Ambient Insight
Targeted Research Report

The Worldwide Mobile Location-based Learning Market: 2011-2016 Forecast and Analysis

The Shift from Distance Learning to Proximity-based Mobile Learning Experiences

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This is a Targeted Report. Ambient Insight has five types of syndicated market research reports:

- **Premium Reports**: A Premium report includes a buyer analysis, a regional demand-side forecast analysis across seven regions with top buying country profiles for each region, a supply-side analysis, and an index of suppliers - These reports are designed for suppliers that need an in-depth view of the buying behaviors in each of the top buying countries in each region of the globe.

- **Standard Reports**: A Standard report includes a brief buyer analysis and a regional demand-side forecast analysis across seven regions. A Standard report does not include country profiles, supply-side analyses, or an index of suppliers - These reports are designed for suppliers that understand the international market dynamics and "just want the numbers."

- **Regional Reports**: A Regional report includes a regional demand-side forecast analysis with top buying country profiles and an index of suppliers in a specific region - These reports are designed for suppliers that are competing (or plan to compete) in specific regions.

- **Targeted Reports:** A Targeted Report may analyze buying behavior and trends in a specific buyer segment; may isolate revenue opportunities, forecast revenues, and trends for a particular product type; or may pinpoint revenues and trends for a specific sub-category of content, service, or technology - These reports are designed for suppliers that are targeting specific buyers or specializing in a particular product sub-type.

- **Revenue Snapshots** are 2-3 page reports that include a single revenue-forecast table and a brief description of that table from a current market report. Please review the free Executive Overview for each report for a list of available tables. Contact us at info@ambientinsight.com to request a specific Revenue Snapshot.

Executive Overview

During the forecast period 2011-2016, the compound annual growth rate (CAGR) for worldwide Location-based Learning products and services is an impressive 26.3%. Revenues will rise from $212.38 million in 2011 to $682.13 million by 2016.

In the last few years, there has been a noticeable shift from distributed learning to proximity or Location-based Learning: learning experiences situated where learners are located. This type of Mobile Learning on location is in the "market creation" phase, which is characterized by modest revenues and strong growth.

In this Targeted Report, we highlight trends, buyer behaviors, and opportunities for Location-based Learning suppliers worldwide. The report includes revenue forecasts for products and services in North America, Western Europe, and Asia across five buyer segments: consumer, corporate, government, academic, and non-profit. It also includes forecasts for a combined "rest of world" category.

Over 110 suppliers in specific countries are cited in this report. This will help international suppliers identify local partners, distributors, resellers, and potential merger and acquisition (M&A) targets.

Ambient Insight provides forecasts for two types of Location-Based Learning products:

- Packaged content and applications
- Custom content development services

Typically, Ambient Insight also forecasts growth and revenues for SaaS hosting services, authoring tools, and platforms; however at this point there are too few of these products designed specifically for Location-based Learning on the market to quantify, although there are many generic ones used in the Location-based Services (LBS) industry.

> Throughout the forecast period, packaged content will have the highest growth rate, while custom services will lead in revenues.

Ambient Insight identified the seismic shift from distance learning to proximity learning in 2009. While distance learning provides content to learners in a separate location, Location-based Learning offers the learner the opportunity to engage with content that is contextual and immediately relevant to the user's physical location.

Suppliers are entering this market at a rapid rate, and partnerships between suppliers and nonprofits are common. Museums and large cultural institutions were the first to seize the opportunity for pleasing visitors with easy-to-use Location-based Learning devices, and have continued to innovate to improve the experience and create a competitive advantage.

Ambient Insight has identified six catalysts that are driving the expansion of the mobile Location-based Learning market across the globe. The convergence of these six factors is energizing this market. For example, the rapid evolution of location-aware technology combined with new

devices that come with multiple location features and that can support multimedia content has created technical readiness.

However, as we have seen in other learning technology markets, user readiness is even more important than technical readiness and there is strong consumer demand for Location-based Learning experiences. This demand helps fuel the explosion of packaged location-based content and the strong demand for custom content services around the world.

Innovations in the exhibition and tourism industries that take advantage of location-aware and device technologies help organizations create a higher level of engagement with their audiences, and even reach new audiences.

