The 2016 Global Learning Technology Investment Patterns

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For more information about this research, email: contact@metaari.com
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 focuses 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
The investment totals in this whitepaper include crowdsourced, seed, angel, venture capital, and private equity. The totals do not include government grants (such as SBIR grants) 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.
The whitepaper only covers digital learning technology companies that sell products directly related to instruction and does not deal with investments made to print-based, brick-and-mortar, classroom equipment companies, or non-instructional software.

Over several decades, Metaari (formerly Ambient Insight) principals have refined a sophisticated and precise learning technology product categorization schema based on pedagogical principles, knowledge engineering systems, data science, and information architecture.

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.

Figure 1– Metaari’s Learning Technology Research Taxonomy

This whitepaper focusses on the eight learning technology product types as defined by Metaari’s Research Taxonomy: Self-paced eLearning (courseware), Collaboration-based Learning (live online tutoring), Digital Reference-ware (digital audio, digital
video, and text), Simulation-based Learning, Game-based Learning, Mobile Learning, Cognitive Learning, and a very new type of learning product, Robotic Tutors.

Metaari tracks the investments made to five types of companies that sell these products. These companies sell retail packaged digital content, custom content development services, value added services, tools & platforms, and educational robots.

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, EducationInverstor (UK), China Money Network, Tech in Asia, AltAssets, VC4Africa, FinanceAsia, VentureVillage (Germany), the Latin American Private Equity & Venture Capital Association (LAVCA), The Wall Street Journal's Venture Capital Dispatch, 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 a educational portal called Jiemo Media (JMDedu). The majority of investment activity posted on JMDedu never gets mentioned in the Western media.
The 2016 Global Learning Technology Investment Patterns

There were seven trends that were clearly evident in the 2016 global learning technology learning investment patterns:

- A massive amount of funding, surpassing the historic record set in 2015
- Strong investor interest in consumer-facing learning technology companies
- The continued flood of investment going to Chinese companies
- The involvement of the global Internet giants in investing in edtech companies
- A dramatic spike in the investments made to companies in India
- The second year of very weak investor activity in Brazil
- And the clear investor preference for next-generation edtech suppliers

It is interesting that while the number of deals made in 2016 was 4.5% lower than 2015 (695 in 2016 compared to 728 in 2015), the total dollar amount invested to learning companies around the world was higher in 2016.

Figure 2 –2016 Trends in the Global Investment Patterns
These trends are iterative and may or may not remain stable in 2017 or later. Considering the dramatic spike in funding in the last two 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.

**2016 Investment Reaches Historic High (Again)**

The investments made to learning technology companies in 2016 were the highest in the history of the learning technology industry by an extraordinary margin. In 2016, global investments made to learning technology companies reached over $7.33 billion, up 12.1% from the previous record set in 2015 ($6.54 billion) and up dramatically from the previous records of $2.44 billion in 2014 and $1.64 billion in 2013.

Thirty-four learning technology companies across the planet garnered investments amounts at or above $50 million in 2016, up from the twenty-five that raised $50 million or above in 2015. Twelve companies obtained $100 million or more in 2016, on par with the ten companies that garnered over $100 million in 2015.

**Table 1 – 2014-2016 Number of Investment Deals by Quarter**

<table>
<thead>
<tr>
<th>Quarter</th>
<th>2014 Number of Deals</th>
<th>2015 Number of Deals</th>
<th>2016 Number of Deals</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>91</td>
<td>135</td>
<td>168</td>
</tr>
<tr>
<td>Second</td>
<td>72</td>
<td>178</td>
<td>174</td>
</tr>
<tr>
<td>Third</td>
<td>77</td>
<td>199</td>
<td>189</td>
</tr>
<tr>
<td>Fourth</td>
<td>76</td>
<td>216</td>
<td>164</td>
</tr>
<tr>
<td><strong>Total Annual Deals</strong></td>
<td><strong>316</strong></td>
<td><strong>728</strong></td>
<td><strong>695</strong></td>
</tr>
</tbody>
</table>

Of the thirty-four companies that raised $50 million or more in 2016, twenty were in the US, ten were in China, and four were in India. **These thirty-four companies combined obtained $3.268 billion in 2016, more than the total investments ($2.440 billion) made to all 316 companies funded in the entire year of 2014.**
The top two companies that garnered the most investment in 2016 were both Chinese companies; Xuele (Xueleyan) obtained $200 million in October 2016 and Chunyu Yisheng raised $183 million in June 2016. The third highest amount went to the US-based Age of Learning (a Game-based Learning and Mobile Learning company), which obtained $150 million. Age of Learning’s early childhood learning product ABCmouse is popular across the planet.

**Figure 3 – 1997-2016 Private Investment in Learning Technology Suppliers (in US$ Millions)**

India's ByJu's Learning raised $155 million in four rounds in 2016 including the $75 million it obtained in March 2016, the highest amount ever invested in an India-based learning technology company.

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 2015 and 2016, with investors shifting their interest away from legacy products like Self-paced eLearning to next-generation Cognitive...
Learning, Simulation-based Learning, Mobile Learning, Game-based Learning, and Educational Robot companies.

**Table 2 – 2014-2016 Private Investment Totals by Quarter (in US$ Millions)**

<table>
<thead>
<tr>
<th>Quarter</th>
<th>2014 Investment Totals</th>
<th>2015 Investment Totals</th>
<th>2016 Investment Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>$685,752,300</td>
<td>$1,414,184,500</td>
<td>$1,647,774,500</td>
</tr>
<tr>
<td>Second</td>
<td>$483,889,700</td>
<td>$1,534,885,000</td>
<td>$1,549,500,615</td>
</tr>
<tr>
<td>Third</td>
<td>$774,527,000</td>
<td>$1,234,974,100</td>
<td>$2,201,935,897</td>
</tr>
<tr>
<td>Fourth</td>
<td>$496,309,700</td>
<td>$2,358,561,918</td>
<td>$1,940,404,408</td>
</tr>
<tr>
<td><strong>Total Annual Investment</strong></td>
<td><strong>$2,440,478,700</strong></td>
<td><strong>$6,542,605,518</strong></td>
<td><strong>$7,339,615,420</strong></td>
</tr>
</tbody>
</table>

The patterns can also expose "customer-facing" trends if funding shifts to companies that serve specific buying segments. In 2016, investor interest tapered slightly off consumer-facing companies but still accounted for the largest number of investment deals.

Investments remained relatively steady for corporate-facing and higher education-facing companies, but investors focused on specific types of products: Cognitive Learning in the corporate segment and managed services in the higher education segment.

Cognitive Learning companies that provide behavioral modification health and wellness programs are attracting high investment amounts:

- Virgin Pulse raised an unprecedented $92 million in 2015
- Quartet Health raised $40 million in April 2016
- Weltok obtained $37 million in October 2016
- Vida Health raised $28 million in December 2016

Companies that provide management services to the higher education segment are doing quite well. They are attracting very large amount of venture. For example, HotChalk raised an astonishing $230 million in 2015 and another $83 million in 2016.
An India-based company called NSPIRA garnered $60 million in early 2016, which is a high amount for a learning technology investment in India.

**Figure 4 - 2014-2016 Number of Investment Deals by Target Customer Type**

Investments deals made with PreK-12 companies have been ticking up at a steady rate for the last five years, mostly driven by new investments made to companies outside the US. Investors were particularly interested in companies that were selling Game-based Learning and so-called Social Emotional Learning platforms (a Cognitive Learning product) to the schools.

**Consumer-facing Companies Dominate Learning Technology Investment**

A total of $2.86 billion was invested in consumer-facing learning technology suppliers in 2016. This is 39% of the total investment made to companies that market to buyers across all eight buying segments.

