Ambient Insight's

2012 Learning Technology Research Taxonomy

*Research Methodology, Buyer Segmentation,
Product Definitions, and Licensing Model*

"We Put Research into Practice"
www.ambientinsight.com

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*To learn more about our research services, email:
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Ambient Insight's Research Taxonomy

Ambient Insight is an international integrity-based market research firm that uses predictive analytics to identify revenue opportunities for global learning technology suppliers.

Figure 1 – Ambient Insight's Learning Technology Research Taxonomy

The purpose of our taxonomy is to provide clarity to suppliers competing in a complex global market. Our research taxonomy is the foundation for identifying addressable revenue opportunities for suppliers marketing specific product types in specific buying segments.

Who are We?

Ambient Insight principals are well-known competitive intelligence experts in the global learning technology industry. Ambient Insight was founded in 2004 by the original members of the Advanced Knowledge Engineering team that built the Microsoft Online Learning Institute (MOLI), the world's first international commercial eLearning business.

Ambient Insight has two lines of business: publishing quantitative syndicated reports and providing proprietary custom research to suppliers and private investment firms.

In our syndicated reports, Ambient Insight provides quantitative market research by customer segment (demand-side) and by product category

Ambient Insight has a detailed 2011-2016 market forecast breakdown of all eight learning technology products across all customer segments.

(supply-side) based on our taxonomy and our proprietary Evidence-based Research Methodology (ERM).

In our custom research, we have developed competitive intelligence, multi-year tactical roadmaps, product pipelines, revenue stream timelines, pricing models, merger and acquisition (M&A) profiles, and go-to-market strategies for a range of international clients. We have helped large and small organizations successfully launch new learning technology products and services.

We Are Unique

We are the only research firm in the industry that has developed a precise learning product taxonomy based on pedagogical principles and information architecture. We specialize exclusively in learning technology.

We track seven international regions, eight buyer segments (not just corporate), and eight product types. We further break down each product into six sub-categories. It is the most complete view of the international demand for learning technology in the industry.

We continue to modify, refine, and enhance our taxonomy as products and buying behavior changes. For example, when we launched in 2004, commercial Social Learning products had yet to emerge. Mobile Learning value added services (VAS), a subset of Mobile Learning, is essentially a new type of learning product that has come on the market in the last two years.

We Are Dependable

We serve our clients with targeted custom online learning research that meets and often exceeds a client's expectations. All custom research is delivered in the agreed upon timeframe. We pride ourselves on meeting deadlines - each time, every time.

Ambient Insight strives to make clients self-sufficient. Our project strategy is to provide continuous knowledge transfer that allows clients to own their intellectual property and to help them reduce dependencies on external consultants, including ourselves.

We Are Precise

We are a quantitative research firm. Quantitative market research is an empirical process in which deductive mathematical models are used to identify and calibrate statistically-valid variables that contain measurable data about target products, markets, and/or buyers.

We use predictive analytics software and proprietary algorithms to triangulate measurable Total Addressable Market (TAM) forecasts and tangible revenue opportunities. Ambient Insight knows suppliers need precise product definitions and forecasts across all buyer segments to compete in the international learning technology industry. We provide our clients with actionable data.

> Ambient Insight has a breathtaking view of the international demand for learning technology products and services.

We Are Ethical

We do not endorse specific suppliers or products. None of our syndicated research is influenced, sponsored, or subsidized by suppliers. We do not evaluate, compare, or rank products.

We understand the competitive value of the intellectual property owned by our clients and we take non-disclosure agreements (NDAs) seriously. All of the proprietary information that our clients have shared with us is kept in strict confidence.

Our Quantitative Evidence-based Research Methodology

Ambient Insight provides quantitiative market revenue forecasts using our proprietary Evidence-based Research Methodology (ERM). We developed ERM by modifying and refining industry-standard quantitative methods to reflect the unique characteristics of the international learning technology market.

Figure 2 – Ambient Insight's Quantitative Evidence-based Research Methodology (ERM)
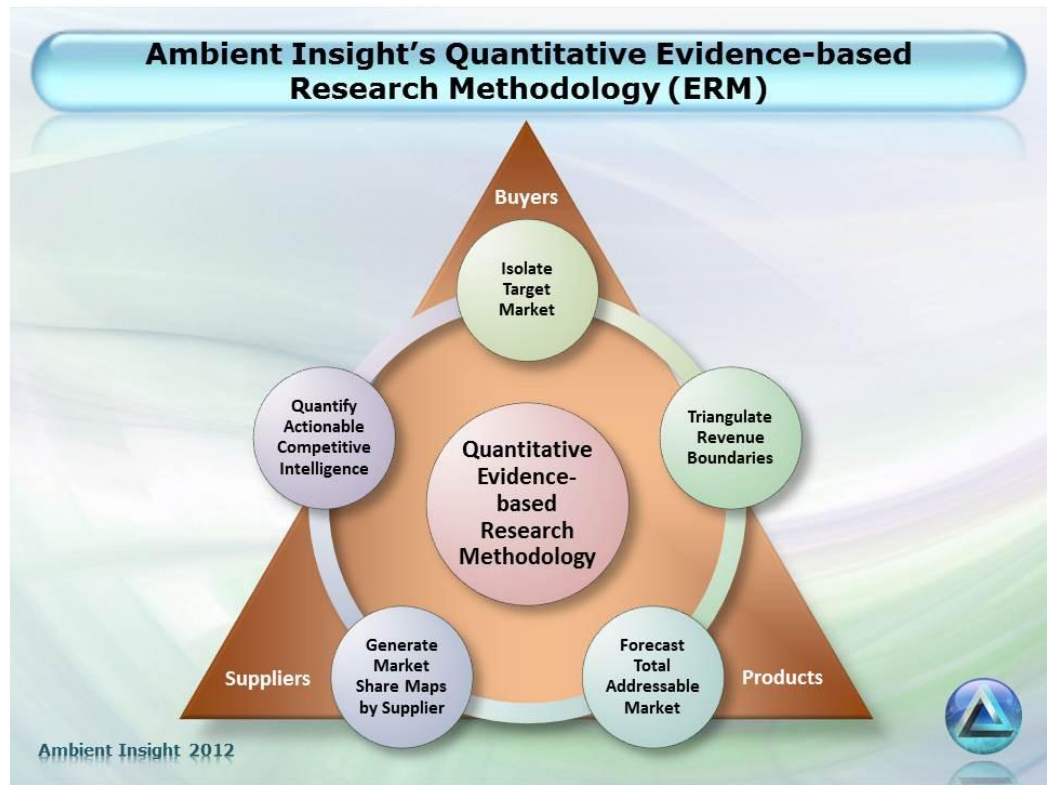
The ERM is an iterative process with five key phases that:

- Isolate the target market
- Triangulate the baseline (the floor) and the topline (the ceiling) revenue boundaries
- Forecast the Total Addressable Market (TAM) for specific products
- Generate market share maps by supplier
- Quantify actionable competitive intelligence

Each phase of the ERM functions as an input and output in the process. In the sense that one phase "informs" the next phase, it is an input. Each phase also generates standalone data points, which are discrete outputs.

The ERM progresses from general patterns (the big picture) to very precise granular patterns. Once the target market is isolated, calculations are done to triangulate the potential revenues boundaries. Actual revenues cannot be below the baseline boundary, known in the research industry as "the floor." Likewise, actual revenues cannot be any higher than the topline boundary, called "the ceiling." The TAM is located within these boundaries.

> Ambient Insight only provides supplier market share analysis on a private consulting basis and we do not publish market share data in syndicated reports.

In custom analysis, Ambient Insight uses the TAM in subsequent strength, weaknesses, opportunities, and threats (SWOT) analyses to determine what portion of the TAM is realistically available to specific suppliers. The primary basis used to determine this is the market share map and the client's position (or desired position) on that map.

The market share map generated by Ambient Insight allows suppliers develop strategies for organic growth or to "buy their way in" via merger and acquisition (M&A) activity.

Figure 3 – Ambient Insight's Actionable Competitive Intelligence
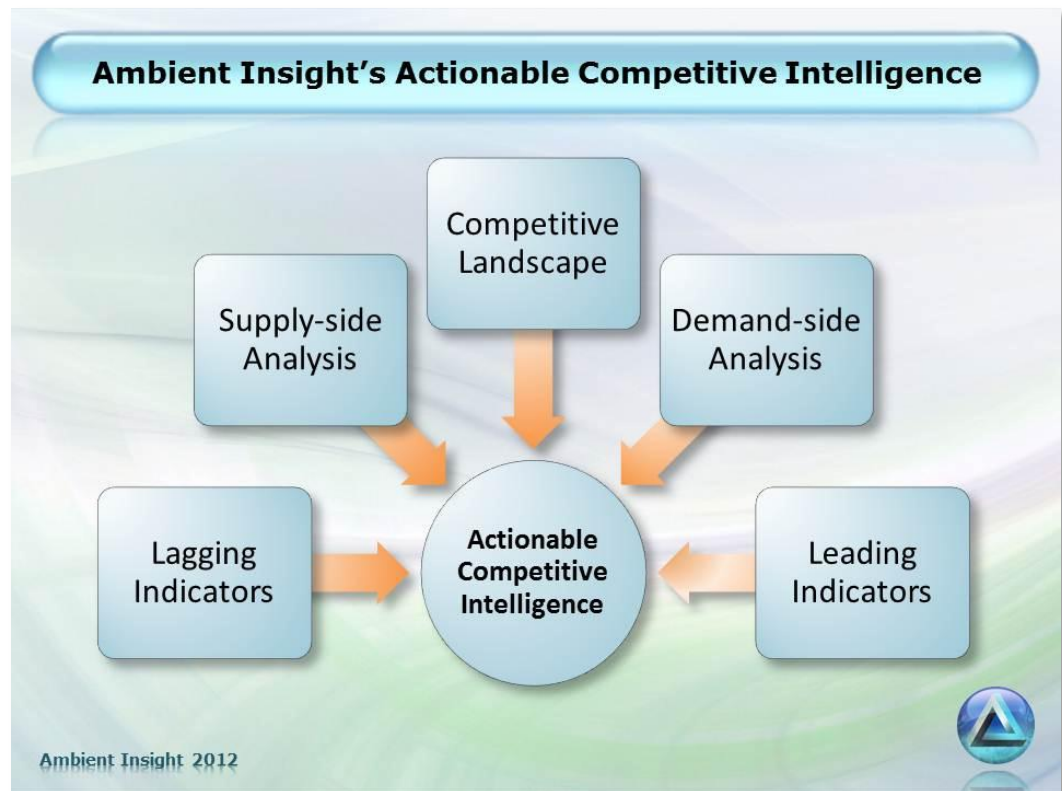
Ambient Insight generates actionable competitive intelligence by mapping the competitive landscape, performing supply-side and demand-side analyses, and by compiling data from a wide spectrum of information broadly classified as leading and lagging indicators.

- **Leading indicators** signal future events and include venture capital investment trends, patent applications, technology-related legislation, technology standards development, product research trends, product substitution patterns, technology infrastructure trends, labor demand, and outsourcing demand.

- **Lagging indicators**, referred to as "rear-view mirror" data, are past events captured in data that include supplier activity, M&A activity, divestitures, executive hiring patterns, US Economic Census data, SIC and NAICS tax data, SEC filings, international stock exchanges, local and federal government data, Universal Commercial Code banking reports, public-domain business records, court records, press releases, government export trade data, regional trade association resources, and international industry association information.

> The governments in Canada, Ireland, and South Korea actively promote and subsidize the export activities of domestic learning technology suppliers.

Many of the companies tracked by Ambient Insight are publicly traded on various international stock exchanges and their financial disclosures provide baseline data for global sales, regional competitive pressures, and specific country-by-country business activity.

Many private companies, particularly outside the US, report their revenues as a matter of policy. Those financial disclosures also provide baseline data for the demand for specific types of products in particular countries and regions.

Federal government and industry trade bodies, particularly in the US, Japan, South Korea, Germany, France, Canada, Ireland, India, and the UK, provide extensive data on export opportunities in specific international education markets. Federal, state, provincial, and local agencies provide detailed reports on technology funding, the adoption of learning technology, and the buying behavior in the academic, vocational, and workforce markets.

The European Union funds ongoing research on the adoption of electronic learning in the EU and Eastern Europe. Several international bodies such as the World Bank, the UN, and the Commonwealth of Learning provide funding for projects and detailed data on the adoption of learning technology in developing countries.

There are now distance learning and learning-technology trade associations in every region of the world. Publications, event presentations, and press from these associations provide valuable insight into the market conditions inside particular countries and regions.

The various publishing, training, and education associations across the globe provide a wealth of information about the migration to digital formats and the buying behavior in specific countries.

<u>Geographical Regions Defined</u>

Ambient Insight conducts international research on learning technology and defines seven global regions: North America, Latin America, Western Europe, Eastern Europe, Asia, Middle East, and Africa.

- North America includes the US and Canada.

- Latin America includes the rest of the western hemisphere starting with Mexico southward. The Caribbean countries and islands are grouped with Latin America.