Figure 1 - International Catalysts Driving Adoption of Mobile Location-based Learning
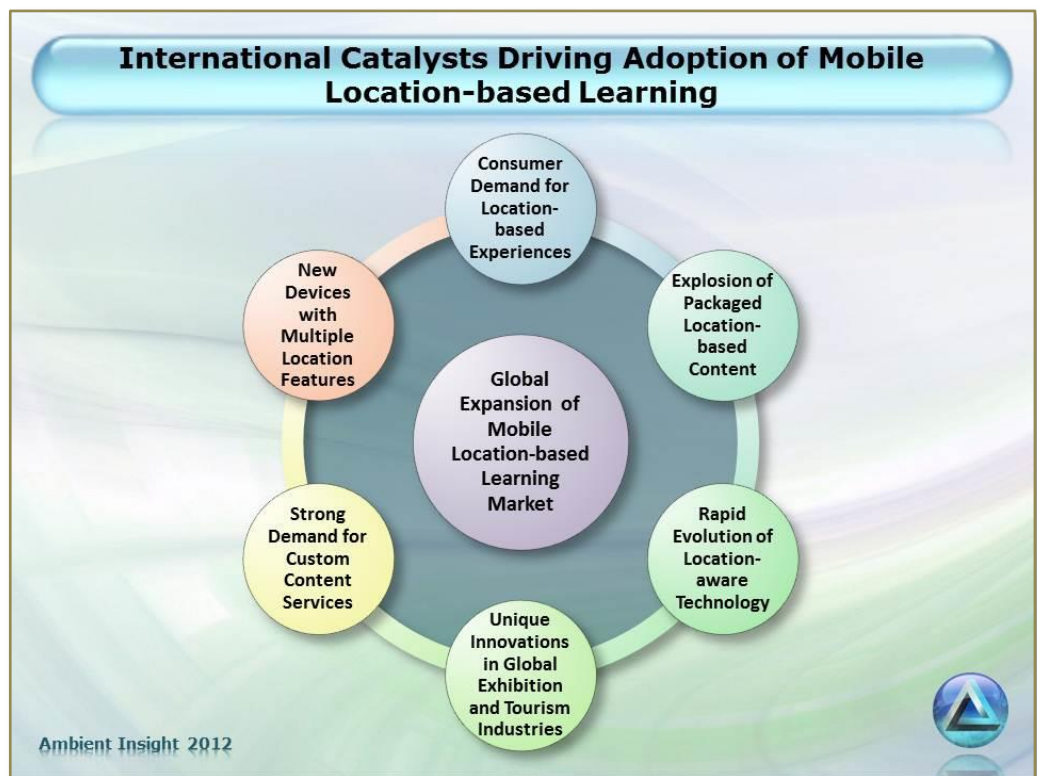
The Location-based Learning experience is decidedly personal and directly engages the user with content that is relevant in time and space.

Leveraging Location-based Services

Location-based Learning leverages the technology advancements of location-based services (LBS) such as popular check-in and related services, and proximity marketing. Proximity marketing enables advertisers to reach consumers with targeted messages and special offers when they enter a virtual zone or "geo-fenced" area around a store or other specific location. More and more Location-based Learning products take advantage of augmented reality technologies.

The ability to bring content to the user at the time when, and place where, the information is most relevant enables a type of experiential, engaged learning not possible with distance learning. Distance learning, in contrast, disseminates information to users in a location-agnostic way. Other than the possibility of an engaging virtual instructor, distance learning's handicap is that it is learning "at arm's length."

Advances in cellular networks are one factor that has spurred development of increasingly sophisticated LBS, and by extension, Location-based Learning products and services. Originally, mobile carriers developed LBS in partnership with mobile content providers. The Japanese mobile carrier KDDI launched the first commercial LBS in 2001.

In the US, the Federal Communications Commission (FCC) rule FCC 94-102 requires that all carriers meet certain criteria: 95% of all mobile devices must resolve to 300 meters for network-based tracking and 150 meters for handset-based tracking, thus providing the technical capabilities for pinpointing device-owners' and their current locations. Mobile carriers amass a rich store of data about their customers, a fact that is a topic of increasing interest to both suppliers and consumers.