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 $994.1 million in 2016. Mobile brain trainers and educational apps for young children dominate the consumer learning technology market. The Mobile Learning company that obtained the highest investment was China-based Chunyu Yisheng, which raised $183 million in 2016. They are a mobile Q&A service providing healthcare content to consumers.

Consumer-facing Game-based Learning companies garnered $576.8 million in 2016. This was due in large part to the unprecedented $150 raised by Age of Learning. This is the highest amount ever obtained by a Game-based Learning company in the history of the learning technology industry. The company sells the internationally popular ABCmouse product for young children. While still a web-based subscription service for the most part, their mobile version of ABCmouse is consistently in the top ten best-selling educational apps in many countries. They are now expanding into the PreK-12 segment.

**Figure 5 - 2016 Private Investments Made to Consumer-facing Companies by Eight Learning Product Types (in US$ Millions)**
Consumer-facing Cognitive Learning companies raised $387 million in funding in 2016. Akili Interactive Labs raised $43.8 million in three funding rounds in 2016. They have developed a sophisticated cognitive game that assesses the mental state of a player. "At Akili, we're in the process of building clinically-validated cognitive therapeutics, assessments, and diagnostics that look and feel like high-quality video games."

Despite being a legacy product facing revenue decline, 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. Thirteen consumer-facing Collaboration-based Learning companies obtained $335.1 million in 2016, with two highest investments going to two China-based companies: $100 million to online English learning company VIPKID and online tutoring firm 1Smart Education which raised $75 million.

VIPKID has garnered $125 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. The company claims they are growing at ten times a year. The investment was made by Kobe Bryant's new fund Bryant Stibel.

Consumer-facing Robotic Tutor companies obtained $286 million in funding in 2016. China-based Rokid raised the second highest amount at $54 million. Robotic Tutor companies market their products to two primary buying segments: consumers and academic buyers. They also sell robots used for therapeutic purposes to mental healthcare-related organizations. The products designed for consumers have relatively low price points (they are falling fast in any case). Products designed for academic research and mental healthcare firms are often quite expensive, but their prices are falling as well.

The highest amount ($100 million) went to China-based ROOBO who sells the Pudding and Domgy educational robots. They claim to be the number one educational robot supplier oin 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, recognises 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."
Metaari's Analysis of the 2016 Global Learning Technology Investment Patterns

Only $35.3 million went to thirteen consumer-facing Simulation-based Learning companies in 2016. The highest investment went to an India-based company called Skill India, which is rolling out VR and AR training centers in India. They are interesting since they use AR and VR to teach AR and VR.

Consumer-facing Digital Reference-war suppliers raised $185.8 million in funding in 2016. Only eleven companies were funded and almost half of this funding went to just one company. Healthline Media raised $90 million in January 2016. Healthline provides a wide range of healthcare-related content including nutrition, dental, addiction, fitness, and physical and mental illness. They have over 65 million subscribers and generate revenues from advertising. "Whether you’re here to learn more about a health condition, research a medication, tap into one of our communities, or get some tips for a healthier lifestyle, you’re in the right place."

There was some investor interest in consumer-facing eLearning companies. Only $94.7 million went to just twelve companies. **What is most striking about this 2016 investment is the fact that $1.5 billion went to 64 consumer-facing eLearning companies in 2015.**

The two largest amounts went to US-based Degreed at $46 million (in two rounds) and China-Based Itxdl.cn at $18.75 million. Degreed aggregates online courses from third-party publishers and focusses on professional and lifelong learning courses. Itxdl is an online IT skills training platform.

**The US Still Dominates the Investment Landscape (For Now)**

The vast majority of learning technology investments in 2016 went to US companies. There were 390 learning technology companies based in the US that obtained funding in 2016.

Combined, these US companies garnered $4.18 billion in investment. This is 58% of the total investments made across the planet in 2016. In comparison, investments made to companies in China reached $2.06 billion in 2016, which was 28% of the total global investments made in 2016. **That said, it is striking that 86% of all investments made to learning technologies across the planet in 2016 went to just two countries.**

Prior to 2012, essentially all of the learning technology investments went to US-based companies. This is now a very different landscape and learning technology investment is a global phenomenon, but the US still dominates the investment ecosystem.

The majority of investment made to learning technology companies in 2015, in terms of both deal flow and dollar amount, went to US-based companies. Of the 728 global
deals made with learning technology companies in 2015, 586 went to US companies for a combined total investment of $3.62 billion, which was 56% of all the investments made in that year.

The investment patterns in terms of deal flow have remained consistent in the US, but the discrete dollar amounts pale in comparison to China. The declining revenue for Self-paced eLearning in the US is an inhibitor going forward for that type of company. Only 32 eLearning companies operating in the US obtained funding in 2016. Combined, they raised $339.17 million, and while this may sound impressive, it is dramatically lower than 2015.

On the other hand, investors turned their attention to next-generation product suppliers in the US including Simulation-based Learning companies, Cognitive Learning suppliers, Game-based Learning companies, Mobile Learning, and Robotic Tutor firms.

There were 84 Simulation-based Learning companies in the US that were funded in 2016. Combined, they raised a breathtaking $1.439 billion in investments. This is all the more remarkable considering that this was 78% of all funding that went to these kind of companies across the planet.

Of the 52 Cognitive Learning suppliers funded in 2015, 47 were US companies. Of the 121 Cognitive Learning companies funded in 2016, 91 were based in the US. US companies accounted for the vast majority of $1.26 billion that went to Cognitive suppliers around the world: US suppliers raised $997.87 million in 2016.

Investments are also flowing to US-based Game-based Learning companies operating in the US in increasingly large amounts and number of deal flows.

- There was only $35.9 million invested in eleven Game-based Learning companies in the US in 2014.
- Game-based Learning suppliers in the US garnered $126.8 million in 2015 with 31 deals made. In 2015, 90% of the Game-based Learning suppliers funded were based in the US.
- In 2016, 58 Game-based Learning companies in the US raised investments for a combined total of $397.06 million in funding, nearly triple from the year before. This was more than the $339.17 invested into US eLearning companies in 2016.

There were 59 Mobile Learning companies in the US that obtained funding in 2016 for a combined total of $248.16 million in investment. This is the one learning technology
investigation pattern that is not concentrated in the US. Investments made to US Mobile Learning companies in the US in 2016 accounted for a mere 20% of all investment that went to this type of company in 2016.

Despite the fact that Robotic Tutor companies in Asia essentially invented the education robot market, 70% of all funding for Robotic Tutoring companies in 2016 went to US-based firms.

All Roads Still Lead to China: Despite the High Rate of Startup Failures
There were only six investments made to online education companies in China in 2012. In 2013, 47 online education companies in China received funding from investors. By the end of 2014, 36 companies operating in China had obtained funding. While 2014 saw a smaller number of deals, the investment total was more than double from 2013.

In 2015, a total of 67 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.

A total of $634.4 million was invested in online education companies in China in 2014; this is just over 26% of all funding that went to all the learning technology suppliers across the globe in 2014. In 2015, a breathtaking $2.19 billion was invested in learning technology companies in China; this is 34% of all global funding. In 2016, $2.06 billion was invested in Chinese edtechs, which is 28% of all funding going to edtech companies across the planet in 2016.

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 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 and the value has always been at the whim of the government. They devalued the yuan to boost exports.

In October 2015, Michael Minhong Yu, Chief Executive Officer of New Oriental Education, stated that, "It is important to note that we have found in other periods of economic downturn that education spending proves to be more resilient than most of
the other consumer discretionary categories in China and this is being proven once again in the current environment."