- Ambient Insight defines Western Europe as the 27 countries in the European Union as of January 2011. It also includes four countries that, so far, have not joined the EU: Iceland, Norway, Lichtenstein, and Switzerland.

- Ambient Insight defines Eastern Europe as most of the Commonwealth of Independent States (CIS) that were once part of the former Soviet Union: the Russian Federation, Belarus, Georgia, Moldova, Armenia, Azerbaijan, Turkmenistan, Kazakhstan, Kyrgyzstan, Uzbekistan, and Ukraine. It should be noted that several countries that were once part of the Soviet Union are now in the EU.

- Asia is defined as the countries in continental eastern Asia and the countries and island nations in the Asian Pacific including Australia and New Zealand.

- The Middle East includes all the countries in the southeast Mediterranean, the Gulf countries, and arbitrarily groups Turkey and Egypt as part of the Middle East.

- Africa includes all the countries on the African continent except Egypt and also includes Madagascar.

The buying behavior inside particular countries and regions tend to be quite different. That said, there are often pan-regional revenue opportunities and Ambient Insight identifies those for suppliers.

International Buyer Segmentation Descriptions

Ambient Insight provides market research across all the global buyer segments including:

- Consumers
- PreK-12 academic institutions
- Higher education institutions
- Local, state/provincial governments
- Federal governments
- Corporations and businesses
- Associations, non-profits, and NGOs
- Healthcare buyers

Because the healthcare market includes buyers in several of the other segments (e.g. associations, consumers, corporations, and governments), Ambient Insight breaks out the healthcare segment to provide clarity for suppliers. The healthcare segment in each country tends to be unique and it is rarely a monolithic vertical buyer segment.

Consumers

Ambient Insight defines consumers as individual buyers that purchase products directly. The consumer segment is the only buying segment in which the buyer and the user are identical. In all other segments the buyers and the users are not the same. It should be noted that consumers do not buy tools or platforms.

Consequently, buying behavior in the global consumer markets tend to provide the best data on customer satisfaction from a product standpoint. In all other segments customer demand is based on the needs of organizational buyers, not the actual users.

The consumer demand for technology-based learning products is different in each country. The differences in Mobile Learning preferences are interesting:

- In the US, the top Mobile Learning apps purchased by consumers are edugames designed for preschool children and brain trainer games designed for the older demographic.

- The top selling educational apps in Germany are English and Spanish language learning titles.

- In South Korea the top Mobile Learning apps purchased by consumers are test prep and English language learning.

- In India, French and Chinese language learning apps trend in the top ten list.

- The top selling apps in Taiwan are test prep for the TOEIC test, followed by traditional Chinese language learning for young children. Japanese language learning comes in third with English language learning close behind.

- In Indonesia, consumers prefer language learning products with Chinese, Vietnamese, English, Arabic, and Farsi consistently being in the top ten paid apps.

- Turkish consumers buy language learning apps and early childhood education apps. The top languages are Greek, English, and Japanese.

- In Nigeria, consumers prefer Spanish and Chinese language learning apps.

Test prep apps for driving tests are popular with consumers in the UK. The top Mobile Learning apps purchased by Russian consumers are language learning (across several languages) and astronomy apps. In South Africa, early childhood learning and astronomy apps top the sales charts. The top selling apps in Canada are astronomy apps. In fact, the consumer demand for astronomy apps is a common thread across the globe.

The consumer demand for academic content is unique in the US. In 2011, 4.1 million PreK-12 children took extracurricular online classes **outside the**

> There are distinct regional differences and the buying behavior can be quite different in each region, and in countries within a region.

jurisdiction of the schools. These students are spread out across public schools, private schools, homeschools, and virtual/cyber charter schools and they are not additional populations. The vast majority of these online classes are sold by commercial suppliers directly to parents. The parents are the buyers of the products.

In order to help suppliers target the buyers, as of 2012, Ambient Insight no longer includes these populations in the PreK-12 category. We now categorize these extracurricular expenditures as part of the consumer segment.

Language learning dominates this extracurricular activity, but there a range of other topics purchased. A breakdown by subject matter is included in the consumer section of "The US Market for Self-paced eLearning Products and Services: 2011-2016 Forecast and Analysis, Ambient Insight, LLC."

The number of US kids taking extracurricular online classes is growing by a five-year annual growth rate of 30.3%. By 2016, over 15.7 million school-aged children will be taking online extracurricular classes outside the jurisdiction of the schools, representing a significant revenue opportunity for consumer-facing suppliers. The demand has been recognized by international suppliers who are now offering products and services (particularly live tutoring) to US children.

PreK-12 (Preschool, Primary, and Secondary) Academic Institutions

PreK-12 school systems are different in each country. Some school systems, such as Mexico, Brazil, South Korea, and China, are operated by the central government. Other school systems, such as Canada and the US, are operated at the provincial/state and local levels. While the French government owns the national curriculum and manages the content for all the schools in France, the school systems make the technology purchasing decisions at the local level.

Consequently, academic buying behavior is quite different in each country. In some countries, schools are autonomous and can make their own buying decisions. In other countries, central government agencies not only decide what products are used, but also purchase the products directly.

In our worldwide syndicated reports, we highlight the unique buying behavior of domestic school systems.

There are often stark differences in buying behavior from country to country even among the technologically advanced nations. ***The concept that "eLearning Readiness" is defined by a country's technology adoption is simply not true.***

For example, except for online language learning there is very little Self-paced eLearning used in Japanese primary and secondary schools. In contrast, essentially all primary and secondary schools in Singapore and South Korea use Self-paced eLearning for a variety of subjects.

A country's educational policies are often more important than a country's technical readiness when it comes to the adoption of learning technology:

- In March 2011, the Ukrainian Minister of Education announced an ambitious program called Open World, launched in the 2011 school year, to deploy distance learning in every school in the country. The program is modeled on a highly successful program in Portugal.

- In May 2011, the Education Ministry of the United Arab Emirates (UAE) initiated a policy that mandates the installation of learning platforms in all 425 of the UAE's public schools within six years.

- In May 2011, the Laguna province of the Philippines announced that they would begin providing students with an educational tablet called the Rizal Tablet designed by a local company, Ionics EMS. The preloaded content on the Rizal was developed in collaboration with the provincial government, Vibal Publishing, and the University of the Philippines. Starting with 1,000 tablets in 2011, the goal is to equip every school child in the province with the device within five years.

- In June 2011, the Education and Vocational Training Minister of Tanzania announced an ambitious multi-year plan starting in 2011 to deploy online learning in 4,000 schools with the goal to reach 1.2 million secondary students.

- In June 2011, the South Korean Education Ministry mandated that all instructional content in all primary and secondary schools must be 100% digital by 2015. ***By 2015, every school child in South Korea will be carrying a personal learning device.***

- In July 2011, the government in Thailand announced that they intend to give every child in grades 1-6 a tablet starting with first grade students in the 2012 school year. The multi-year program will equip over 5 million primary students with handheld devices.

- In October 2011, the Indian government launched their heavily-subsidized tablet designed for schools called Aakash. The tablet is priced at $35.00 for schools and the government plans to deploy over one million devices to schools in 2012 alone.

- In November 2011, the Minister of Education and Science in Kazakhstan announced that every school-aged child in the country, over 92,300 students, will be provided with a tablet by 2020. Interestingly, they are supplying the first wave of tablets to, "the 9,300 children with disabilities that are unable to attend school for health reasons."

China and South Korea are the first countries in the world to convert all their primary and secondary academic content to digital formats.

In China, the central government develops and controls the academic curriculum. As of 2010, the entire primary and secondary curriculum was online in China. Although the content is online, relatively few students have access to it yet. ***The Chinese government's goal is to have their entire K-12 population of over 200 million students online by 2020.***

The Pre-K education system in Indonesia is also controlled by the central government. The Indonesian Ministry of Education started digitizing textbooks in 2008. As of September 2011, they had 942 textbooks digitized and posted online in the country.

A significant global catalyst driving the adoption of learning technology in the schools is the migration to digital content in the PreK-12 buying segments throughout the world.

There are now major digitization efforts going on in the school systems in South Korea, Thailand, China, Taiwan, Australia, Turkey, Brazil, Russia, France, Poland, Spain, Ukraine, Mexico, Japan, Singapore, United Arab Emirates (UAE), and in various school systems in the UK and the US.

Indiana, Virginia, Idaho, West Virginia, Texas, California, and Florida are examples of US states that are implementing statewide policies mandating the use of digital content in the schools.

Obviously, this is a boon to device makers. The Turkish government is seeking bids for the purchase of 15 million tablets for school children in the country, a deal touted to be worth over $6 billion, even with heavily-discounted prices.

In August 2011, the Russian government announced a plan to deploy tablets, "on a massive scale in the Russian educational system to replace printed textbooks."

Figure 4 – International Catalysts Driving Adoption of Learning Technology in the Global PreK-12 Segment
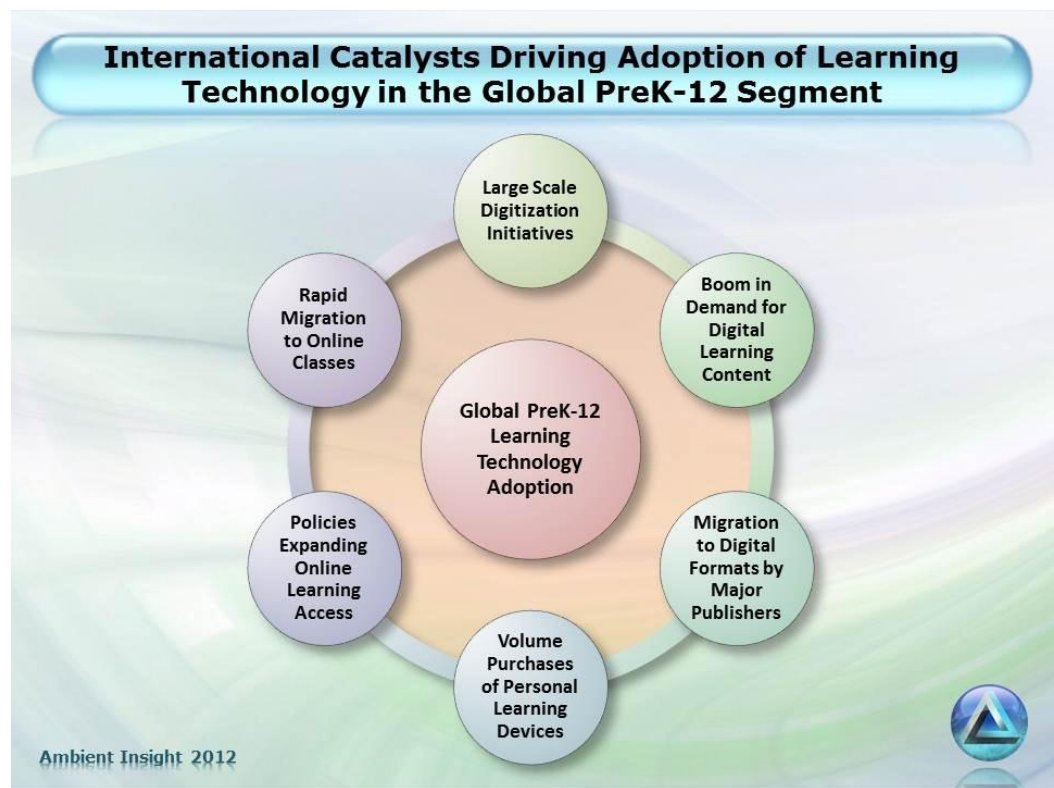
While all domestic school systems are unique, the US stands out because it has the largest population of online PreK-12 students, so far. The large (and growing) number of children attending online primary and secondary schools *fulltime* in the US is a trend found nowhere else in the world.

The US PreK-12 Academic Market

As of 2011, the US PreK-12 buying segment represented the most dynamic academic market on the globe. It has the highest growth rate for learning technology out of all the eight buying segments tracked by Ambient Insight. In terms of deal volumes, it has the highest number of merger and acquisition deals anywhere in the world.

The strong demand for learning technology in US schools is being driven by the robust growth of virtual and cyber charter schools, the rapid rise of online student enrollments, state legislation mandating content digitization (and online alternatives to classroom instruction), and ironically, the reduced budgets resulting from the lingering effects of the recession.

Ambient Insight defines virtual and cyber charter classes as courses that are taken outside the physical classroom, but within the jurisdiction of the schools. The schools are the buyers of the learning technology products.

Table 1 - 2011-2016 Total Number of US PreK-12 Students in Classrooms, Home Schools, and Online Schools

PreK-12 Student Populations	2011	2016	5-year CAGR
Physical Classroom Only	52,260,000	47,910,000	-1.7%
Home Schooled (Physical and Online Combined)	3,450,000	5,010,000	7.7%
Take at Least One Online Class Outside the Classroom in Virtual and Cyber Charter Classes within the Jurisdiction of the Schools	920,000	6,530,000	48.0%
Totals	56,630,000	59,450,000	*0.9%*

Note: Total student populations are extrapolated from projections from the Department of Education NCES and the US Census Bureau.