Historically, mobile LBS have focused on the obvious: navigation or finding your way to a location. The primary uses today of location-based services besides GPS navigation are socializing, finding nearby services or deals, and receiving traffic or weather alerts.

> The focus is shifting now from merely "finding" to experiencing something relevant to a location—including learning.

Figure 2 - Mobile Location-based Learning: The Shift from Distance Learning to Proximity Learning
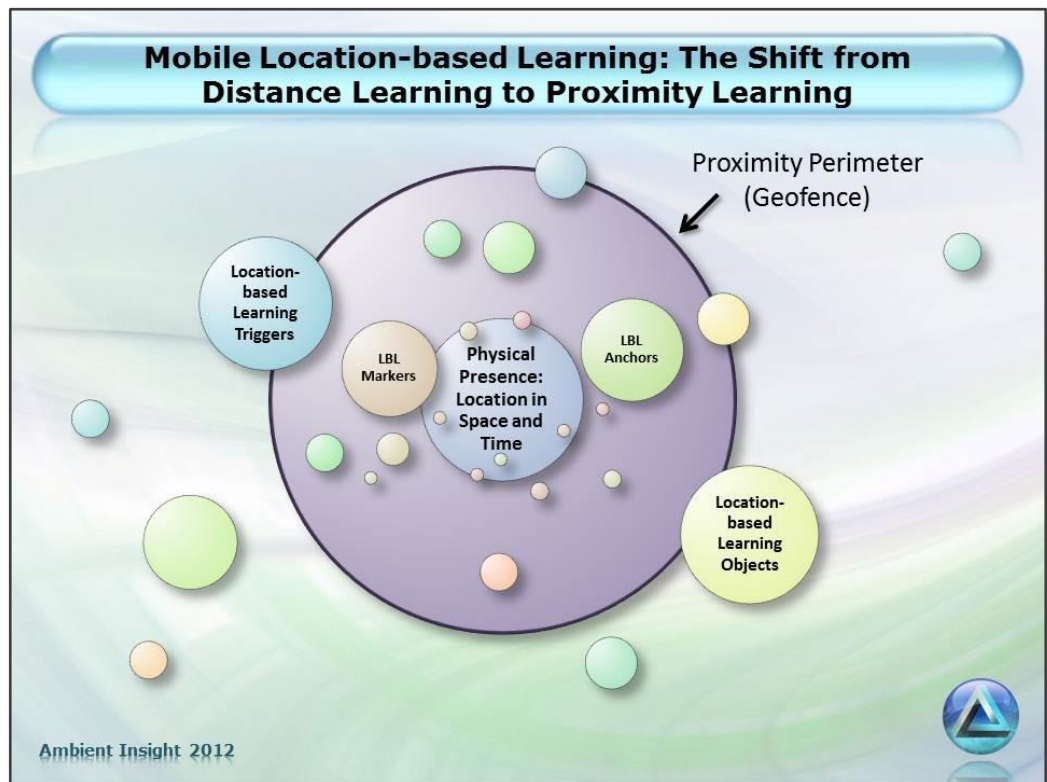
Location-based Learning suppliers benefit from the growing awareness and expanded use of LBS; as well as may suffer similar challenges facing the LBS market, such as escalating concerns from both consumers and lawmakers in the US and the EU about privacy and management of personal information.

Not My Location!

The issue of personal privacy and location is fraught with ambiguities and uncertainties.

The primary hesitation about LBS is privacy. This is similar to concerns that affected Facebook's plan, in January 2011, to make addresses and mobile numbers accessible to third party developers and external websites. The company responded to what it identified as "useful feedback" from its customers and in the Facebook Developer Blog announced a shift in policy, requiring developers to "make people more clearly aware of when they are granting access to this data" via the Facebook permissions process.