The High Rate of Edtech Startup Failures Does Not Seem to Faze Investors
At the end of 2012, there were barely 100 online education companies operating in China. There has been a spike in the number of online education startups in China that began in earnest in 2013.

According to an April 2014 article in The China Times, over 1,000 new online education companies opened for business in China in 2013 alone.

According to BANC Business Research, there are now over 8,000 online education companies in China. Despite the healthy demand in China for online education, the market is just too crowded and fragmented. The market cannot sustain this many suppliers. It should come as no surprise that a shakeout is in progress. The turmoil intensified in 2015.

In June 2016, the South China Moring Post reported that "Despite the adequate funding support over the last two years, many online education start-ups have run out of money and were forced to close their business due to unprofitable business models. More than 30 out of 110 well-known Chinese online education start-ups including Tizi.com, nahao.com and fenbi.com, all shut down after running out of the money raised over the last two years."

Yet, new online education companies (mostly bootstrapped) continue to come on the market and some analysts are predicting that a bubble is on the horizon. A 2014 report from Deloitte predicts "that a third wave of IPOs by Chinese online education companies will wash up on American exchanges by the end of 2016."

In many segments in China (particularly the consumer segment), learning technology startups are now competing for the same customers even offering products for free in concerted efforts to grow their installed user bases in a short period of time. These are the suppliers that are failing at a rapid rate. Another reason they are failing is that they simply cannot compete with the major brands that have aggressively entered the market.

The most active investors in online education in China in 2014 and 2015 were the venture capital firms DCM, Shunwei, Weitoulu, Gobi, ZhenFund, Matrix, and IDG. The largest corporate investors were Qualcomm, Xueresi, Bertelsmann, Baidu, and NetEase.

For more information about this research, email: contact@metaari.com
One very unique aspect of the learning technology market in China is the active participation of the major technology companies that are increasingly diversifying into the market. They are now major competitors (and investors) in China.

**The Big Internet Brands in China Shake Up the Market**

Baidu, Alibaba, and Tencent are the largest Internet companies in China and they all entered the commercial eLearning and Mobile Learning markets in 2013 and 2014. Several other leading Internet companies entered the commercial learning technology market in the last two years including NetEase, Sohu, Renren, Kaixin, Jiayuan, Sina Weibo, YY, NetDragon Websoft, Youku Tudou, and Kingsoft. All of their online learning businesses at launch were web-based; all of them are now adding mobile features.

What is interesting is the diversity of the Internet companies. Baidu is the largest search engine in China. Alibaba and Tencent are eRetailers. Jiayuan is a dating site, RenRen and Kaixin are social networks, NetDragon is a game developer, Sohu is an online media and gaming company, NetEase is an IT giant, YY is a Skype-like platform, Sina Weibo is a media company with a Twitter-like product, Youku Tudou is an online video provider, and Kingsoft is a software company.

To put this unusual ecosystem in perspective, imagine if Google, Google's YouTube, Yahoo, eBay, Facebook, Microsoft, Microsoft's Skype, Gameloft, Twitter, IBM, Amazon, and eHarmony all entered the commercial learning technology market *at the same time*.

Tencent, the largest online mass media company in China, started offering online courses in late 2013. In April 2014, they launched Tencent Classroom "an e-learning center that offers exam-oriented courses in language study, skill training and certification, as well as a few lessons for primary and high school students." By August 2014, they had attracted over 34 million users.

New Oriental and Tencent announced a joint venture called Weixue Mingri (Beijing WeLearn Future Network Technology) in August 2014 to develop mobile English language learning products. Their first product launched in December 2014. New Oriental CEO stated in the press that, "Thanks to our joint efforts with Tencent over the past four months, we have successfully launched the first mobile learning product that will transform how students in China learn English. Working together, we believe we can create more best-in-class mobile learning solutions for students in China."

YY, the video-based social network, launched their online learning platform called 100.com in February 2014. The new learning platform is focused on digital English language learning. YY released the iOS and Android mobile versions of the learning
platform in September 2014. "Like the website, the mobile app is able to stream live classes during which students can interact with teachers."

It is interesting that the Internet giants continue to invest in online education companies despite the fact that they now have branded products on the market. For example, Alibaba led the breathtaking $100 million investment in TutorGroup in early 2014. Baidu invested $4 million in an online test prep company called Wanxue in July 2014 and $10.6 million in another test prep company called Innobuddy in September 2014.

In February 2015, Baidu invested $100 million the online language learning provider HuJiang. In October 2015, TAL Education invested $35 million in Phoenix E-Learning Corporation, "which operates zxxk.com, the largest online educational platform serving the public school system in China."

**The Pattern Continued in 2016**
The internet giants continued to pour money inot learning technology companies in 2016, but there was one major difference: they started invested in companies outised of China too.

In February 2016, TAL Education invested $52 million in US-based Knewton, which develops what they claim is adaptive learning technology.

Tencent invested $50.4 million in New Oriental's Xun Cheng -Koolearn.com portal in February 2016. Tencent gave $40 million to Yuanfudao in June 2016 and another $30 million to Zaih.com (Zaihang) in November 2016. They aso gave "millions of dollars" to a Mobile Learning Q&A app company in China called Fenda. The word Fenda in Chinese translates to "one minute answer."

In November 2016, Baidu invested $29 million in China-based SmartStudy. SmartStudy was founded by former New Oriental executives and specializes in international standardized exam prep content.

NetDragon invested $3.94 million in an extraordinary company called ARHT Media based in Canada. The company has a technology that generates what the call HumaGrams. A holographic image of a teacher or trainer can be broadcast across the planet. The unique thing is that technology is interactive and the presenter can interact with the audience.

Alibaba invested $5 million in the US-based location intelligence company PlaceIQ in October 2016 and $18 million to Israel-based InfinityVR in November 2016.
Not Just a China Phenomenon Anymore

Naspers is a South Africa-based Internet giant with operations in over 130 countries. In 2016, they explicitly stated in the press that they intended to emulate Tencent’s investments in edtech companies.


Dramatic Spike in Investments In India-based Learning Technology Companies

In 2016, 103 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 63 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.

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.

In 2015, the majority of investments made in India learning technology companies went to Self-paced eLearning courseware suppliers. In 2015, $192.4 million went to eLearning companies in India. The pattern shifted in 2016, with only 17 eLearning companies being funded for a combined total of $116.64 in funding.

In contrast, 23 Game-based Learning companies were funded raising a combined total of $171.47 million in 2016. Additionally, 16 Mobile Learning companies were funded in India in 2016 garnering a combined total of $69.60 million and nine Cognitive Learning companies were funded for a total of $54.34 million.

Interestingly, a new learning technology accelerator call EDUGILD launched in September 2015 in India. It began providing seed and angel funding to startups beginning in January 2016; each selected startup receiving up to $22,500 in exchange for a 10% stake. EDUGILD funded six edtech startups in 2016. They funded other education-facing companies in 2016, but only six were directly related to instruction.
Brazil Hits Headwinds: Not a Good Time for Edtech Startups

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 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 Movile obtained from South Africa's Napsters.

The investment environment is complicated in Brazil. The inflation rate is very high and the dramatic devaluation of the Brazilian Real is economy-driven - a primary factor relating to the recession. Unemployment is at a five-year high. Brazil reported in December 2015 that they are in three quarters of contraction, the longest since 1999.

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 last 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.

"Compared with its average in 2013, the Brazilian Real lost 38 per cent of its value against the US dollar in 2016. At its weakest, in January 2016, it lost as much as 47 per cent." (Financial Times, December 2016)

As recently as September 2015, analysts expected that this would have a positive impact on private investment; this has not proven to be the case. The annual inflation rate in Brazil is 9.5%. Investors now expect a continued drop in the value of the real and are waiting until it hits a bottom.