An "online class" includes products delivered on tangible media such as DVDs, as well as web-based content supported by an online teacher or a parent in the home. The class can be either synchronous (live) or asynchronous (self-paced with periodic tutoring support.)

It should be noted that a large amount of learning technology products (over $1.8 billion in 2011) are purchased by the physical schools to be used *inside* the classroom. In the US, 100% of schools have access to Internet-enabled computers with a computer-to-student ratio of 3 to 1. *Essentially, every student in the US uses at least one PC-based (either web-based or DVD-based) product every year inside the classroom.* Language learning and math are the dominant topics. These products are almost always used as part of a course, and are rarely a course in itself.

In 2012, Ambient Insight started categorizing the students taking extracurricular online classes taken outside the jurisdiction of the schools as part of the consumer segment.

Learning technology provides a viable, cost-effective alternative to schools strapped with reduced budgets. For example, learning technology is increasingly being used to deliver supplemental, advanced placement, credit-recovery, and remedial content.

The PreK-12 academic segment includes private, public, and commercial institutions. As of 2011, there were 14,166 school districts, 133,464 schools (both public and private combined), 56.6 million students, and 3.8 million teachers in the US PreK-12 educational system.

There are 33,366 private schools in the US comprising 25% of all schools. Almost 10% (5.5 million) of school children in the US attend private schools.

There are five student sub-markets in the PreK-12 segment:

- Charter Schools
- Home Schools
- Private Schools
- Public Schools
- Virtual Schools and Cyber Charter Schools

As of 2011, 49 states and the District of Columbia have policies sanctioning virtual classes (the exception being Delaware), 41 states and the District of Columbia allow charter schools, and 31 states allow cyber charter schools. As of 2011, there were over 5,300 charter schools in the US and the number of schools is growing by 6% a year. Over 380 charter schools in the US offer online programs. There are over 250 dedicated virtual charter schools in the US. *Sources: National Conference of State Legislatures and National Alliance for Public Charter Schools.*

In general, a charter school is publicly funded and privately managed. Virtual schools can be publicly funded or privately funded and can be managed by public or private entities. That said, many states label their cyber charter schools as virtual schools or even virtual charters, so the terms are used interchangeably.

There are now attempts to catalog all the online schools in the US. Wikipedia has identified 233 virtual and cyber charter schools in the US. The EU's Researching Virtual Initiatives in Education project has catalogued 261 online schools in the US.

The US online PreK-12 populations

Ambient Insight counts the discrete number of individual students, not course enrollments. A student can enroll in one or more courses in a year, yet we focus on the unduplicated student headcount as it represents a quantifiable "seat license" baseline for suppliers.

Ambient Insight derives their online student population totals by counting numbers reported in quantitative public-domain sources provided by state education agencies, school districts, universities, state legislatures, federal

government agencies, charter school associations, and commercial suppliers. We do not triangulate data from qualitative sources.

Over 1.6 million discrete students were enrolled in online programs in 2011, with at least 455,000 students (including home schooled) attending fulltime (see Table 3 for fulltime totals.) As of late 2011, the aggregate percentage of students (full and part-time combined) taking virtual or cyber charter classes across all states is 2.9%.

Table 2 - 2011-2016 Total Number of US PreK-12 Students in Online Classes - Full and Part-time Combined

PreK-12 Student Populations - Full and Part-time Combined	2011	2016	5-year CAGR
Fulltime and Part-time Online Home Schooled Students	760,000	4,180,000	40.7%
Fulltime and Part-time Online Students in School Administrated Public and Private Schools	920,000	6,530,000	48.0%
Totals	1,680,000	10,710,000	*44.4%*

By 2016, 6.53 million students will be taking virtual and cyber charter classes outside the classroom, but within the jurisdiction of the school and an additional 4.18 million home schooled children will be online for a total of 10.71 million online students. By 2016, 18.0% of all US students will be taking one or more online classes.

An interesting trend over the last four years is the continuing emergence of new private online *national* schools including:

- Kaplan's University High School
- George Washington University
- The Cambridge Academy
- Smart Horizons Career Online High School
- National University Virtual High School
- Avondale & Williams Preparatory High School
- National Connections Academy

Several online schools in the US accept international students on a fee-basis. Additionally, dozens of faith-based online private schools have launched in just the last year. Over 90% of students in these new online private schools attend fulltime.

> A relatively recent trend is the emergence of online international schools such as Giant Campus Academy, K12 International Academy, and International Virtual Learning Academy.

The US online schooling ecosystem is transparent

Virtual and cyber charter classes are offered by federal agencies, states, districts, private institutions, religious institutions, non-profit consortia, commercial suppliers, and universities.

Even the US Department of Defense has a virtual high school. The Department of Defense Education Activity (DoDEA) operates 223 schools, which employ 14,500 teachers and support staff. The DoDEA has over 101,500 students

enrolled. In the 2010-2011 school year, the DoDEA launched their virtual high school with 33 courses.

Several states, such as California, Ohio, Colorado, Washington, Florida, Nebraska, Minnesota, Texas, North Carolina, Nevada, Wisconsin, Idaho, Utah, New York, and Arizona have state-wide data repositories that track online enrollment percentages across **all school districts** in the state.

Additionally, state-operated virtual schools serve the majority of school districts in their respective states making it unnecessary to sample individual districts.

A major trend that emerged in 2011 was the growing tendency for school districts to launch their own virtual schools as a way to cut costs, attract home schooled students, and lure students back from virtual/cyber charter schools.

Ambient Insight is agnostic about educational policy. We track online student populations in order to quantify revenue opportunities for suppliers.

The presence of dedicated virtual and cyber charter schools with discrete student populations is a clear "per-seat" opportunity for content, services, and technology suppliers.

State legislation data sources

A valuable source of data is the total online populations cited in the various state legislative documents dealing with online schools. There have been over 25 states that initiated high-profile legislative efforts relating to PreK-12 online learning in 2011 alone. Almost all of those proceedings reported the current number of online students and many provided projections.

The Arizona legislature approved expansion of the Arizona Online Instruction program in 2010. As of May 2011, 28 school districts and 14 charter schools had received approval for online programs. Administrators of the program report that more than 35,000 students are already enrolled in just the first year of the expanded operation.

In September 2011, results from a report by the Office of the Legislature Auditor commissioned by the Minnesota legislature indicated that over 20,000 students in Minnesota took at least one online class in the 2010 school year, (and the number has doubled annually for the last three years.) Minnesota's online student population has a high percentage of fulltime online students, averaging 68% (13,600 students in 2010) over the last three years.

In April 2011, the New York Board of Regents approved a policy mandating that all schools in the state increase the amount of online learning available to students.

New York was granted $700 million in funds from the national Race to the Top program and indicated they would use some of the money to launch the New York State Virtual High School with the goal to reach 20,000 students by 2014.

Until recently, charter schools in Alabama, while permitted to offer online classes, had to also operate physical buildings. That requirement was eliminated in 2011, allowing virtual charter schools to operate without a physical presence.

Legislative Trends

Until recently, the prevailing trend in state legislation regarding online schools
was restrictive and laws were designed to limit the growth of those schools.

While restrictive laws (such as enrollment caps and new online school
moratoriums) are still on the books, the new legal trend that emerged in 2010
and 2011 was the introduction of laws that allowed:

- Expansion of enrollments (either by raising the enrollment caps or
  removing caps altogether) at existing online schools
- Creation of new online schools
- Students to take all their classes online
- Students to enroll in virtual schools outside their district
- Online classes to be taught by a percentage (usually quite small) of
  teachers from outside the state
- Home schooled children to enroll in district-run virtual schools without
  having to enroll in the district.

For example, state legislatures in Arizona, Connecticut, Maryland, Virginia,
Louisiana, Utah, Alabama, Florida, Wisconsin, Tennessee, and New Jersey
passed laws in 2010 and 2011 that expanded (or created for the first time)
virtual and cyber charter school programs.

Follow the numbers

Just five virtual school systems account for 302,000, or 32.9%, of the total US
online student population in virtual and cyber charter schools:

- Florida Virtual School (FLVS) with 122,000 students, up from 97,000
  students in 2010
- Kaplan University Online High School is a national high school with over
  50,000 students
- North Carolina's Virtual Public School (NCVPS) has over 49,000
  students
- Alabama's ACCESS Distance Learning Initiative has over 41,000 online
  students.
- Penn Foster High School (owned by the Princeton Review) has over
  40,000 online students.

Each of these school systems has reported phenomenal growth over the last
two years.

State sources of enrollment data

California has the most extensive and detailed data on online students. The
California Board of Education (CDE) has a data repository called the California
Directory of Online Schools and Programs (CDOSP), which shows discrete
online enrollment totals for every county in the state for schools that provide
over 30% of their curriculum online.

In 2011, Kapolei
Middle School in
Honolulu became
the first school
district in Hawaii
to offer all 7th and
8th grade classes
online.
Interestingly, the
move is aimed at
reducing
overcrowding.

Over 2.7% of California's 6.2 million PreK-12 students are taking at least one class online as of 2011. The percentage of online students is much higher in the charter schools.

The California Board of Education (CDE) estimates that 23%, or 95,000, of the 412,000 students in charter schools (both online and physical) are taking one or more of their classes online. (California added 100 new charter schools in 2011 and their student population spiked from 364,000 to 412,000 charter students in one year.)

California Virtual Academies (CAVA), a publicly-funded online charter school system operated by K12, Inc., had 10,766 online students in 2010 according to their School Accountability Report Cards (SARC) required by the California Department of Education (CDE). CAVA had 11,519 online students in 2011 according to the CDOSP, a 7% increase over 2010.

Pennsylvania has over 50,000 online students across the 13 cyber charter schools. The Pennsylvania Cyber Charter School is just one of those 13 cyber charter schools and has 11,000 students.

In May 2011, the Ohio Department of Education reported that the number of students enrolled in the publicly-funded "e-schools" increased 46% from 2006 to 2011 to a total of 31,000 students. This total does not include the students in private online programs. Ironically, Ohio has a moratorium on the increase of new online schools, yet their online population has increased dramatically in spite of the moratorium.

The Minnesota Department of Education reports that over 23,000 children are enrolled in online programs in the state, with over 8,500 enrolled fulltime. According to Minnesota's Office of the Legislative Auditor (OLA), part-time enrollment nearly doubled in the last four years, while full-time enrollment more than tripled in the same period.

According to the Colorado Department of Education, the number of Colorado students enrolled in online programs jumped from 9,222 in 2007 to 15,249 in 2010, a 65% increase. As of 2011, they have 24 online schools with over 22,000 students.

Washington State education officials announced in May 2011, that over 20,000 students, or 2% of their public school K12 population, were enrolled in one or more online programs. This does not include enrollments in private schools.

The non-profit Virtual High School Global Consortium is a national program and serves over 770 schools across 35 states with 15,000 enrolled students. They report that the number of schools working with them has grown 34% in the last two years.

All state-run programs report on their online student populations. For example:

- Michigan Virtual School has over 18,000 online students

- Idaho Digital Learning Academy (IDLA) serves 100% of Idaho's school districts and has 14,300 students enrolled.

- The Utah Electronic High School has over 9,000 students.

- The Texas Virtual School Network (TxVSN) serves all 1,225 districts in the state and online enrollment rapidly grew from 103 students in 2009 to over 8,000 students by the summer of 2011.

- Virtual Virginia Online School serves 90% of Virginia's schools and has over 7,800 students.

- The Oregon Virtual School District (ORVSD) has over 7,000 online students.

- The Georgia Cyber Academy currently has 6,500 students enrolled in K-9 online classes.

- The Louisiana Virtual School (LVS) has 5,234 students as of 2011.

It should be noted that the numbers above are just for the students in these specific state-run programs and are not the total number of online students in the states. For example, Idaho has an additional 4,900 online students across seven district-level virtual charter schools.

University Sources of Enrollment Data

Several colleges, such as Stanford, Brigham Young, and Northwestern offer online high school classes. There are also several colleges that operate virtual high schools that grant high school degrees.

- During the 2010-2011 school year, Texas Tech University Independent School District (TTUISD) had over 12,000 part time enrollments **and more than 2,500 full-time students** in their high school diploma program.

- The University of Missouri High School reports that they average 7,000 student enrollments a year.

- Indiana University High School reports they have over 2,500 students a year.

Stanford University's Online High School is unique in that it is designed for gifted children. In 2010, Middlebury College partnered with K12, Inc. to offer online language learning to high school students. As of November 2011, they serve over 50,000 students. The George Washington University Online High School opened in January, 2011. Clearly, this is a significant new trend driving the growth of online high schools in the US.

High growth rates now common

Thousands of high school children take online classes annually from universities and colleges. The majority of those students are taking post-secondary classes (known as dual program.) Those enrollments are analyzed in Ambient Insight's higher education segment.