The news that many smartphones (first the iPhone and then Android) were collecting location-related data and, in the case of Android, were sending it back to Google several times an hour without users' knowledge much less their consent, also put a glaring spotlight on the issue of privacy. The more recent news that Google came under investigation in the US and the European Union (EU) for circumventing Safari's privacy controls and the reaction to the "Girls Around Me" geo-location app that used publically available data from Facebook and Foursquare keeps the issue of privacy in the light.

| Suppliers are advised to track changes in legislation and regulations that affect collecting, using, and storing personally identifiable information. |

In October 2012, 27 European data protection agencies sent a warning letter to Google advising the company to "modify its global privacy policy," including for Android mobile phone apps, adopted last winter, or they may face legal sanctions or fines. In the same month, the California Attorney General's office sent warning letters to more than 100 companies including Delta Airlines, United Airlines, and Open Table that their mobile apps were in violation of the California Online Privacy Act that requires them to conspicuously post a privacy policy.

In 2011, US legislators conducted hearings on how personal information is collected, protected, and utilized online, and also introduced legislation to address location privacy specifically.

The framework for personal privacy in the US—a mix of porous privacy agreements and a patchwork of state and federal data privacy laws, regulation, and self-regulation—is very different from the European Union (EU) approach to privacy. In the EU, privacy rights are legally bound to human rights via the Data Protection Directive 95/46/EC.

Viviane Reding, Vice-President of the European Commission, warned on March 5, 2012, that mobile apps and advertisers "are spotting you, they are following you, they are getting information about your friends, about your whereabouts, and your preferences…With social networking sites, cloud computing, location-based services, and smart cards we leave digital traces with every move we make."

The current EU legal framework originated in 1995—before widespread use of the Internet and the ubiquity of smartphones. Since then rapid technological changes and globalization have rendered the rules outdated. Changes are underway in the EU to strengthen and standardize online privacy rights. In January 2012, Ms. Reding proposed a new set of rules, which are currently undergoing a two-year review process before being passed into EU law.

In February 2012, the GSMA announced publication of a new set of global Privacy Design Guidelines for Mobile Application development, which build on the Mobile Privacy Principles they adopted last year. The guidelines "are aimed at all those in the mobile app or service delivery chain who are responsible for collecting and processing personal information about mobile users, including developers, device makers, OS companies, mobile operators, advertisers and analytic companies."

GSMA's Chief Regulatory Officer Tom Phillips said, "The research shows that to realise the full potential of mobile Internet services, it is imperative that ways are found to strengthen consumer confidence and trust by giving users meaningful transparency, choice and control over how their personal information is used."

Network, Device, and Satellite Advances

Technology advances such as mobile phones' high quality cameras and accelerometers, increased network speeds, and improved GPS accuracy have fueled suppliers' LBS and Location-based Learning product innovations.

Sharp introduced the first commercial camera phone in Japan in 2001, with a resolution of 0.1 megapixels (MP). Nowadays, 5-8 MP is standard on smartphones and 3 MP is common on feature phones; and new smartphones often sport 10 and 12 MP cameras.

Camera technology advancements are particularly important for mobile augmented reality products.

- Digital image processing technologies are important for object recognition and augmented reality apps, to reduce distortion and remove artifacts such as glare and shadows
- Image stabilization sense and correct jitter, so the accelerometer can wait to snap a photo
- Tiny MEM-based gyroscopes also improve picture quality
- LED flash and autofocus help in low light situations

The prevalence of 3G and 4G features in mobile devices also enhance opportunities for building sophisticated Location-based Learning products and services.

When GPS III (the most recent satellite fleet upgrade) is fully operational, GPS satellites will provide more powerful signal strength, greater accuracy and reliability; and include three new signals (L2C, LB, and L1C) for civilian use. (L2C will enable accuracy to 1 meter, compared to the current at best 5 meters.) These advances will improve the ability of GPS receivers to gain a satellite lock in built-up areas and even indoors. Increases in cloud computing capacity should also provide a richer platform for a "real world web" where items of interest are tagged virtually with information.

Riding the Augmented Reality Wave

Lev Manovich coined the term "augmented space" in 2002. In his article, "The Poetics of Augmented Learning from Prada," he described augmented space as places enriched by overlaying (digital) information over the visual field of a user.

Now, a decade later, the "space" is enhanced with various types of information, such as historic information, personal stories, commercial information, and actionable decision-making information and learning. In one sense, AR could become a "zero-click interface" to the so-called "internet of things," where many common objects have data associated with them.

William Gibson's 2007 book *Spook Country* ends with a confident prediction for the future of AR and a call-to-action for the reader to get involved and Location-based Learning suppliers certainly have.