"Just a few months ago, dealmakers at some of Brazil's largest investment banking firms, like Bradesco BBI and Goldman Sachs believed a gradual slide in the Real would boost activity as takeover costs would fall in dollar terms for cash-rich private equity and sovereign wealth funds. Buyout firms are walking on egg-shells and multinational firms are also taking longer than usual to execute due-diligence. In the year through September 2015, companies announced $24.3 billion worth of M&A transactions in Brazil, the lowest in a decade and down 45 percent from a year earlier, according to Thomson Reuters deal intelligence data.”
Investors Migrating Rapidly Away From Legacy Products

The global learning technology market reached $76.2 billion in 2016. There are eight learning technology product types tracked by Metaari: Self-paced eLearning, Digital Reference-ware, Collaboration-based Learning, Simulation-based Learning, Game-based Learning, Cognitive Learning, Mobile Learning, and Robotic Tutors.

The Steep Decline in Legacy Learning Product Revenues

The growth rates for the three legacy learning technology products (Self-paced eLearning, Digital Reference-ware, and Collaboration-based Learning) are in steep decline.

Table 3 - Worldwide 2016-2021 Five-year Revenue Forecasts for Eight Learning Technology Product Types (in US$ Millions)

<table>
<thead>
<tr>
<th>Learning Technology Product Type</th>
<th>2016 Global Revenues (in US$ Millions)</th>
<th>2021 Global Revenues (in US$ Millions)</th>
<th>5-year Compound Annual Growth Rate (CAGR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-paced eLearning (courseware)</td>
<td>$46,674.67</td>
<td>$33,498.21</td>
<td>-6.4%</td>
</tr>
<tr>
<td>Digital Reference-ware</td>
<td>$4,702.32</td>
<td>$4,037.39</td>
<td>-3.0%</td>
</tr>
<tr>
<td>Collaboration-based Learning (live online classes)</td>
<td>$4,210.17</td>
<td>$3,200.71</td>
<td>-5.3%</td>
</tr>
<tr>
<td>Simulation-based Learning</td>
<td>$5,167.87</td>
<td>$11,310.43</td>
<td>17.0%</td>
</tr>
<tr>
<td>Game-based Learning (edugames)</td>
<td>$2,661.96</td>
<td>$7,324.84</td>
<td>22.4%</td>
</tr>
<tr>
<td>Cognitive Learning</td>
<td>$992.98</td>
<td>$3,123.37</td>
<td>25.8%</td>
</tr>
<tr>
<td>Mobile Learning</td>
<td>$11,314.16</td>
<td>$19,968.91</td>
<td>12.0%</td>
</tr>
<tr>
<td>Robotic Tutors</td>
<td>$507.14</td>
<td>$1,841.36</td>
<td>29.4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$76,231.27</strong></td>
<td><strong>$84,305.21</strong></td>
<td><strong>2.0%</strong></td>
</tr>
</tbody>
</table>

For more information about this research, email: contact@metaari.com
These are the most mature learning products on the market and despite vendor claims to the contrary, *there have been no major innovations to these legacy products in decades*. All three combined generated $55.5 billion in global revenues in 2016.

By 2021, the combined revenue of the three legacy product types will drop to $40.7 billion, with $33.4 billion of that being generated by the sales of Self-paced eLearning products (down precipitously from the $46.6 billion in 2016).

Due to the steep decline in the global eLearning market, the 2021 global learning technology market (across all eight products) will only reach $84.3 billion by 2021. The global five-year growth rate for all eight products combined is essentially flat at 2.0%.

**Figure 6 – 2016-2021 Worldwide Five-year Growth Rates by Eight Learning Technology Product Types**

In sharp contrast, the growth rates for Simulation-based Learning, Game-based Learning, Cognitive Learning, Mobile Learning, and Robotic Tutors are very healthy.
All five of these learning technology product types have positive growth rates, but combined, they only generated $20.6 billion in 2016. Due to the high growth rates, these four product types combined will generate $43.5 billion by 2021, effectively outpacing the revenues generated by the three legacy products combined.

**Investor Behavior in the Midst of Declining Revenues for Legacy Products**

There has been a very distinct investment trend that has emerged in the last three years. Funding for legacy eLearning, Reference-ware, and Collaboration-based Learning companies have dropped and investments made to next-generation learning products have spiked dramatically.

The spike in funding for legacy companies in 2015 now appears to be an anomaly. Twenty-five learning technology suppliers obtained $50 million or more in funding in 2015. Fifteen of these companies were based in China, nine in the USA, and one in Brazil.

The spike in eLearning investments in 2015 was due entirely to exceptionally large funding amounts made to companies in China and the extraordinary investments made to Lynda.com at $186 million and the unprecedented $230 million invested in the managed eLearning services vendor HotChalk by Bertelsmann. Lynda.com was on a path to be acquired by LinkedIn in April 2015 for an astonishing $1.5 billion, so the large investment was clearly intended to drive up the value of the company. LinkedIn was subsequently acquired by Microsoft.

HotChalk is a managed eLearning services vendor and their $230 million in investment was the highest single round made to an eLearning company so far. The managed services component of the eLearning industry is one of the positive growth areas for the product type, but ironically is one of the reasons revenues are dropping.

Managed services (School-as-a-Service) are provided by commercial third-party suppliers. These managed services are usually turnkey bundles that include content design, content development, cloud-based hosting and delivery, and most importantly, 24/7 technical support; all at a fraction of the cost that the institutions would spend if they did it themselves.

The global managed education and training services suppliers are generating significant revenues and the leading suppliers are reporting annual growth rates between 18-37%.

Managed education services (also called online program management and edtech program management) in the PreK-12 and higher education segments and managed training services in the corporate segments across the globe are bright spots for the
eLearning industry in terms of revenues but also one the factors driving overall revenues down.

When organizations and institutions outsource their online programs, they no longer have to buy their own content, tools, or platforms. They also do not have to pay to maintain and support systems. The business decision by institutions to use managed services is relatively risk free as the managed services suppliers takes a percentage of the tuition paid by students. There are very few, if any, upfront costs for institutions.

**Figure 7 - 2014-2016 Private Investments by Eight Learning Product Types (in US$ Millions)**

![Graph showing private investments by eight learning product types.]  

One current pattern is striking. All three legacy products saw a spike in investment in 2015 and a sharp decline in 2016. The investment patterns for legacy products are now quite erratic.

In contrast, the five next-generation products have seen significant and steady growth in investment in all three years. Total funding obtained by the three legacy products combined totaled $1.90 billion in 2016. *Total funding raised by the five next-generation products combined totaled a breathtaking $5.48 billion in 2016.*
Funding to eLearning companies dropped from $2.6 billion in 2015 to $806 million in 2016, an astonishing drop of $1.79 billion in funding. The largest investment for an eLearning company in 2016 went to a Chinese company called Xuele (Xueleyan) that garnered an extraordinary $200 million in funding, essential 25% of all funding that went to eLearning companies in 2016. US-based managed eLearning services provider HotChalk raised $83.1 million in 2016 on top of the extraordinary $230 million they obtained in 2015.

In 2016, another Chinese eLearning company called Zuoyebang obtained $60 million and US-based Udemy raised $60 million to continue expansion into India and China. A managed eLearning services provider in India called NSPIRA obtained $60 million as well, a relatively high investment amount for India.

Investment in Digital Reference-ware companies halved from $1.2 billion in 2015 to $607 million in 2016. The decline in investments made to Collaboration-based Learning companies was less dramatic but still steep with investments falling to $492 million in 2016, down from $842 million in 2015.