The one thing all these virtual and cyber charter schools have in common is the explosive growth in enrollments. For example, the Virtual Learning Academy Charter in New Hampshire grew from 700 students in 2008 to over 9,000 students in 2011. And that is just one cyber charter school in the state.

The Southern Regional Education Board (SREB), a non-profit organization set up by 16 member states, works directly with state education agencies. SREB tracks state virtual schools in 14 states and reports that four of their schools are growing enrollments by 40% or more a year and that all their schools combined expect *a minimum enrollment growth of 25%* over the next five years.

The only examples of virtual and cyber charter schools that are not experiencing rapid growth are schools in states that still impose enrollment caps and states that have reduced funding or outright eliminated funding (as in Delaware.)

Fulltime online enrollments growing rapidly

A conservative estimate (that includes online home schooled children) is that, as of 2011, at least 420,000 PreK-12 children in the US attended all their classes online. This is a mere 0.74% of the total number of school children in the US. However, this is changing fast.

Four providers account for 65% of the fulltime population: Kaplan University Online High School, Penn Foster High School, K12, Inc., and Connections Education.

In November 2011, K12, Inc. reported in their SEC filing that, "our total full time enrollment has grown from approximately 99,600 to 141,500 over the past year." This is a breathtaking annual growth rate of 42%.

In September 2011, Connections Education reported that they had over 40,000 fulltime students. Connections Education was purchased by Pearson in September 2011 for $400 million and at the time of the acquisition indicated in the press that they had grown their revenues 30% in each of the last three years.

In states that allow fulltime online attendance, fulltime enrollment tends to be very high. For example:

- Almost all students attending national online high schools and online faith-based private schools are fulltime.

- Agora Cyber Charter School is just one of 13 cyber charters in Pennsylvania with over 6,000 students and all of their students are fulltime.

- Primavera Online High School in Arizona has over 15,000 online students and 86% are fulltime students.

- Over 68% of Minnesota's online students are fulltime.

- Over 7,180 (half of all students) of Idaho Digital Learning Academy (IDLA) online students are fulltime.

- Data derived from the California Department of Education Data Partnership (Ed-Data) show that enrollment in online charter schools in the state has been growing by 38-40% in the last three years and they now have over 35,000 fulltime online students.

Considering the explosive growth in fulltime online enrollments and the tendency for more and more states to allow fulltime virtual attendance, *a conservative estimate is that over 8.2%, or 4.75 million students, will be taking all their classes online by 2016.* While this is still a small percent across the total school population, it is 44.8% of all online students in 2016.

Table 3 - 2011-2016 Total Number of Fulltime Online US PreK-12 Students in Home Schools and Public/Private Schools

Fulltime PreK-12 Student Populations	2011	2016	5-year CAGR
Fulltime Online Home Schooled Students	145,000	1,800,000	65.5%
Fulltime Online Students in School Administrated Public and Private Schools	310,000	2,950,000	56.9%
Totals	**455,000**	**4,750,000**	*59.9%*

On the edges of the US PreK-12 ecosystem: home schooling

Ambient Insight defines home schooling as education that is provided in residential environments outside the jurisdiction of the school districts. As more and more school districts reach out to home schooled children with online programs, the distinction is blurring.

Ambient Insight's estimate for the home-schooled population is higher than estimates from the US Department of Education (DoE) or the home school associations. This is because 7% of the school-age population has a disability that prevents them from attending a physical school, but at least 2% are being schooled in an institution or home schooled using assistive technology and technology-based learning products. Those children are not included in DoE or association statistics, but are included in the Ambient Insight estimate.

It is interesting that the proliferation and greater availability of high-quality learning technology products and online tutoring services are now major catalysts driving the growth of home schooling.

A conservative forecast is that by 2016, over 5 million US children will be schooled at home. Ambient Insight believes that over 80% of those children will be online (but not necessarily fulltime) by 2016. This represents over four million seat licenses for suppliers.

By 2016, it will be difficult to differentiate between a home-schooled student and a virtual/cyber charter student.

All the major commercial online school providers and supplemental learning suppliers are now marketing their products to parents of home schooled children. In an effort to attract government funding, the school districts are now opening their online programs to home schooled children.

<u>Higher Education Institutions</u>

Like the Prek-12 segment, higher education institutions are different in every country. The adoption of learning technology varies dramatically from country to country.

Government-mandated educational policies have a significant impact (either negative or positive depending on the country) on the adoption of learning technology in the higher education institutions across the globe.

Educational policies are inhibiting the growth of learning technology in several countries:

- Both Brazil and Indonesia have strict government guidelines surrounding "the quality" of academic distance learning content making it difficult for foreign suppliers to compete.

- The Chinese Ministry of Education must approve online degree programs and, so far, does not allow foreign firms to grant online degrees in China. As of 2010, 68 schools (all domestic firms based in China) have been approved.

- In August 2010, the Ethiopian Ministry of Education **banned all distance learning** in higher education institutions in the country. In October 2010, the government lifted the ban on the condition that restrictive (and complex) curriculum guidelines are followed.

A country's educational policies can also create positive market conditions that accelerate the adoption of learning technology:

- Mexico's Public Education Secretariat launched a federally funded virtual university in September 2010 called the Educación Superior Abierta y a Distancia (ESAD). ESAD offers free undergraduate degree programs to Mexican nationals.

- In April 2011, Malaysia launched the Malaysia Education Online (MEdO) national online learning portal. The goal of their new National e-Learning Policy is to have 30% of all higher education courses delivered online by 2015.

- In May 2011, The Sri Lankan Ministry of Higher Education signed an agreement with Mobitel to use Mobitel's mLearning platform as "the National Higher Education Learning Platform through the National Online Distance Education Service (NODES)."

- In October 2011, the French Higher Education and Research Ministry announced they were subsidizing tablet purchases for higher education

students in a partnership with France's largest mobile operator, Orange. Students are offered tablets at significant discounts. The government has a similar deal with Bouygues Telecom, France's third-largest operator.

The French government's (rather ambitious) goal is to have 95% of all higher education students using tablets by the end of 2013.

Apple has been a major proponent of global higher education. Launched in 2007, Apple's iTunes U has content from over 1,000 educational institutions from 26 countries across the globe. The content is available in over 123 countries. In September 2011, Apple reported that over 60% of iTunes U traffic comes from outside the US. Apple reports that they have had over 600 million downloads since the launch of iTunes U in 2007.

All public content on iTunes U is free, yet it is a major catalyst for the commercial Mobile Learning industry as it increases awareness and drives adoption worldwide. About half of all iTunes U content providers make their content available to the public. The other half provides private access only to their enrolled students.

One of the largest institutions on iTunes U is the Open University based in the UK. In August 2011, they reported that since their launch on iTunes U in June 2008, they had over 38.7 million downloads by over 4.4 million visitors. They indicate that 89.9% of downloads originate outside the UK, with the US accounting for the largest activity with 10.7 million downloads. The next largest downloads originated from the UK, Canada, China, Australia, Germany, Japan, France, the Netherlands, and Spain, respectively.

Stanford has had over 30 million downloads since they joined iTunes U. Schools with over 20 million downloads include UC Berkeley, Yale, and MIT. Oxford and the University of Munich each have had over 10 million downloads on iTunes U.

The US online higher education ecosystem

The US has been the leading adopter of learning technology in higher education so far and is treated in greater depth in this document. Ambient Insight's US higher education segment is comprised of the institutions that are eligible for Title IV funds (student loans.) Those schools include: public non-profit universities and colleges, private non-profit universities and colleges, and for-profit career colleges. We use the term "higher education" throughout this section.

The higher education segment includes degree and non-degree granting organizations. According the US Department of Education, there are over 27 million students that are formally enrolled in the post-secondary system as of 2010.

Roughly 18 million are in degree or certificate programs **with over nine million additional students attending classes, but not pursuing a credential.** This non-credential demographic is routinely overlooked in

Starting in 2012, Ambient Insight categorizes non-Title IV trade and vocational schools as part of the corporate commercial training and education industry. The online populations are discussed in the corporate section.

research, yet this is a third of the total higher education population and represents a significant revenue opportunity for suppliers.

The demographic is much larger considering that up to 50 million adults in the US also participate every year in some kind of formal educational experience.

Table 4 - 2011-2016 Total US Post-secondary Student Enrollment by Three Institution Types (in Millions)

Institution Type	2011	2012	2013	2014	2015	2016	5-year CAGR
Public Non-profit Universities and Colleges	19.3	19.2	19	18.8	18.7	18.5	*-0.8%*
Private Non-profit Universities and Colleges	5.2	5	4.9	4.8	4.8	4.7	*-2.0%*
For-profit Career Colleges	2.7	2.6	2.8	3.1	3.4	3.6	*5.9%*
Total	**27.2**	**26.8**	**26.7**	**26.7**	**26.9**	**26.8**	***-0.3%***

Source: Extrapolated from US Department of Education's National Center for Educational Statistics (NCES) – 12 month unduplicated headcount in Title IV institutions

The for-profit schools are growing faster than the non-profits and are the best revenue opportunities for third-party content and services suppliers. Two-year for-profit degree-granting schools now make up 38% of the two-year college market compared to 17% fifteen years ago. Four-year for-profit schools degree-granting institutions (career colleges) now make up 17-18% of the market compared to 1% fifteen years ago.

Of the roughly 3,000 for-profit institutions, 40% are now owned by one of 13 publicly-traded companies. In 1990, only 10% of the for-profit institutions offered associate, bachelor, or professional degrees. By 2011, over 50% of the for-profit institutions offered accredited degrees. **More than 90% of students attending for-profit institutions are now enrolled in degree programs.**

Table 5 - 2011-2016 Total Number of US Higher Education Students in Physical Classrooms versus Online Schools

Higher Education Online Student Population	2011	2016	5-year CAGR
Attends Physical Classroom Only	11,086,400	3,043,300	-22.8%
Takes Some Classes Online	14,567,200	19,659,600	6.2%
Takes All Classes Online	1,572,100	4,153,000	21.4%
Totals	**27,225,700**	**26,855,900**	**-0.3%**

Source: The US Market for Self-paced eLearning Products and Services: 2011-2016 Forecast and Analysis, Ambient Insight, LLC.

The number of students that are taking all their classes in a traditional physical classroom environment is shrinking by -22.8% and barely 3 million students will be taking classes exclusively in physical classrooms by 2016.

The number of higher education students taking at least one class online is growing by a five-year CAGR of 6.2%. This rather modest compounded growth rate masks the explosive annual growths in the last three years. For example,

There are 27.2 million US students formally enrolled in higher education programs, but there are up to 50 million people that take part in some kind of adult education every year.

the annual growth in the number of students taking at least one class online from 2008 to 2010 was 68.0%.

The growth rate has slowed, but the total numbers of students is now very large, and even modest growth rates will result in large increases of online populations. By 2016, over 23.8 million higher education students will be taking one or more courses online.

The "big story" in the US higher education segment is the rapid growth of the number of students taking all their classes online. The number of fulltime students is growing by a five-year CAGR of 21.4% and enrollments will reach 4.1 million by 2016.

By 2016, there will be more full time online students than students that take all their classes in a physical classroom.

Ambient Insight quantifies the fulltime enrollment and part-time enrollment in great detail in our syndicated US Self-paced eLearning reports. We identify the top institutions by enrollment totals. For example, just ten institutions account for 34.3% of all fulltime enrollments. ***Source: "[The US Market for Self-paced eLearning Products and Services: 2011-2016 Forecast and Analysis](#)," Ambient Insight LLC.***

From a marketing perspective, it is interesting to look at the demographics of the online higher education student population.

- The Ohio Learning Network publishes annual reports on their demographics and as of late 2009, 66% of their online students were female and 51% were over the age of 25.

- Jones International University, a school that is 100% online, indicates that the average age of their students is 37.

- The average age of an Ivy Bridge student is 30. Over 75% of Ivy Bridge students are older than 21 and 65% are female.

- The average age of an undergraduate student at University of Maryland University College (UMUC) is 31 and the majority of undergrads are female. UMUC reports that 66% of their students are married, 75% attend part time, and 92% of UMUC students are employed full time.

- The Distance Education and Training Council (DETC) accredits online schools that reach 4 million students a year. DETC reports that these students are, "in their thirties, half are female, and the complete their studies in 70% of the time compared to traditional students."

Obviously, the online demographic is distinct, and suppliers are advised to target this population with products that meet their unique needs.

Local and State/Provincial Governments

Relative to buying behavior, the local and state/provincial governments vary widely across the planet. The one common thread as of 2011 was the impact

of budget cuts induced by the slow economy. Education and training budgets have been dramatically reduced except for training for public safety personnel.

One common adoption of learning technology in local and state governments across the planet is electronic tests related to obtaining a driving license. Government agencies pay service providers to create test prep products and usually offer the test prep to citizens for free. The agencies are also converting their paper-based portions of the driving test to electronic formats, which dramatically reduce the costs compared to paper-based tests.