In mid-2009, Apple filed a mobile augmented reality patent. In September of that year, Apple took another game-changing step: it allowed developers to publish apps that used cameras to display content. This development contributed to the sharp increase in iPhone AR apps.

The venture capitalist community has shown interest in the technology, as they see the potential for search and advertising. Location-based Learning products and services will certainly ride the coattails as the technology moves towards mainstream.

It is difficult to ascertain the actual number of mobile augmented reality apps in any app store as products are listed under diverse categories such as lifestyle, reference, education, games, entertainment, and travel; and there are no categories for city guides, nature guides, or local search.

One thing is certain: suppliers are beginning to employ augmented reality technology to create engaging learning experiences for the Prek-12 and tourism markets, although not perhaps as rapidly as Ambient Insight surmised when this product type emerged on the scene in 2010.

> The fact that the number of Location-based Learning services suppliers tripled in the last two years is evidence that the Location-based Learning market is in a growth phase.

Key Findings

In 2009, Ambient Insight perceived that this new form of Mobile Learning would quickly outdistance previous popular types of distance learning solutions. The many examples in this report are evidence of the rapid pace of innovation taking place in Location-based Learning products and services. Factors are converging to continue to expand the market opportunities for suppliers worldwide.

The primary key findings discussed in this report include:

- The global market for Location-based Learning is growing by 26.3% and revenues will reach $682.13 million by 2016

- Governments are the top buyers of location-based learning products and services worldwide, and the nonprofit and consumer segments will experience greatest growth during the forecast period

- Convergence! Mo-Lo-So (mobile + local + social) products are increasingly popular with users; the "golden triangle" is mobile, social, and real-time

- Location-based Learning can "bring to life" a different time period as well as enhance an experience in a specific place

- Business models vary: freemium, sponsored, revenue-generating, value-add, and brand-enhancement.

Secondary Findings

Secondary findings include:

- Location-based Learning leverages the technology advancements of devices, GPS systems, and location-based services

- Advances in proximity marketing technologies transfer to engaging location-based and augmented-reality (AR) Mobile Learning experiences

- The emergence of mainstream tools, AR browsers, middleware, and platforms between 2009-2010

- The intersection of Mobile Learning games and location began appearing in 2010

- Established brands are adapting existing content to engage new audiences

- Universities and enterprise accelerators contribute support to spur innovations.

Quantitative Methodology, Scope, and Definitions

Ambient Insight provides quantitative revenue forecasts based on our proprietary Evidence-based Research Methodology (ERM). The ERM is an iterative process based on predictive analytics used to identify revenue opportunities for suppliers. There are four key components of the ERM process:

- Isolate target market via leading and lagging indicators
- Define the potential market revenue boundaries
- Triangulate the baseline market revenue
- Forecast the Total Addressable Market (TAM) for specific products

ERM progresses from general patterns (the big picture) to very precise granular patterns. It is used to create a forecast model comprised of accurate predictors. The forecast model is refined as additional data become available. Ambient Insight triangulates baseline revenues from three analysis vectors that include:

- Supply-side analysis
- Demand-side analysis
- Product and Service category analysis

Ambient Insight gathers market and competitive intelligence from a wide spectrum of information broadly classified as leading and lagging indicators. Economic and market conditions are subject to change and the data in this report are current at the time of publication.

Many of the companies discussed in this report are publicly traded on various international stock exchanges and their financial disclosures provide baseline data for global sales and specific regional 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.

Scope

This report analyzes the worldwide market for mobile Location-based Learning products, and provides revenue forecasts for three regions—North America, Western Europe, and Asia—and the combined revenues for the rest of the world. The report also includes trends, analyses of buying behaviors, and references to suppliers around the world as evidence of the development of the market for Location-based Learning products and services.

The vast majority of Location-based Learning developers use generic LBS or augmented reality tools to build their products; many of these tools are free. The market for Location-based Learning tools is nascent; it is not yet

large enough to quantify, therefore this report focuses on packaged content and on content services and does not include revenue forecasts for tools.

The report includes examples of Game-based Learning products, but does not include forecasts for Simulation-based Learning or Game-based Learning.