In stark contrast, investment made to Simulation-based Learning, Game-based Learning, Cognitive Learning, Mobile Learning, and Robotic Tutor companies rose sharply. In particular, investments spiked dramatically for Simulation-based Learning and Game-based Learning companies.

This is due to the extraordinary innovations for those two product types. Simulation-based Learning is being buoyed by the rapidly evolving virtual reality and augmented reality technologies.

One of the most amazing innovations in Simulation-based Learning is the new AI-based chatbots used as intelligent tutors. Six companies developing intelligent chatbots raised $93.3 million (combined) in 2016. They are coming on the market at a rapid rate and are gaining traction in the academic segments. They essentially function as software-based intelligent tutors.

Virtual reality and augmented reality-based learning technologies are categorized as subsets of Simulation-based Learning. They are integrating AI into the learning experience. Most of the Simulation-based Learning companies that were funded in 2016 are developing extraordinary products. For example:

- A Swiss company called MindMaze raised $100 million in funding in 2016. They develop VR products used to "retrain the brain and bodies" of patients that have traumatic injuries. They combine virtual reality, augmented reality, electroencephalographic (EEG) scans, and motion capture to create what they call a medical-grade "neural virtual reality platform." They have a subscription-
based business model, "where hospitals get our hardware for free and pay for neuro-healthcare exercise/games content and analytics. We also have a subscription-based home product for compliance and training."

- Another interesting company is SenseTime in China. They garnered $120 million in funding in 2016. They develop AI-based facial and gesture recognition for education robots that simulate human tutors.

- A company called DataRobot sells an AI-based knowledge management platform designed for data scientists. They raised $33 million in 2016. "The company captures the knowledge, experience, and best practices of the world’s top data scientists and transfers them through practical education and software automation to users of all skills levels."

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.

A Canadian company called DAQRI is selling extraordinary augmented reality products designed to merge real time knowledge transfer and learning transfer simultaneously while a worker performs tasks on the job. They obtained $115 million in funding in 2016. Their premier product is their augmented reality Smart Helmet, which is a hardhat that has a visor that displays procedural data over objects (machinery, construction sites, etc.)

DAQRI is targeting the industrial verticals with the helmet. "Reduce talent and experience gap with repeatable, fully modularized, and contextualized training capturing experts’ knowledge and experience; avoid costly human teaching errors with the use of precise data driven decision-support training."

And Game-based Learning is attracting investor interest due not only to technology innovations but also due to the new and rapid uptake of psychometric-based assessment edugames in the corporate segment used to assess job candidates.

Akili Interactive Labs garnered $30.5 million in investment in January 2016, $1.4 million in May 2016, and another $11.9 million in July 2016. Their product is quite sophisticated. They develop games that assess the cognitive states of users. Their edugame is being used in clinical trials for attention deficit. "Akili Interactive Labs is a medical device company that makes mobile video games—and not the other way around."
2014-2016 Deal Flow Patterns

Another stark pattern is the deal flows between 2014 and 2016. Similar to the funding amounts, deal flows spiked in 2015 for the three legacy products and then fell sharply in 2016.

Table 4 – 2014-2016 Total Number of Deals by Eight Learning Product Types

<table>
<thead>
<tr>
<th>Learning Technology Product Type</th>
<th>2014 Number of Deals</th>
<th>2015 Number of Deals</th>
<th>2016 Number of Deals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-paced eLearning (courseware)</td>
<td>80</td>
<td>196</td>
<td>61</td>
</tr>
<tr>
<td>Digital Reference-ware</td>
<td>96</td>
<td>177</td>
<td>53</td>
</tr>
<tr>
<td>Collaboration-based Learning (live online classes)</td>
<td>55</td>
<td>73</td>
<td>34</td>
</tr>
<tr>
<td>Simulation-based Learning</td>
<td>1</td>
<td>34</td>
<td>115</td>
</tr>
<tr>
<td>Game-based Learning (edugames)</td>
<td>18</td>
<td>52</td>
<td>121</td>
</tr>
<tr>
<td>Cognitive Learning</td>
<td>7</td>
<td>68</td>
<td>132</td>
</tr>
<tr>
<td>Mobile Learning</td>
<td>56</td>
<td>121</td>
<td>167</td>
</tr>
<tr>
<td>Robotic Tutors</td>
<td>4</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>316</strong></td>
<td><strong>728</strong></td>
<td><strong>695</strong></td>
</tr>
</tbody>
</table>

The number of deals made to legacy suppliers dropped precipitously in 2016 while the number of deals made to next-generation products rose significantly. As evidence for the amazing innovation occurring in simulation technology, investments made to Simulation-based Learning companies soared to 115 in 2016 compared to just a single investment in 2014.

Investors are now clearly interested in Game-based Learning companies as the product gains new traction in the corporate segments and continue to gain adoption in the academic segments across the planet.

For more information about this research, email: contact@metaari.com
Mobile Learning has seen steady deal flow growth for the last three years, more than doubling to 121 deals in 2015, compared to the 56 deals made in 2014. Mobile Learning suppliers saw the deal flow rise to 167 deals in 2016.

The progression of deal flow for Cognitive Learning companies between 2014 and 2016 was equally dramatic rising from a mere seven investments made in 2014 to 132 investments in 2016. Deals made with Robotic Tutor companies are relative new in the learning technology industry, but appear to be ticking up steadily. There were only four deals made to these kinds of companies in 2014, yet this tripled to twelve in 2016.

**Modifying Behavior: Cognitive Learning Comes into Focus**

The presence of concentrated investment activity in specific learning technology types or in products that target particular buying segments indicates that investors are banking on a significant return on their investment in those areas. This is now the case with Cognitive Learning.

**Figure 8 - 1997 to 2016 Global Investments Made to Cognitive Learning Companies (in US$ Millions)**
Investor interest in Cognitive Learning companies has been rising steadily over the last five years and has spiked dramatically since 2015. A major investment pattern that appeared in 2015 was the investor interest in next-generation Cognitive Learning (behavior modification) companies that develop products based on Cognitive Behavior Therapy (CBT), neuroscience, and artificial intelligence.

Cognitive Learning and behavior modification are synonymous. The synonymous relationship between behavior modification (Cognitive Learning) and knowledge transfer (learning) is widely understood by instructional design experts in the federal government (particularly the military) and corporate segments. Cognitive Learning is a fundamental tenet in both the Bloom and Gagne taxonomies, two of the most prevalent instructional schemas used in systematic approaches to instructional design used to develop training content.

Webster's Dictionary defines learning as "a modification of a behavioral tendency by experience." Learning is demonstrated by a change in behavior. Technology-based Cognitive Learning products are behavior modification products designed to improve or enhance perception, working memory, comprehension, emotional states, decision making, fluid intelligence (general problem solving), and reasoning. They are meta-cognition products that enable users to modify cognitive behavior (learn) by understanding and manipulating the learning process itself.

Investments made to Cognitive Learning companies spiked dramatically to $483.5 million in 2015, up from a mere $24 million in 2014. There were 68 Cognitive Learning companies funded in 2015, up from just seven companies funded in 2014 and the three funded in 2013.

As dramatic as the investment patterns were in 2015, it pales in comparison the investments made to Cognitive Learning companies in 2016. In 2016, 132 Cognitive Learning companies were funded for a breathtaking total of $1.09 billion in investment. Clearly, investors are now interested in this type of learning technology company.

Prior to 2000, there were no recorded investments made to Cognitive Learning companies. Starting in 2000, there was tepid investor interest in Cognitive Learning but investments were quite small. Before the first three quarters of 2015, there was never more than $50 million invested in commercial Cognitive Learning companies in any given year.