Interestingly, the recession has contributed to a spike in expenditures on learning technology in city and county libraries. Libraries across the globe have been purchasing learning content, particularly around workforce development, to help their patrons retrain for new jobs. Language learning content is also popular with library patrons. As of early 2012, OverDrive, one of the leading digital content suppliers for libraries, had over 15,000 library customers worldwide. A significant portion of their online content catalog is educational.

The US Local and State Governments

According to the US Census Bureau, there are about 90,500 local governments in the US that employ 5.2 million people. Local government agencies include county and municipal institutions. These include about 3,000 county governments; 19,400 municipal governments; 16,500 townships; 16,500 school districts; and 35,100 special districts. Illinois has the most local government units, with more than 6,900; Hawaii has the fewest, with 20. County and municipal agencies spend $8 billion a year on employee training.

There are 50 US state government entities that employ 2.6 million people and they spend about $2.7 billion a year on training and education for employees.

Federal Governments

A consistent international pattern is the growing demand for learning technology in government agencies. Many countries, such as Mexico and China, have centralized educational systems and they are the primary buyers of academic content, outspending corporate buyers in those countries.

Brazil has a centralized education system administered by the federal government. Brazil spends over $400 million a year (48% of the entire Brazilian publishing industry) on textbooks for schools and announced that they will begin buying digital content in 2014. The government explicitly stated that the reason they are waiting until 2014 is to give publishers time to develop the content.

DataWind, the company that builds the government-subsidized Aakash tablet in India, reported in October 2011 that the governments of Mexico, Sri Lanka, Egypt, Thailand, and Brazil are now interested in replicating the program.

Federal governments are not only direct buyers of learning products for their civilian employees and military personnel, they also fund a great deal of technology-based learning initiatives. For example:

- The French Ministry of Education, Research, Youth and Sports hired SIVECO Romania to build a professional development learning portal for teachers in France. The project is co-funded by the European Social Fund and is funded through 2014.

- The largest domestic Self-paced eLearning provider in the UK, in terms of enrollment, is learndirect, a federally funded organization. The organization was created by Ufi, a government body, to provide free vocational online learning in the country and they now serve 8,500 users a day.

- The South Korean government subsidizes a great deal of online learning. For example, the government's Cyber Home Learning System is essentially a national virtual school.

- Columbia's National Learning Service (SENA) awarded Rosetta Stone a million dollar contract to provide English language learning to over 100,000 Columbian citizens.

- In December 2011, the Catalan government in Spain awarded Cambridge ELT a contract to provide an online learning to adult learners over the next three years.

- The Australian government is a major funder of domestic Self-paced eLearning programs in two specific areas: PreK-12 and workforce training. The government grants awards directly to suppliers as part of their National Vocational Education and Training E-learning Strategy.

- Brazil won the competition to host two major games: The 2014 World Cup and the 2016 Olympics. Brazil's Ministry of Tourism awarded Englishtown a multimillion dollar multi-year contract to provide online language learning to the country's tourism professionals.

The US Federal Government

The US federal government is major buyer of learning products and services. There are two major sub-segments in the US federal government segment: civilian and military. There are 2.6 million civilians employed by the federal government. Of these 640,000 are civilian employees that work for the Department of Defense (DoD).

There are 1.4 million active personnel in the US military and another 890 thousand in the reserves. Both civilian and military agencies purchase training for contractors and there are at least 4 million additional individuals that are often provided training by the two sub-segments.

There are several areas in the federal government besides agency employee or personnel training that represent revenue opportunities for suppliers. For example, the Department of Defense runs a very large K-12 school system

and is responsible for the education of over 100,000 PreK-12 students. The federal government also provides $9.7 billion in workforce retraining funding, but these funds are almost always administered by state and local agencies. Consequently, the state and local agencies are the actual buyers for content and services.

Corporations and Businesses

The overall global corporate market has been negatively impacted by the recession, downsizing, training budget cuts, commoditization pressures, and product substitution. The lingering impact of the recession has had a greater impact (both positive and negative) on training expenditures in certain industries.

While no industry is immune from a recession, there are verticals (such as healthcare) that tend to be "recession-resilient" and some industries tend to recover faster or slower than others.

Large companies (particularly in the US) were early adopters of learning technology and during the current gradual economic recovery they are reducing their expenditures on all types of training and education products. On the other hand, small and medium-sized businesses (SMB) are migrating away from classroom products to a range of learning technologies.

There is a long-standing myth that corporations in advanced countries follow the adoption patterns of the US. The evidence does not support this conclusion. For a variety of reasons not related to technology, the demand and revenues for Self-paced eLearning are relatively low in corporations in Japan, France, and Germany.

There is also little evidence to support the widely held belief in the industry that the corporate-facing learning technology markets in the US, Canada, the UK, and Australia are very similar. The evidence shows that the corporate buying behavior is quite different in each of these countries.

The current economic conditions are influencing the growth rates of expenditures on specific types of content. Companies tend to calibrate budgets for certain types of content during economic recoveries, increasing expenditures in some areas and decreasing them in others.

The US Commercial Training and Education Industry

There are private commercial institutions catering to post-secondary students seeking vocational training all over the world. The market is quite transparent in the US because these institutions file federal income taxes under the tax code for "educational services" with total revenues formally tracked by the government. Over 3 million people in the US take classes each year from commercial training and education firms.

The number of establishments filing taxes as educational services (excluding PreK-12 and degree-granting higher education providers) is growing by a

The current economic conditions are catalysts for specific types of products, such as hosted tools, platforms, and services.

The US commercial training and education industry is a significant revenue opportunity for suppliers considering the relatively low adoption of learning technology so far.

healthy 23% every five years. As of 2011, there were 60,907 establishments, up from 49,319 in 2002.

According to the US Economic Census, there are 49,201 for-profit educational service companies and they generate over $25.3 billion in annual revenues. These for-profit companies represent the commercial training and education industry in the US.

There are an additional 11,706 non-profit establishments that account for $13.3 billion in annual revenue, **but they only generate $800 million of that revenue**. The non-profits obtain $5.0 billion from government grants and $7.5 billion from private contributions, gifts, and grants.

These combined establishments account for $26.1 billion in generated revenues for occupational, technical, and trade; professional development; and management training programs. As of 2011, very little of this $26.1 billion in revenue was generated from the sales of learning technology products. Part of this is due to the necessity of hands-on training required for many trades and skills. Training in many areas (for example auto repair) simply does not lend itself to technology-based instruction.

Associations, Non-profits, and NGOs

Associations, non-profits, and non-government organizations (NGOs) are both buyers of learning technology for their membership and major funders of learning technology projects across the globe.

In the US, associations spend over $6.2 billion annually on education and training events. Associations were once slow adopters of learning technology in general, but this is no longer true. This segment is moving fast to learning technology.

According to the American Society of Association Executives (ASAE), there are more than 140,000 US associations. This includes more than 116,000 local, state, and regional associations; 23,000 national associations; and 1,300 international associations headquartered in the US.

This US segment has over 60 professions that require continuing education and certification. The Canada has over 30 professions that require continuing education. This association segment will experience steady growth as assessment, re-certification, and mandatory continuing education events migrate to learning technology formats.

UNESCO, The World Bank, The European Social Fund, and the Commonwealth of Learning are examples of NGOs that subsidize learning technology initiatives across the planet. The funding is heavily concentrated in developing economies.

NGOs play a pivotal role in the uptake of Mobile Learning in Africa:

- In January 2011, the non-profit Worldreader.org began rolling out pre-loaded eReaders for school children in Ghana. It has partnered with

eight African publishers to digitize local content and textbooks. The Kindle eReader is heavily subsidized by Amazon and Worldreader is able to sell the complete bundle for $200 per student. Worldreader now has permission from the Ministry of Education in Ghana to take the program across the country, potentially reaching millions of school children.

- In South Africa, where literacy rates are low, the Shuttleworth Foundation has started a major Mobile Learning campaign called the m4Lit to encourage reading and writing among schoolchildren and young adults. The project publishes "teen mysteries" and interfaces with the most popular social network in South Africa called MXit. The foundation reports that, "In the first three months of publication, over 12,000 teens read the whole story on their phones."

- The Institute for Entrepreneurship and Management (ISEG) and International University for African Diasporas (UNIDAF) in Senegal develops and sells a product called mLearning4Africa, "an innovative platform that provides low-cost mobile learning services to African schools, universities, and corporations in remote areas."

- Nurses and health workers in Kenya who are trained by the African Medical and Research Foundation (AMREF) can download tests, reference material, and exam dates on their mobile phones.

- M-Ubuntu is Mobile Learning project funded by the Swedish NGO Learning Academy Worldwide in South Africa.

The BridgeIT project was launched in Tanzania in 2007 and in Lagos, Nigeria in May 2011. The Tanzanian project was funded by a three-year $2 million grant from the US Agency for International Development (USAID). The Nigerian content and the technology are donated by Nokia, Pearson, Longman, and Airtel.

BridgeIT allows teachers in public schools to access and download a catalog of educational videos using a video-based mobile application. "The videos are stored on a remote server and organized by subject and grade. By connecting the mobile phone to a TV or a projector, the teacher can play the videos to a class to illustrate any relevant topic in the school curriculum."

<u>Healthcare</u>

The healthcare segment in most countries is a very complex, and relatively opaque, supply chain. It is not a monolithic vertical, but rather an amorphous cluster of buyers. The buyers in the healthcare segment are spread out among consumers, corporations, academic institutions, government agencies, and associations.

Some of the most innovative learning technology products are found in the healthcare segment including sophisticated Simulation-based Learning and Mobile Learning products.

Discerning "who the buyer is" is the most difficult challenge for suppliers in this segment. More often than not, the largest buyers are not the users.

While the majority of technology-based learning products and services are targeted to healthcare professionals, suppliers are increasingly developing innovative products and services for consumers. Technology-based patient education is an international growth trend.

One significant trend driving the adoption of Mobile Learning in developing economies is the "mHealth" initiatives being launched by NGOs, carriers, device makers, and governments. Mobile Learning is now recognized as an integral component of mHealth and the rapid adoption of mHealth across the planet is a significant catalyst for Mobile Learning.

Not only are rural teachers and healthcare workers being provided with professional development, procedural support, and decision support; but consumers and patients are being provided with a range of educational content, including mobile game-based learning content. The programs have been enthusiastically received by the users.

The UN Foundation-Vodaphone Foundation Partnership has been developing Mobile Learning applications that include remote data collection and monitoring, diagnostic and treatment support, education and awareness, communication and training for healthcare workers, and disease and epidemic outbreak tracking. Remote monitoring and medication notification reminders increased compliance rates among TB patients in Thailand to 90%.

In rural communities around the world, the mobile phone provides more than connectivity and conversation. In India, when learners get the right answers while playing ZMQ's mobile edugame about HIV/AIDS called Safety Cricket, they win coveted airtime minutes. Players downloaded 10.3 million game sessions for this and three other ZMQ HIV/AIDS edugames in the 15 months following launch. ZMQ has also developed a program to provide women in India with information on prenatal care via SMS.

Houghton Mifflin Harcourt (HMH) and the iheed Institute sponsored the world's first mobile healthcare education event called mHealthEd in Africa in June 2011. They report that mobile healthcare education "leverages the proliferation and relative cost effectiveness of mobile phone devices to improve the training and skills of front–line health workers." At the event an HMH executive stated that, "Houghton Mifflin Harcourt is pleased to be working at the forefront of mobile learning technology."

There are mHealth products that are designed exclusively for patient education:

- The Japanese mobile cellular company NTT DoCoMo launched a new "mobile health support service" in 2010 called i-Bodymo. The service includes a suite of wellness apps performance-based health tools.

- Bharti Airtel launched their "m-health services" value added service (VAS) in India in June 2011. For two cents a day subscribers get access to Mobile Learning in four categories: "women's health pack, men's health pack, and two lifestyle packs."

- HTH Worldwide, a global health and safety services company, sells a subscription-based Mobile Learning product for English-speaking travelers who need to navigate healthcare services when traveling abroad. With the iPhone app mPassport, users can "find a conveniently located, carefully selected, English-speaking doctor or dentist and request an appointment," and then use mapping and GPS features to find the shortest route to the location. Other features of mPassport include translations of brand names for medications and key medical terms and phrases.

The international growth in wireless monitoring technology is now a catalyst for learning technology innovation in the healthcare segment. Devices that were once primarily sensors displaying vital sign information have evolved into "intelligent jewelry" that provides patients with step-by-step instructions on self-administered procedures.

There is opportunity for suppliers who can combine mobile monitoring and health-related information for patients and for caregivers. Ambient Insight categorizes products that are designed to contribute to patient education or provide clinical performance support as "Device-embedded Learning," which is a subset of Mobile Learning.

The US healthcare segment

As of 2011, there were over 16 million people employed in the US healthcare segment. According to the US Bureau of Labor Statistics (BLS), 43.8% of these employees (6.57 million) are clinical and technical professionals that require licensure and continuing medical education to legally work in their fields. According to the BLS, this licensed demographic is predicted to grow to 8.04 million people by 2018.

