What is interesting is that they both have very similar so-called "homework helper" products in which peers provide help on assignments via a smartphone. A mobile company called Yuanfudao (formerly Yuantiku) raised \$120 million in 2017 and an AI-based mobile language learning company called Liulishuo (Lingo Champ) garnered \$120 million in 2017.

The AI innovations in the corporate learning market revolve around AI-based knowledge management that utilizes natural language processing (NLP) and "smart chatbots" that essentially provide ad hoc performance and decision support to employees. New AI-base big data analysis, data visualization, predictive analysis, and business process intelligence have fundamentally altered the corporate learning landscape. There were consumer-facing AI-based Learning companies funded in 2017:

- A startup called Replika allows users to create and chat with their own personal AI that they claim provides "new levels of self-reflection and an always available confidant willing to lend an ear or provide an encouraging word. Replika learns quirks, tone and syntax of how a user communicates to the point where it can start sounding like its creator." They raised \$6.5 million in November 2017.
- Duolingo is a major language learning app developer and launched their Duolingo Bots product line in late 2016. "Duolingo Bots are powered by artificial intelligence and react differently to thousands of possible answers. Feeling stuck? Hit 'help me reply' and they'll come up with suggestions. Best of all — the more you practice, the smarter they get." Duolingo has obtained \$108.3 million in funding since 2011 including \$25 million in July 2017.
- In July 2016, China-based Liulishuo introduced "the leading AI tutor, called 'Dong Ni Ying Yu' (tutor that understands you). It provides users with personalized learning content and a study plan. Touted as a revolution in language learning within the industry, the company claims it can triple users' learning efficiency." They had over 40 million users across 20 countries by April 2017. The company obtained \$100 million in funding in July 2017.

One major catalyst for the AI-based Learning product type is the use of IBM's Watson cognitive computing platform in the educational sector. Sesame Street, Pearson, Harcourt Mifflin Harcourt, and Blackboard are now developing education apps on Watson.

Cognitive Learning companies that provide behavioral modification health and wellness programs and psychometric-based recruitment assessment games are attracting high investment amounts.

The spike in the funding for Mixed Reality Learning companies coincides with the vibrant innovation occurring in the industry in general. Except for six academic-facing companies, most of the funding went to consumer and corporate-facing firms. The catalysts driving Mixed Reality learning in the corporate segment are the rapid adoption of real-time AR-based decision and performance support systems in the industrial sectors and the increased use of VR-based education products in healthcare.

In 2017, over \$335.6 million was invested in 25 learning companies that were selling Educational Robots. While the total funding amount is up from the \$286.4 million invested in Educational Robot companies in 2016, only six companies were funded in 2016 and four of them were in China. The 2017 investments went to companies all over the world including the US, the UAE, the UK, India, South Korea, Denmark, Israel, France, and Sweden. The largest funding went to China's ROOBO which raised

\$53 million in September 2017. They make the popular Pudding Bean educational robot for kids.

Educational Robots are designed specifically for knowledge transfer and are different from so-called companion, social, and family robots. Many companion robots (like Blue Frog Robotics' Buddy robot) do have education content for young children but they are not designed exclusively for education.

According to the report, *Executive Summary World Robotics 2016 Service Robots* published by the International Federation of Robotics (IFR), "About 3 million robots for education and research are expected to be sold in the period between 2016 and 2019." In February 2016, the US Toy Industry Association (TIA) reported that the "hottest robots of the year will be customizable and teach kids important concepts, including coding, engineering, problem-solving and building."

A startup called Catalia Health sells an AI-powered "patient engagement" robot called Mabu that the company defines as a "wellness coach". She "provides tailored conversations to each patient that evolve over time." They raised \$2.6 million in funding May 2017 and another \$4 million in November 2017.