The next-generation Cognitive Learning products hitting the market now integrate a range of new technologies such as psychometrics, emotion recognition, and artificial intelligence. For example, a company called Cogito raised $15 million in 2016. Their
product is an intelligent social and emotion learning (SEL) platform that delivers one-to-one tutoring via a chatbot.

- In January 2016, Neurotrack (which has developed an online cognitive assessment test), raised $6.5 million in funding. This brings Neurotrack’s total funding to $9.5 million.

- A company called Claned garnered $4.2 million in April 2016 on top of the $1.36 million they obtained in March 2016. "Claned uses artificial intelligence and real-time learning analytics to provide both educator and learner with insights into study performance, orientation and motivation."

- In May 2016, the emotion artificial intelligence supplier Affectiva, an MIT Media Lab spinout, garnered a $14 million investment to build out their SDK plugin for the Unity game platform. They had previously garnered $5.7 million in 2011. The SDK is free for development companies that generate less than one million in annual revenues.

- In June 2016, Querium, "which uses artificial intelligence to provide students with step-by-step coaching in math, science, and engineering courses," obtained $366,000 in venture capital. They had previously obtained $800,000 in early 2015.

- A company called Big Health garnered $12 million in funding in July 2016. They had previously raised $3.3 million in 0214. Big Health's first product is Sleepio, a sleep management system. Big Health develops "solutions to tackle various mental health disorders, including via the digital delivery of Cognitive Behavioral Therapy (CBT)."

- Happify Health and Koko garnered $5 million and $2.5 million, respectively, in August 2016. Happify is primarily corporate facing and sells emotional intelligence products. Koko is a cognitive therapy company and sells a mobile product called KokoBot, "which provides a peer-to-peer network for users to deal with symptoms related to stress, anxiety and depression. Interactions go through KokoBot, which moderates content and exposes users to principles of cognitive therapy."

- The emotion tracking company Beyond Verbal obtained $3 million in funding in September 2016. They had previously garnered $3.3 million in 2014. Their product analyzes voice intonation to determine emotional states.

A cognitive assessment company called BrainCheck raised $3 million in October 2016. They had previously garnered $2.26 million in February 2016. BrainCheck
"uses an iPad or desktop screen games to measure reaction time, visual processing, cognitive process, coordination and memory."

In July 2016, EverFi obtained $40 million in funding. EverFi’s platform is called Foundry, which "assesses learners’ knowledge and attitudes on skills including financial education, STEM career readiness, entrepreneurship, alcohol responsibility, sexual assault prevention, social and emotional learning, and employee compliance."

A company called eMindful garnered $6.85 million in October 2016. They sell live online "globally scalable programs that specifically address stress and resilience, metabolic syndrome, chronic pain, diabetes, tobacco usage, and cancer. eMindful’s programs are backed by rigorous research and the company has years of experience collaborating in mindfulness research with such institutions as Vanderbilt University, Harvard Medical School, Chatham University, University of British Columbia and the University of Calgary."

- Welltok obtained an impressive $37 million in funding in October 2016. They had obtained $45 million in 2015. Their premier product is CaféWell. "The program uses social, gaming, and cognitive techniques to try to engage users with health and condition management." They have obtained a total of $134 million in funding so far.

- Cogito obtained $15 million in funding in November 2016. Cogito is an emotion recognition suppliers that has to date focused on healthcare solutions for cognitive disorders.

- Grokker is an "online/mobile video network of expert-led yoga, meditation, fitness & cooking videos" and obtained $7 million late November. This brings their total investment to $22.5 million since 2013.

The most innovative Cognitive Learning products in the current market are the new assessment and evaluation edugames based on psychometrics. They are essentially hybrid Game-based Learning and Cognitive Learning products. They are rapidly gaining traction in the US corporate segment as they have proven to be efficient and cost-effective job candidate screening tools.

Psychometrics is the science that focusses on statistical measurement of psychological states. Psychometric instruments measure knowledge, abilities, skills, attitudes, and personality traits.

Several new companies that specialize in this type of edugame have come on the market in just the last 2-3 years including Pymetrics, Revelian, Knack, Scoutible,
SHFuse, RoundPegg, and Arctic Shores. All of them are seeing rapid uptake in the corporate segments across the planet and are now attracting private investment.

Pymetrics raised $6.13 million in August 2016 bringing their total funding to date to $8.63 million. "Pymetrics was started by neuroscientists seeking to apply neuroscience-based assessment to the field of human capital management. Pymetrics aims to make human capital management more scientific with the goal of improved outcomes for job seekers and employees, as well as firms."

Roundpeg has garnered $5.9 million in funding since they launched including $1.81 million in May 2016. Scoutible obtained 1.5 million from Mark Cuban in May 2016 and an undisclosed amount in October 2016. Arctic Shores raised capital through the VentureFounders fund in 2016.

Another major factor driving investment to Cognitive Learning companies is the uptake of cognitive behavioral modification (health and wellness) platforms in the corporate segment.

Until recently, companies that specialized in health and wellness products marketed to consumers. A dramatic shift has occurred in the last few years with companies selling platforms that can scale to corporate demand. Large scale deployment are now being rolled out as the large healthcare providers and payers adopt the products. They then offer the programs to their clients as part of their corporate services.

- In February 2016, a company called Lantern obtained $17 million in funding. They specialize in developing tools that mitigate tools stress, anxiety, and poor body image. They had obtained $4.1 million prior to this round.

- In February 2016, Constant Therapy obtained $1.96 million in funding. They developed the NeuroPerformance Engine "to create a personalized profile of each person’s strengths and weaknesses. The app then delivers a combination of exercises to improve their brain function. Constant Therapy’s app offers about 58 science-based task categories and more than 60,000 exercises, according to the company."

- In April 2016, Quartet Health, a behavioral health startup, raised $40 million in a round led by Google Ventures. "Quartet’s data scientists create algorithms that help doctors figure out if a patient is at risk for another health issue. Then they get a referral to a provider in Quartet’s network or access to online cognitive behavioral therapy and consultation tools."

- Workit Health obtained $1.1 million in August 2016. They develop intervention software for substance abuse. "The curriculum adapts to each participant's
evolving needs and feedback by using evidence-based therapies for addiction, including motivational interviewing, relapse prevention therapy, cognitive behavioral therapy, and brief interventions.

- A health and wellness company called Zipongo raised $18 million in November 2016. To date, they have obtained $30 million in funding. "Zipongo's platform consists of a number of different apps designed to change people's behavior around nutrition by changing their environment."

- In December 2016, a wellness coaching app company called Vida Health garnered $28 million in funding. "People can use Vida to access a wide range of educational resources, including evidence-based clinical programs for diabetes prevention, weight loss, or hypertension, as well as exercise and diet information."

In November 2016, a company called Yewno announced that they had obtained $16.5 million in investment. "Mimicking the human brain, the Yewno inference engine incorporates machine learning, cognitive science, neural networking, and computational linguistics into a highly visual solution to enhance human understanding by correlating concepts across vast volumes of text. The launch of its first vertical offering, Yewno for Education, serves as a unique service designed for scholars and students and is at use at leading academic and research libraries around the world, including Harvard, MIT and Stanford."

One of the big game changers for Cognitive Learning is the number of new products that are built on top of IBM's Watson cognitive computing platform. IBM claims that IBM Watson Education "is bringing education into the cognitive era. We are transforming the learning experience through personalization. Cognitive solutions that understand, reason and learn help educators gain insights into learning styles, preferences, and aptitude of every student. The results are holistic learning paths, for every learner, through their lifelong learning journey."