Figure 5 – Factors Driving Adoption of Learning Technology in Healthcare
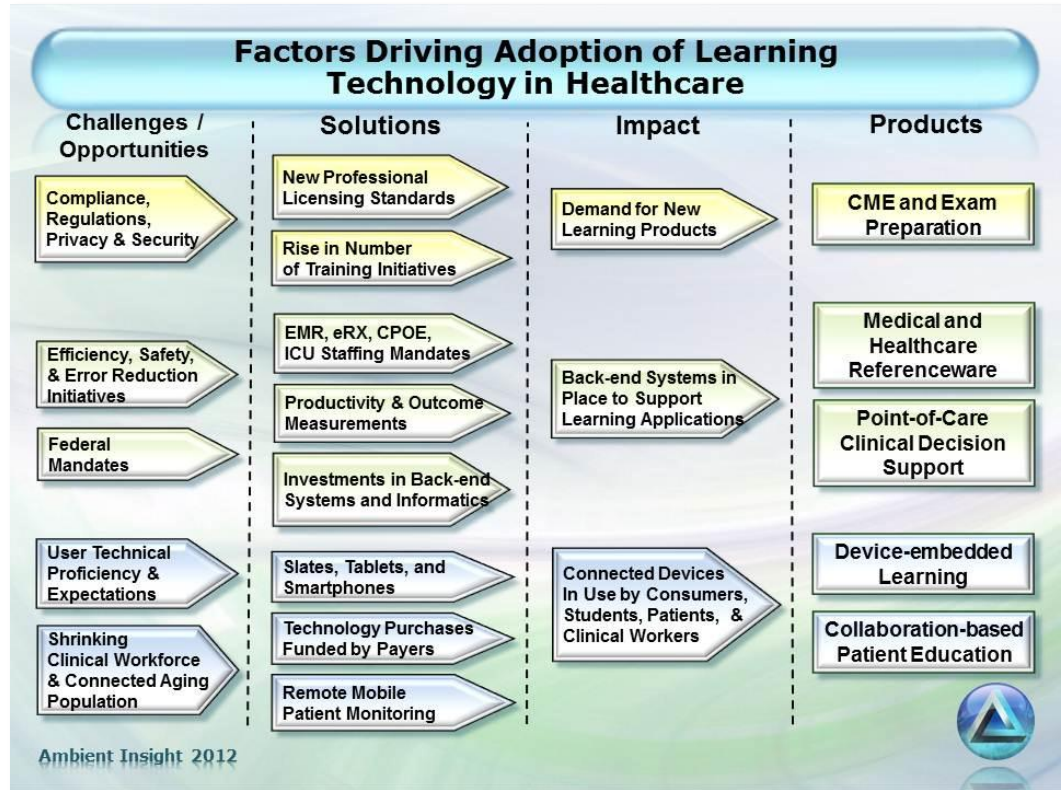
About 518,000 establishments make up the health services industry; all vary greatly in terms of size and number of employees. Three-fourths of all health services establishments are offices of physicians, dentists, or other health practitioners. Although hospitals comprise only 2% of all establishments, they employ 41% of all workers.

The healthcare segment has been immune to the recession. Since the recession began, the healthcare segment has added over 866,000 jobs. According to a May 2010 report by the US Bureau of Labor Statistics (BLS), the healthcare segment has been adding an average of 19,700 jobs a month over the last two years. Obviously, there is a strong demand for training.

Learning Technology Product Definitions

Ambient Insight provides market forecast research for eight pedagogically-defined learning products. These products include:

- Self-paced eLearning Courseware and Exam Products
- Digital Media Reference Content (Referenceware)
- Collaboration-based Learning
- Social Learning
- Simulation-based Learning
- Game-based Learning
- Cognitive Learning

We provide highly-granular revenue breakouts for each of these products in private reports customized to the needs of individual clients.

- Mobile Learning

We provide forecasts for the major product types in syndicated commercial reports.

Table 6 - Ambient Insight's Pedagogical Learning Technology Taxonomy

Learning Product Type	Pedagogical Method	Learning Theory	Bloom's Learning Domain
Self-paced eLearning Courseware and Exam Products	Tutorial, Presentation, Drill-and-practice	Instructional, Socratic	Cognitive
Digital Media Referenceware	Presentation	Instructional	Cognitive
Collaboration-based	Presentation, Drill-and-practice, Mentoring, Demonstration, Discussion, Problem solving, Cooperative learning	Instructional, Socratic, Situational, Experiential, Constructionist	Cognitive
Social Learning	Mentoring, Discussion, Cooperative learning	Situational, Experiential	Cognitive and Affective
Simulation-based Learning	Demonstration, Simulation, Cooperative Learning, Problem solving, Discovery	Situational, Experiential, Constructionist	Cognitive, Affective, and Psychomotor
Game-based Learning	Demonstration, Gaming, Cooperative Learning, Problem solving, Discovery	Situational, Experiential, Constructionist	Cognitive, Affective, and Psychomotor
Cognitive Learning	Demonstration, Mentoring, Cooperative learning, Problem solving, Discovery	Experiential, Socratic, Constructionist	Cognitive and Affective
Mobile Learning	Mentoring, Cooperative learning, Discovery, Problem solving	Situational, Experiential	Cognitive and Affective

The demand for a specific product type can be much higher (or lower) in a particular region. For example, the growth rate for specialized authoring software tools is negative in North America, yet positive in Asia and Eastern Europe.

The dermand for installed learning platforms is flat in Western Europe compared to Eastern Europe where the growth rate is quite high. Ambient Insight provides detailed breakouts of demand in targeted regional reports

Self-paced eLearning Courseware and Exam Products

Ambient Insight defines eLearning as self-paced courseware products. This includes catalog off-the-shelf content, installed learning management platforms and authoring tools, and two types of services (content and technology).

The defining characteristic of Self-paced eLearning is the pedagogical structure imposed by formal instructional design and systematic development of the products.

There is a significant degree of "resistance" to traditional packaged Self-paced eLearning content in various countries, particularly in the Middle East and Africa. This resistance is often due to the fact that content is translated, but not localized.

Additionally, the systematic instructional design process pioneered in the US results in a very distinct product design and user experience that does not resonate in many countries.

Test Preparation and Exam Products

Exam and assessment products are almost always used in conjunction with some type of courseware and include technology, content, and services surrounding the design and delivery of test questions intended to measure learning or behavior characteristics.

Cognitive assessment products are categorized as Cognitive Learning products by Ambient Insight.

The market for technology-based exam products is growing by 20-22% due to consumer, corporate, government, and academic demand for test prep, compliance assurance, skills assessment, and NCLB-related testing. Academic test prep and NCLB-related exam products and services dominate the market.

As of 2011, the traditional US academic test preparation industry was a $2.9 billion industry and suppliers competed from three industries: educational services, supplemental educational services (SES), and educational publishing. Ambient Insight excludes exam preparation revenues related to state-mandated K-12 testing to isolate the revenue opportunities for national "commercial" academic exams.

The largest test developers are ACT, Educational Testing Service (ETS), and the College Board. Interestingly, ETS is also a secure exam provider having acquired Prometric from Thomson. The five largest academic exams in terms of number of tests taken each year are the TOEFL, TOEIC, ACT, AP (Advanced Placement), and the SAT.

Digital Media Reference Content (Referenceware)

This learning technology is digital video, text, or audio reference content including technical reference, science and medical research, and market research content. eBooks, eTextbooks, digital audiobooks, and online technical manuals are common formats.

There is an explosion of peer and user-generated content ranging from Wikipedia-like products, user-populated search engines, podcasts, and "how-to" videos.

The vast majority of technology-based learning content in the US still resides in text-based formats. There is a surge in the demand for digital media "Referenceware." This is due to a variety of factors, but mainly because new technology allows conventional digital media to be broken down into small units that can be reassembled into new formats and delivered in a range of media formats, and on a wide variety of computing devices.
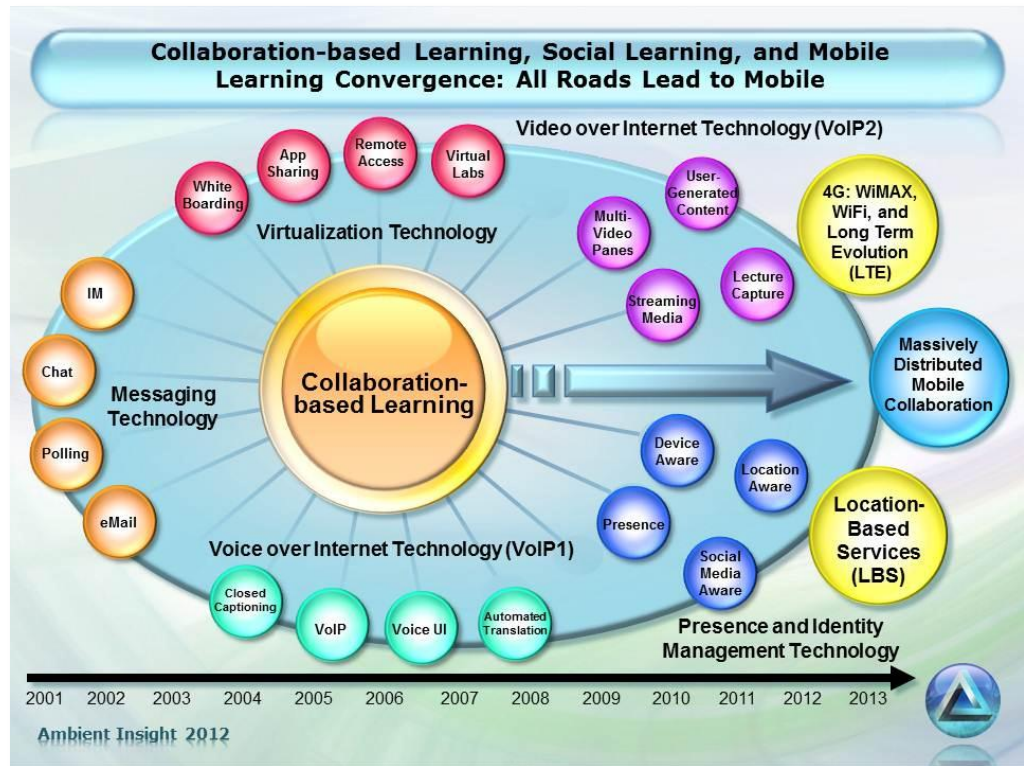
Collaboration-based Learning

Collaboration-based Learning is human-to-human collaboration and mentoring. As a knowledge-transfer method, by definition, collaboration requires the interaction between two or more people. Consequently the use of **synchronous** collaboration platforms is the defining pedagogical characteristic of Collaboration-based Learning.

Figure 6 - Collaboration-based Learning, Social Learning, Referenceware, and Mobile Learning Convergence

Ambient Insight defines Collaboration-based Learning products sold via the hosted SaaS model as Technology Services in our market research. Access to the products is sold as a service and customers do not actually own the products.

There are five specific types of Collaboration-based Learning platforms:

- Remote assistance and screen-sharing tools
- Virtual labs
- Virtual classrooms and virtual learning environments (VLE)
- General-purpose collaboration platforms used for learning
- Classroom collaboration management systems

With the exception of classroom collaboration management systems, which to date, are usually sold as installed solutions; they can all be sold either as hosted SaaS solutions or as installed platforms.

Social Learning

There is a very new type of Web 2.0-based open learning product that Ambient Insight refers to as Social Learning. The term "open learning" was coined many years before Web 2.0 entered the lexicon. In both, the locus of control is centered on the user.

The traditional pedagogical concept of open learning involves giving the learner control of most of the instructional process. Web 2.0 open learning gives the learner **complete** control.

Social Learning represents a shift from top-down centralized sources of learning to bottom-up widely distributed peer-to-peer learning communities. It is not about push or pull. It is about a constantly evolving experience. Above all, it is about community.

In Social Learning the value migrates to something never anticipated by product suppliers or practitioners: user-generated content and data. In terms of adoption, it enables very large numbers of people to not only get access to learning but to participate in the development of it. Social Learning could potentially replace both commercial and open source products. This is called product substitution in traditional competitive analysis.

There is now clear evidence that the growing demand for Social Learning is cannibalizing textbook (print and electronic), classroom, and eLearning revenues, particularly in North America.

> Social Learning is disrupting the business of training and education. The traditional value chain is now threatened.

Simulation-based Learning

The definitions of Simulation-based Learning and Game-based Learning in our taxonomy are based on the research done by Alessi and Trollip. In their seminal work entitled, "Computer Based Instruction: Methods and Development," they identified five types of computer-aided instruction (CAI): drills, tutorials, simulations, instructional games, and tests. Alessi and Trollip define four types of Simulation-based Learning:

- Physical Object and Environmental
- Process
- Procedural
- Situational

The researchers compressed these four into two instructional strategies: **learning about something** (physical and process), and **learning to do something** (procedural and situational). These can be restated in instructional terms as knowledge-based and performance-based simulations.

Ambient Insight does not include high-end military, aviation, and heavy equipment simulator revenues in our forecasts. The barriers to entry are quite high to develop and market these machines and only a handful of suppliers can compete in the simulator market.