Ambient Insight provides a granular definition of learning technology product types in the free Ambient Insight's 2012 Learning Technology Research Taxonomy and strongly recommends reading the taxonomy document prior to reading an Ambient Insight report.

Product Definition

As defined in the Ambient Insight taxonomy, "**Location-based Learning** is one of four native types of Mobile Learning and 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.

Figure 3 – Ambient Insight's Definition of Mobile Learning Products and Services
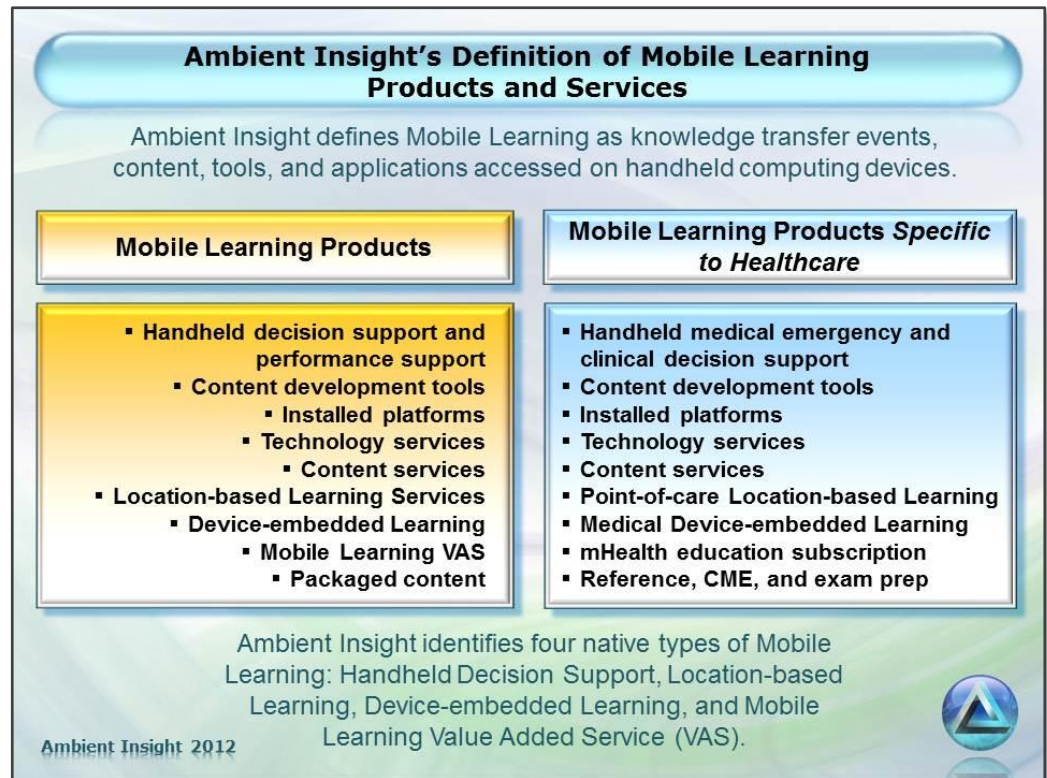
> Ambient Insight has a precise product taxonomy that includes an explicit definition of Location-based Learning. This provides suppliers with clarity surrounding the demand for a specific product type.

RFID chips, GPS chips, barcodes, 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.

Mobile Learning value-added services (VAS) is another type of Mobile Learning. Ambient Insight defines **Mobile Learning VAS** as a subscription-based product sold directly to consumers and organizations 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 Mobile Learning VAS 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.

Ambient Insight defines **mobile augmented reality** in this way: Mobile Augmented Reality utilizes images, schematics, audio, multimedia, historical context, location data, and other forms of content overlaid on real-world objects and manipulated by users holding a mobile device.

> The term "augmented reality" used throughout this report refers to mobile augmented reality.

Related Research

Buyers of this report may also benefit by the following Ambient Insight market research:

- The Worldwide Market for Mobile Learning Products and Services: 2010-2015 Forecast and Analysis

- The US Market for Mobile Learning Products and Services: 2010-2015 Forecast and Analysis

- The US Healthcare Market for Mobile Learning Products and Services: 2009-2014 Forecast and Analysis

- Ambient Insight's 2012 Learning Technology Research Taxonomy

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