In April 2016, Sesame Street announced a three-year partnership with IBM to develop educational products using IBM's artificial intelligence platform Watson. In the press, IBM stated "As part of a three-year agreement, Sesame Workshop and IBM will collaborate to develop educational platforms and products that will be designed to adapt to the learning preferences and aptitude levels of individual preschoolers. Using Watson's cognitive capabilities, the app will analyze a child's response in real-time and then intervene with content just for that child because each of us learns in a very, very different way."

In September 2016, the IBM Foundation announced a project with the American Federation of Teachers (AFT) "to create an AI-based lesson plan tool called Teacher
Advisor. The program essentially uses Watson's cognitive smarts to answer questions from educators and help them build personalized lesson plans, understand concepts, and learn strategies to improve student comprehension. Watson may even ask the teacher additional questions to refine its response, honing in on what the teacher needs to address certain challenges."

In October 2016, Pearson and Apple announced separate deals with IBM to deploy learning technology integrated with Watson in the academic markets. Pearson is using Watson to deliver personalized tutoring services to college students in their Revel product.

Apple and IBM launched the iPad-based IBM Watson Element for Educators for the PreK-12 segment. The product "enables a new level of engagement for teachers by providing a holistic view of each student at their fingertips, including data on interests, accomplishments, academic performance, attendance, behaviors and learning activities."

Texas-based CognitiveScale was founded by former IBM Watson executives and raised $21.8 million in funding in August 2016. They have two flagship products: Engage and Amplify, that are integrated with IBM Watson. "The technology interprets multi-structured big data and weaves knowledge and learning across the enterprise. Both products learn from new data and customer interactions to deliver targeted insights and advice on making changes to achieve top performance." Performance improvement is synonymous with behavior modification.

A Cognitive Learning company called Welltok raised $37 million in funding in 2016. Welltok's CaféWell Rewards uses IBM's Watson platform in their tools designed to create health-related behavior changes in seniors. "The platform leverages social connectivity, gaming mechanics and IBM Watson’s cognitive technologies to drive engagement and behavior change."

CogniToys Dino from Elemental Path is a unique educational robotic product for young children that integrates with IBM's Watson. "The curious and conversational Dinos are powered by IBM Watson and Elemental Path's Friendgine technology, allowing them to deliver the kind of personalized play experience every child deserves. Recommended for kids ages 5 to 9, CogniToys have custom content modules such as questions and answers, storytelling, and games that include vocabulary, math and more to engage children in educational play. Then as a student progresses or gets stuck, Watson can rethink its approach to get them on the correct track."
The Rise of the Robotic Tutors

The market for an entirely new type of learning technology solidified in 2015 and 2016. Education robots have been on the market for at least a decade, but the early products were very expensive and relatively primitive. That changed in the last 2-3 years with very sophisticated and relatively inexpensive robotic tutors hitting the market.

The new robotic learning technology products on the market are primarily used to teach children, so far. These products first emerged in China, Japan, and South Korea and are now gaining rapid traction around the globe.

Educational robots are designed specifically for knowledge transfer and are different form 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."

There are companies that sell robot construction kits to the schools. These are not tutoring robots. The kits are designed to teach children how to build a robot as part of a STEM curriculum and while often branded as educational robotics, these products are not robotic tutors and Metaari does not track investment to robot kit companies.

There are smart toys designed for early childhood learning, like China's voice-activated YYD Learning Robot for preschoolers which tutors young children in counting, vocabulary, and letters. The robot sings and tells children's stories.

The price points for educational robots used to be exorbitantly expensive, but a range of sophisticated cost-effective products have come on the market in the last two years. These new companies are just starting to attract private investment.

Investments in robotic tutors and education robots were quite rare prior to 2014. Sphero had obtained $15.1 million between 2010 and 2013, but they had not yet changed their focus to education.
In 2014, a mere $45.2 million was raised by robotic tutor companies. This spiked to $204.7 million in 2015 and jumped to $450.0 million in 2016. Considering the popularity of the product in organizational settings like schools and clinics and the availability of relatively inexpensive robots designed for consumers, it is likely that investment will continue flowing to these companies in the near future.

The barriers-to entry are dropping fast with cutting edge AI cognitive computing platforms like IBM's Watson available for low monthly subscriptions. Emotion recognition software platforms are also falling in price. There are online portals selling all the components for the inside workings of robots including servos and sensors and the cost of assembling any kind of robot is dropping. That said, in the commercial education robot market, the robots are still relatively expensive.

The Nao robot from SoftBank Robotics is being used for language learning for children in the UK, the Netherlands, and Germany. In 2016, the Nao robot cost between $6,150 and $8,000. As hefty as this price is, it is down from $10,000 in 2015 and half the price it sold for in 2010.

In the current market there are four primary types of robotic tutors: language learning tutors, general purpose tutors, behavior modification therapeutic tutors (also called socially assistive robots), and AI-based tutors. The latter two are also called Robotic Intelligent Cognitive Tutors. The new therapeutic and AI-based intelligent robotic tutors are proving particularly effective at providing behavioral intervention to children with disabilities such as autism.

KT Corp in South Korea sells a robot called Kibot. It has sold over 10,000 units in South Korea. One of the things it does is provide English language tutoring to young children. Kibot can read, sing, and speak to children in several languages.

A South Korean company called Yujin Robo sells a small humanoid robot called iRobi-Q designed for early childhood learning. It provides general instruction content and a dedicated component that teaches children English.

US-based Alelo built the interactive robot RALL-E (Robot-Assisted Language Learning in Education) using the Zeno R25 robot built by RoboKind. The robot teaches children Chinese. "The RALL-E robots are Chinese-speaking human-like robots that create a safe environment for learners to practice their conversational skills. These robots create the experience of a conversation through a lifelike range of facial expressions and gestures coupled with Alelo’s innovative language acquisition-based dialog software."

China-based Evolver sells a robot designed to teach English to children between the ages of 4 and 12. The Evolver robot called Xiaoping is relatively expensive at the
equivalent of $1,450. The Evolver robot has the notorious distinction of an operator-caused malfunction at a Chinese trade show in November 2016 smashing into a glass booth and injuring a man bad enough that he had to be taken to a hospital. The operator had pressed the "forward" button instead of the "reverse" button causing the robot to injure the man who fell in the broken glass.

A startup company in Denmark sells a small educational robot called KUBO. "KUBO is a simple and intuitive educational robot, that children in early primary school use collaboratively to learn various subjects, such as coding, language, and music through the tangible and innovative coding language called TagTiles." They won the Web Summit pitch competition in November 2016 and raised $105,000 from Portugal Ventures. They are now raising capital on Indiegogo.

Government agencies are now catalysts for robotic tutors. In 2012, the US National Science Foundation (NSF) awarded Yale University a $10 million grant ("one of its biggest grants ever") for a five-year project known as “Robots Helping Kids” that uses the Nao robot to tutor children in homes and schools. In a press release, Yale University described the purpose of the project was to develop “sophisticated ‘socially assistive’ robots” designed to help children read, exercise, overcome disabilities and enjoy physical activities. “We want them to help children learn language, we want to help them learn better eating habits, and we want them to learn new social or cognitive skills through their interactions with these robots."

The Horizon 2020 program of the European Commission funded a project called L2TOR (pronounced ‘el tutor’) that uses the Nao robot to teach preschool children a second language. The project obtained $3.8 million in funding. The robot provides one-to-one tutoring for English, Dutch, German, and Turkish. "In particular, the project will focus on teaching English as L2 to native speakers of Dutch, German and Turkish, and teaching Dutch and German as L2 to immigrant children speaking Turkish as a native language." The project is funded through 2018.