Game-based Learning

Game-based Learning is a knowledge transfer method that utilizes "gameplay," which includes some form of competition (against oneself or others) and a reward/penalty system that essentially functions as an assessment method. Game-based Learning products (edugames) have explicit pedagogical goals. A user "wins" an edugame when they achieve the learning objectives of the gameplay.

All educational games are designed for behavior modification (learning), pedagogical intervention, or cognitive remediation. The first two are well known but the third is relatively new.

There are remediation edugames designed to alter behavior attributed to developmental or cognitive challenges (such as dyslexia.) There are also remediation edugames used to strengthen appropriate (and mitigate inappropriate) behavior in areas of diversity, conflict management, team building, and leadership.

Virtual worlds designed for children often embed edugaming in semi-immersive environments. Whyville, JumpStart, and Mingoville are good examples of virtual worlds that include edugames designed for children. Most virtual worlds for children under ten include edugames.

Virtual worlds that embed edugames illustrate the difference between Simulation-based Learning and Game-based Learning. The "environment" is indeed simulated but the knowledge transfer method is game-based. In Simulation-based Learning, the simulation itself is the knowledge transfer method.

> There are distinct pedagogical differences between Simulation-based Learning and Game-based Learning. There is confusion in the marketplace with practitioners and suppliers using the terms interchangeably.

Cognitive Learning

Webster's Dictionary defines learning as "modification of a behavioral tendency by experience." Technology-based Cognitive Learning products are 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.

Meta-cognition was defined by the educational psychologist John W. Santrock in 2008 as the information process that, "includes knowledge about when and where to use particular strategies for learning or for problem solving."

There are three primary types of Cognitive Learning products on the market:

- Cognitive assessments
- Cognitive and intelligent tutors
- Brain fitness applications.

Ambient Insight does not categorize clinical diagnostic and clinical intervention (therapy and treatment) tools designed to diagnose and treat cognitive disorders as Cognitive Learning products.

Cognitive assessments evaluate and measure the spatial perceptions, verbal abilities, memory, problem-solving skills, temperament, and the so-called "intentional" states of users. These products are used in two major areas: in the evaluation of childhood cognitive abilities and in employee personality screening during the hiring process.

There are three primary cognitive tests given to 4-15 year-old children in the US: the Cognitive Abilities Test (CogAT), the Otis-Lennon School Ability Test (OLSAT), and the Naglieri Non-Verbal Ability Test (NNAT). The majority of the commercial assessment products on the market are test preparation exercises and practice tests that map to these three tests.

The employee personality measurement products range from sophisticated psychometric instruments (such as those based on the so-called five-factor model) to scientifically-unproven instruments such as the Wonderlic Personnel Test (WPT) or the Myers-Briggs Type Indicator (MBTI). One important distinction is that the psychometric instruments are defensible in court, while the scientifically-unproven tests are not.

Even though several million people a year take the WPT or MBTI, tests based on the five-factor model are the most widely used for candidate screening. The five-factor model is also known as the OCEAN model and is comprised of five personality dimensions: Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (OCEAN).

One of the more common five-factor instruments is the Revised NEO Personality Inventory, or NEO PI-R. The NEO PI-R is copyrighted by Psychological Assessment Resources (PAR), and can only be purchased by professionals.

Cognitive and intelligent tutors are meta-cognition technologies that simulate the behavior of a human mentor and provide personalized responses, remediation, and interventions in real time based on the knowledge, behavior, and cognitive abilities of a particular user. The products are based on artificial intelligence and generate a cognitive model of the student based on the interaction with the student. The model is then used to provide individualized instruction to the student.

Over the last twenty years, one-to-one tutoring has been empirically proven to be the most effective knowledge transfer method. There are now Cognitive and intelligent tutors on the market that can perform better than human tutors.

In a seminal study known as the "Two Sigma Problem," Bloom found that, on average, tutored students scored better than 98% of classroom students.

Figure 7 – The Most Effective Knowledge Transfer Method is One-to-one Tutoring
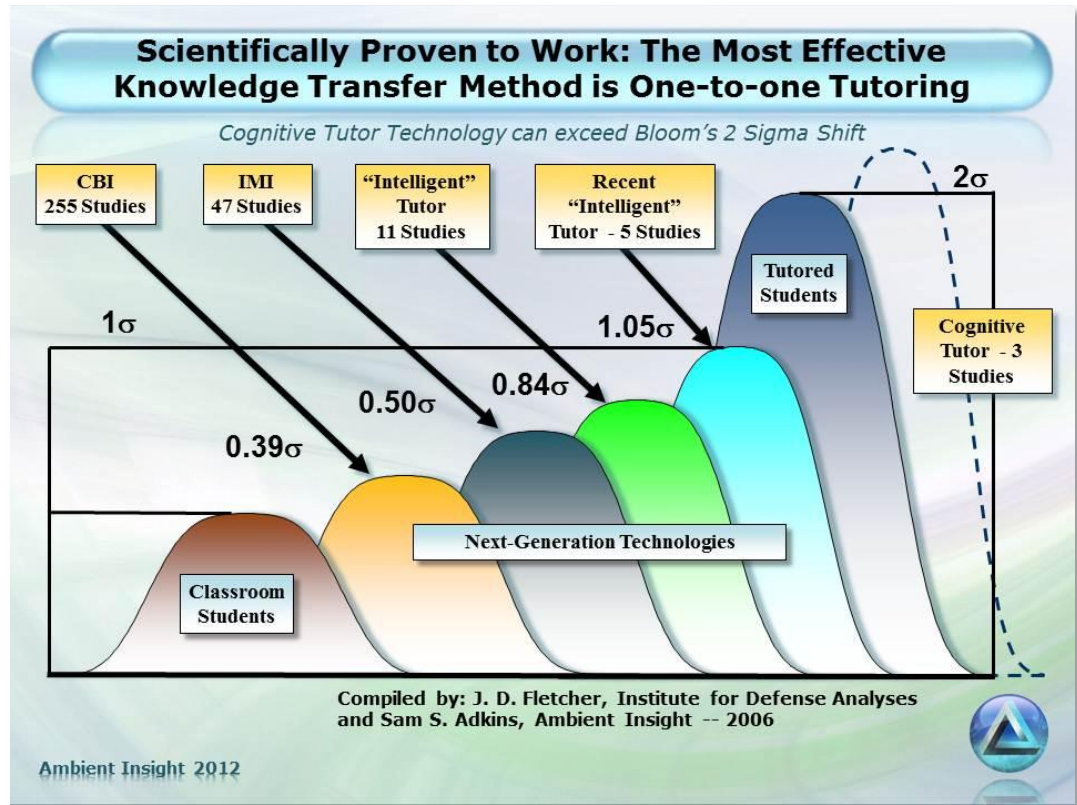
This means that the achievement of individually-tutored students may exceed that of classroom students by as much as two standard deviations (a two sigma shift). This knowledge-transfer improvement is roughly equivalent to raising the performance of 50th percentile students to that of 98th percentile students. New Cognitive Tutor products are capable of exceeding the two-sigma deviation.
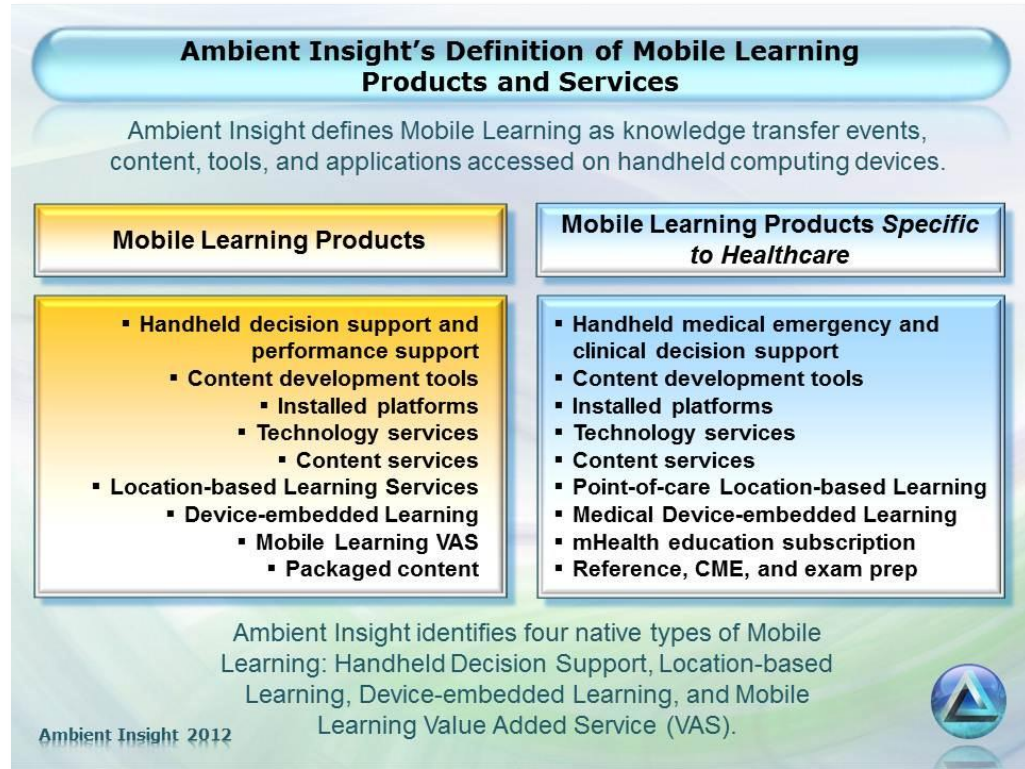
Mobile Learning

Ambient Insight defines Mobile Learning as knowledge transfer events, content, tools, and applications accessed on handheld computing devices. In our taxonomy, laptop and netbook computers, while perhaps mobile, are not considered handheld devices.

Mobile Learning now represents a product substitution threat to Self-paced eLearning and there is clear evidence that it is cannibalizing revenues, particularly in North America and parts of Asia. This threat is particularly acute for academic test prep products. The mobile device is near ideal for test prep and new mobile test prep products are inhibiting the sales of both print and online test prep courseware.

Large rural populations across Asia, Africa, and Latin America are now avid users of Mobile Learning technology, while very few have experienced Self-paced eLearning on a desktop. In developing economies, PC penetration is often low, yet mobile subscriptions are relatively high. For example, only 9.6%

of the total African population has access to the Internet via a computer. In contrast, 57% of the population accesses the Internet via a mobile device.

Figure 8 – Ambient Insight's Definition of Mobile Learning Products and Services

Ambient Insight defines four major types of "native" Mobile Learning products: Handheld Decision Support, Location-based Learning, Device-embedded Learning, and Mobile Learning VAS (value added service).

- **Handheld Decision Support** is an interactive application that provides sequential performance and decision support based on the input provided by the user. Handheld Decision Support is very common in corporate mobile field force, government first responder, and clinical healthcare environments.

- **Location-based Learning** is based on location-based services (LBS) technology. It is a type of knowledge transfer enabled by wirelessly-networked interfaces and sensors responding to the actions of a user at a specific location *in space and time* to create a situated learning experience. RFID chips, GPS chips, barcodes, Quick Response (QR) codes, SMS short codes, image recognition, and augmented reality technologies are often used in this type of learning, particularly in clinical healthcare environments, first responder situations, museums, tourist attractions, consumer and patient education, navigation applications, and in the travel industry.

There are several new types of Mobile Learning product s that have emerged in the last 2-3 years.

- ▪ **Device-embedded Learning** is when the primary purpose of a handheld computing device is to enhance learning, access educational content, and assess and support performance. The device functions as a *personal learning device*. This type of product is very common in the consumer and PreK-6 academic segments.

- ▪ **Mobile Learning VAS** is a subscription-based product sold directly to consumers by telecom network operators, device makers, and content suppliers. The content is usually delivered over mobile networks via audio, Short Message Service (SMS), or Interactive Voice Response (IVR). The mobile network operators dominate the market so far. Nokia and Urban Planet Mobile are examples of non-telecoms that sell Mobile Learning VAS products. To date, Mobile Learning VAS products are heavily concentrated in Asia, Africa, and Latin America.

Subscription-based Mobile Learning content sold as a value-added service is quite new on the market and *essentially represents a new type of Mobile Learning product – a fusion of packaged content and services. Ambient Insight has labeled this new product type "Mobile Learning VAS".*

Figure 9 – The 2012 Worldwide Mobile Learning Ecosystem

There are many types of handheld devices that are used for Mobile Learning including:

- ▪ Dedicated gaming devices (e.g., the Nintendo DS or Sony PSP)

- Personal media players (PMPs)
- Personal digital assistants (PDAs)
- Handheld tablets and slates
- Handheld eReaders
- Personal learning devices designed solely for learning and performance support
- Mobile phones (feature phones and smartphones)

A new type of Mobile Learning product has emerged in the last two years utilizing mobile augmented reality. Mobile augmented reality utilizes images, schematics, audio, multimedia, historical context, location data, and other forms of digital content overlaid on real-world objects and locations that are manipulated by users holding a mobile device.

Mobile Edugame Types

There are six major types of Mobile Game-based Learning content tracked by Ambient Insight:

- Knowledge-based games
- Skills-based games
- Brain trainers and cognitive fitness games
- Language learning games
- Location-based learning games
- Mobile augmented reality games

The current market is dominated by the brain training and cognitive fitness category, although the demand for each of the other content types is growing much faster. Knowledge-based games will dominate by 2016.

Knowledge-based Games

Handheld and mobile knowledge-based edugames are designed to help users learn and memorize concepts, principles, facts, patterns, and rules (such as verb conjugation.) These edugames are usually designed as quizzes, flashcards, or trivia games. They are relatively easy to design and there are commercial development tools on the market. Players compete for high scores and often the incentive is a race against the clock.

In the current market, the majority of knowledge-based mobile games are designed for the PreK-3 market. They are designed to help children learn to recognize shapes, colors, letters, words, and numbers. Test prep edugames for college entry exams are also prevalent.

Skill-based Games

A skill is the ability to apply knowledge in the context of a performance. Skill-based games are designed to improve hand-eye coordination, improve performance on physical tasks, and hone psychomotor skills of players. For example, a math game is considered a skill-based game. Memorizing the rules of math is knowledge-based. Applying that knowledge in calculations is a skill.

Ambient Insight's definition of knowledge and skills is based on Bloom's Taxonomy of educational domains.

Memorizing facts for a driving written test is knowledge-based, while applying those rules in the car is a skill.

The growth of these types of edugames is being driven by developers aggressively marketing to new customers and by the rapid pace of innovation in mobile technology. For example, there are dozens of edugames on the market that teach users to play music or create art,

Game developers can now use sophisticated motion sensor and gesture tracking technology in the design of their games. It is quite likely that skill-based edugames will be in much higher demand once developers and buyers realize that complex psychomotor skills can be taught using the mobile device.

Brain Trainers and Cognitive Fitness Games

Brain trainer and cognitive fitness games are based on cognitive science, neuropsychology, and brain-based learning theories emerging from educational psychology and educational neuroscience. It is an instructional method that targets the neuro-physiological processes involved in learning and has little in common with traditional instructional design principles.

The "fitness" metaphor derives from physical exercise concepts. Researchers and suppliers have a growing body of empirical evidence to show that people who use the products can condition and train the brain to improve memory, attention, visual and spatial awareness, auditory processing, linguistic skills, planning skills, and problem solving.

> The brain trainer and cognitive fitness industry in the US entered a wide adoption phase in late 2008-early 2009. Nintendo has defined this new category of games as "mental training.

Nintendo almost single-handedly created the market for these games with the launch of their Brain Age games and also expanded the demand for the games into completely new demographics.

- Brain Age and Brain Age 2 have sold over 37 million copies worldwide since their launch in 2006 - 9.3 million sold in the US
- The best-selling game in Europe in 2007 and 2008 was Brain Age
- In Japan, Brain Age 2 was the best-selling game in its debut month
- In December 2009, Amazon placed Brain Age as the top selling game *of the decade*
- The Professor Layton series of brain trainers have sold 10.1 million copies worldwide - 1.7 million sold in the US
- Until August 2010, the top selling video game in the UK across all platforms (including consoles) was Brain Age

Language Learning Games

Memorizing foreign words is knowledge-based, while using those words in speech and writing is a skill. Ambient Insight breaks out mobile language learning edugames for suppliers because they are part of the greater language learning market.

There is a growing demand for language learning edugames on mobile devices. This type of mobile edugame has been a staple in the Japanese market and now games like this are being adopted across the planet. The

language "coaching" games for the Nintendo devices are good examples of this genre.

Speech recognition and real-time translation are now being used in the more sophisticated language learning games.

Location-based Learning Games

There is a new type of mobile edugame that emerged in 2009 that utilizes location-based technology. Essentially, developers are designing educational game play around physical locations **and time**. For example, a new company called SCVNGR has their own location-based platform and creates these games for customers.

Another example is the City Secrets games developed by the European supplier La Mosca. They have transformed tour guide content into location-based games for Paris, Barcelona and Amsterdam.

Mobile Augmented Reality Games

Mobile augmented reality games are new on the market and emerged in 2010. Mobile augmented reality games utilize images, schematics, audio, multimedia, historical context, location data, and other forms of digital content overlaid on real-world objects and locations that are manipulated by users holding a mobile device.

Artificial environments and objects are overlaid on the real world via the mobile device's camera. The augmented elements are triggered by specific objects, print-based markers, and/or by location coordinates. Ogmento is a pioneer in this new genre.

Subcategories of Learning Technology Products

Ambient Insight defines six sub-types of learning technology products and services for our eight product types including:

- Packaged content
- Custom content services
- Value added services (VAS)
- Hosted tools platforms, and technology services
- Installed tools and platforms
- Personal learning devices

It should be noted that not all of the eight learning technology products have all six of these subcategories yet. Also, personal learning devices can have one or more learning technology product types loaded on the device. These subcategories map directly to the six supplier types identified by Ambient Insight. While some suppliers offer a full catalog of products, most tend to specialize in specific areas.

Figure 10 – Subcategories of Learning Technology Products

> Ambient Insight began forecasting the revenues for mobile location-based games in 2010.

Subcategories of Learning Technology Products

Packaged Content

Packaged content includes products delivered on tangible media such as DVDs, as well as web-based content. Packaged content types include (but are not limited to):

- IT-related
- General academic textbooks, courses, and references
- Exam and test preparation
- Hobbies and "how to" guides
- Tourist guides
- Vertical professional skills and professional development
- Channel, partner, and supplier Education
- Continuing education (CE) and continuing medical education (CME)
- Professional licensure and certification
- Internal and externals
- Decision and performance support
- Business processes
- Customer, patient, or constituent education
- Business and finance
- Organizational, management, and leadership development
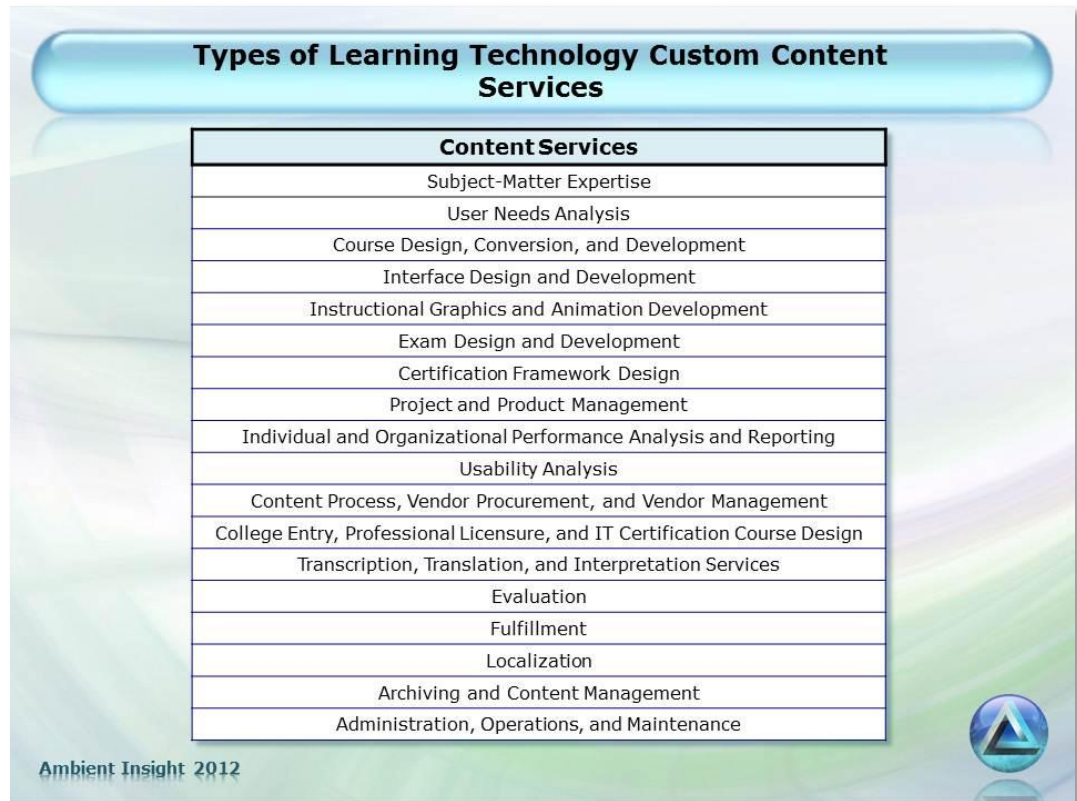- Compliance and mandated learning
- Language learning

Each one of these can be further broken out to provide clarity for content suppliers. For example. Language learning can be broken down further by

revenues for specific languages. Likewise, exam and test prep can be broken down by specific tests.

Custom Content Services

Custom content services include a wide range of services including analysis, design, development, conversion, delivery, localization, translation, and maintenance of courseware content. As the outsourcing trend grows, there is a greater demand for strategic content services, such as project management and supplier management.

Figure 11 – Types of Custom Content Services

Content services is a complex global industry with literally thousands of regional suppliers offering services to local businesses, major national brands offering services to large companies, business process outsourcers (BPOs) offering services to global buyers, and well established "courseware factories" in Canada, Ireland, India, China, Russia, and Pakistan selling retail services directly to companies and selling wholesale services to BPOs.

Value Added Services

Mobile Learning has spread like wildfire across the planet primarily due to the launch of dozens of successful Mobile Learning value-added service (VAS) products sold directly to consumers by telecom network operators, device

makers, and content suppliers. The content is usually delivered via audio, Short Message Service (SMS), or Interactive Voice Response (IVR).

Subscription-based Mobile Learning content sold as a value-added service is quite new on the market and ***essentially represents a new type of Mobile Learning product – a fusion of packaged content and services. Ambient Insight has labeled this new product type "Mobile Learning VAS".***

The operators initially launched their Mobile Learning VAS products in developing economies and are now expanding into the developed economies. Combining the Mobile Learning VAS products with the "legacy" Mobile Learning market in the developed economies exposes the clear contours of a cohesive worldwide Mobile Learning market.

So far, language learning content is the most popular type of Mobile Learning VAS, which obviously threatens the revenues of the other language learning products. It is no surprise that the major educational publishers with language learning content are partnering with the carriers.

Hosted Tools, Platforms, and Technology Services

Hosting and technology services include a wide range of services including (but not limited to):

- Integration, configuration, and customization services
- Content hosting services
- Data architecture design
- Coding
- Reporting
- Product support
- Technical support
- Software-as-a-Service (SaaS) hosted tools and platforms

Ambient Insight defines cloud-based products and products sold via the Software-as-a-Service (SaaS) model as hosting services in our market research. Access to the products is sold as a service and customers do not actually own the products.

Installed Tools and Platforms

The current Self-paced eLearning authoring tool market is dominated by products marketed as "rapid learning" tools. Many of these tools originated as screen capture utilities and have been modified to create self-paced courseware as well. All of these tools allow native authoring as well as convert Microsoft PowerPoint slides into Adobe's Flash format. Adobe's Captivate is the best known rapid-learning tool and the market leader.

Authoring tool suppliers are continually lowering their prices. This generates more sales, but less revenue across the market.

There are several dedicated Simulation-based Learning authoring tools on the market. Interestingly, developers tend to use general-purpose game engines (such as Unity) to build Game-based Learning. Since 2010 dozens of native Mobile Learning authoring tools have come on the market.

The installed platforms include Learning Management Systems (LMS), Classroom Management Systems, Education Management Systems, Student Information Systems, Course Management Systems, Learning Content Management Systems (LCMS), Collaboration Management Systems and the range of products used in PreK-12 for tracking instructional content usually called Student Information Systems (SIS).

Personal Learning Devices

Personal learning devices are quite popular with consumers and academic buyers in Asia and are now gaining traction in other parts of the world. New international and domestic suppliers continue to enter the market with new products designed for young children and PreK-12 academic buyers.

In essence, these are dedicated educational tablets. The devices are attractive to consumers (parents) and academic buyers because they are:

- Designed solely for education
- Preloaded with vetted educational content
- Priced significantly lower than general-purpose tablets such as the iPad or the Galaxy.

The burst of academic content digitization efforts underway across the globe are the major catalysts for personal learning devices. Although many school systems will use commercial general-purpose devices, the devices will be configured for dedicates educational use.

> Since mid-2010, over 30 new personal learning devices have come on the global market. Some are being marketed in specific countries, while others are global offerings.

A conservative estimate is that by 2016, over 300 million PreK-12 schoolchildren across the planet will be carrying personal learning devices.

The rapid adoption of personal learning devices represents significant revenue opportunities for content suppliers. ***Essentially, personal learning devices represent a new distribution method for packaged content suppliers.***

Ambient Insight's Research Licensing Model

Ambient Insight's Distribution and Limitations on Use Policy
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