The US government gave Alelo and a company called Aptima $3 million in July 2016 to develop the new AI-based language acquisition software called ALLEARN. "ALLEARN engages learners in interactive learning activities that develop their communication skills on a mobile device or regular computer. As they do this the system analyzes responses, and collects analytics on the key metrics of spoken language proficiency – fluency, accuracy, and complexity of language."

In June 2016, Beijing-based ROOBO launched a prototype of its newest product, a “pet robot” called Domgy that launched commercially in late 2016. "Domgy uses ROOBO’s proprietary artificial intelligence and facial recognition systems to identify family members, greet and entertain them and follow their rules. We are focused on integrating cutting-edge AI and robotic technology to enhance the interactive
experience and create a smarter, better life." ROOBO raised $100 million in funding in September 2016.

ROOBO's earlier product called Pudding launched in 2015, which is a voice-activated educational robot for young children. According to ROOBO, "Roobo Pudding is a voice driven home robot for children and their parents. Specially designed for children, this AI robot includes interactive dialogue and abundant amount of kids education & entertainment content."

They announced their latest Robotic Tutor called Pudding Bean at the CES event in January 2017. "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."

Elemental Path obtained $1 million in funding in late 2014 and another $1 million in early 2016. Their robotic tutor brand is called CogniToys. Their CogniToys Dino is a unique educational product for young children. "The curious and conversational Dinos are powered by IBM Watson and Elemental Path's Friendgine technology, allowing them to deliver the kind of personalized play experience every child deserves."

Leka is an intelligent robot tutor designed to tutor children with special needs across a range of skills and "plays" edugames with disabled children. Leka is a "new robotic companion designed specifically for children with special needs, to sparkle their motivation and help them learn, play & progress." Leka raised $100 thousand in seed funding in March 2016.

A company called Embodied obtained $3.7 million in funding from Intel in October 2016, "to build life-like, interactive robots to serve as motivators, coaches, and companions that help and empower people to be better at helping themselves."

A team at the University of Hertfordshire developed an intelligent tutoring robot called Kaspar used to tutor autistic children. "Specially designed with a human-like face and the tacit complexities therein, Kaspar helps teach facial expressions and appropriate physical contact, creating a safer learning environment for special needs children."

France-based Aldebaran Robotics (rebranded as SoftBank Robotics in June 2016) sells a robot called Nao and has a version designed to assist autistic children called the ASK Nao (Autism Solution for Kids).

The Hilton hotel chain in the US is using AI-based "robot concierges" using the Nao robot and running on IBM Watson's cognitive computing platform. The robot is called Connie and "is available to answer questions from customers. Connie knows everything about the hotel, neighborhood restaurants, tourist attractions, and so on."
"Connie is learning to interact with guests and respond to their questions in a friendly and informative manner. Connie uses a combination of Watson APIs, including Dialog, Speech to Text, Text to Speech and Natural Language Classifier, to enable it to greet guests upon arrival and to answer questions about hotel amenities, services and hours of operation. By tapping into WayBlazer’s extensive travel domain knowledge powered by Watson, Connie can also suggest local attractions outside the hotel."

WayBlazer defines their software as the "world’s first cognitive travel recommendation engine." They obtained $5 million in funding in 2015. "WayBlazer is an intelligent discovery system that delivers contextual, personalized advice and insights for travelers."

An interesting AI-based chatbot called Amelia is being sold by IPSoft. The company refers to Amelia as a "cognitive robot," although it is a software-based product. Amelia is designed to automate customer service functions such as IT support. It is well known in the software industry that 90% of support calls are actually training-related and not due to software defects. Deloitte signed an agreement with IPSoft in December 2016, "to reengineer some of our client organizations’ legacy processes, and train Amelia in different service situations across a host of industries including Financial Services, Health, Education, and Telecommunications."

SoftBank Robotics’ Pepper robot runs on IBM’s Watson cognitive computing platform. SoftBank Robotics claims that Pepper has an "emotion engine" that can detect emotions and respond appropriately. Singapore is using SoftBank Robotics' Nao and Pepper robots in the elementary schools.

RoboKind raised $3.5 million in funding in 2016. RoboKind sells two robots designed for cognitive intervention with children: Zeno and Milo. Zeno is used in classrooms and Milo (who is two feet tall) is usually used in clinical settings. RoboKind has a software bundle for organizations called Robots4Autism.

- "Milo is a humanoid robot that engages children with Autism and delivers research-based lessons that teach social behaviors. This revolutionary robot is an exciting and affordable new tool for educators, therapists and parents. Using Robots4Autism’s research-based curriculum, Milo teaches elementary and middle school age children the understanding and meaning of emotions and expressions, and demonstrates appropriate social behavior and responses."

Milo was in use in over 100 PreK-12 schools in the US by the end of 2016. "We design and build robots with advanced capabilities that enable people to engage with robots personally and socially. Our advanced social robots are purpose-built for autism"
intervention, special education, STEM instruction, and university research. We can deliver full courseware and therapies created by subject matter experts, and include appropriate interaction for both verbal and non-verbal learners."

The China-based company Abilix was launched in 1996 and claims to be the world's oldest education robot developer. They launched their new "humanoid" education robot called Everest in 2016. Everest is designed to tutor children in STEM subjects.

South Korean telecom operator SK Telecom sells an educational robot called Albert robot bundled with the Smart Robot Coding School training program designed to teach children how to develop software. The Albert-based product has been sold to schools in South Korea, Spain, France, Brazil, Colombia, Taiwan, and Malaysia. In May 2016, SK Telecom signed an MOU with the Central State Government of Paraguay to supply 10,000 units of the smart learning robot to schools in the country.

In October 2016, SK Telecom announced that they would deploy education robots to Costa Rica, with co-funding from the Inter-American Development Bank (IDB). "Under the agreement, SK Telecom will provide its smartphone-powered education robot Albert for 300 preschool classrooms to support children's mathematics education. The company will also provide technical expertise on smart-education technologies." In May 2016, they announced "Based on the result in Costa Rica, SK Telecom and IDB plan to expand their project to the entire Central and South American region."

Several new educational robots designed to teach kids programming and related skills have entered the market over the past year including the Vortex, the Kamibot, the Fisher-Price Code-a-Pillar, WowWee's Coji, Primo Toy's Cubetto, Makeblock's Codeybot, Aisoy, and Ozobot from a company called Evollve. The one thing they have in common is relatively low price points.

Wonder Workshop (formerly Play-I) obtained $20 million in funding in July 2016. They have obtained $35.9 million so far. They sell two educational robots designed to teach children coding: Dash and Dot. "Dash & Dot are real robots that teach your kids to code while they play. Using our free apps and a compatible tablet or smartphone, kids learn to code while they make Dash sing, dance and navigate all around the house. Sensors on the robot mean they react to the environment around them, including your kids."

A smart toy company called Sphero launched in 2010 but was not focused on education at launch. The company has raised $83.36 million since 2010 including $45 million in 2015 and an additional $3.2 million in 2016. In 2015, they focused on education with their baseball-sized educational robot (also called Sphero).
In 2016, Sphero reported that their education robot was being used in 2,000 schools and by 12,000 teachers and 300,000 kids. The robot can be programmed to teach any subject in the curricula. Sphero retails for $129.

UK-based Primo Toys has an interesting robot designed to teach young children to code before they can read. The Cubetto robot is a wooden rectangle with no screen. Children choreograph the robots movements by placing wooden blocks on a diagrammatic board. Primo Toys has raised $1.8 million in the last two years. They sell the Cubetto tutoring robot for $225.

China-based Makeblock decided to raise money for their Codeybot robot on Kickstarter and raised $194,634 from 1,038 backers in mid-2016. "Codeybot seamlessly turns the code-learning process into something natural and visually comprehensible." The Codeybot sells for the equivalent of $170.