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THE eLEARNING GUILD™ Research

360° REPORT℠

March 2008

IMMERSIVE LEARNING SIMULATIONS

The demand for, and demands of, simulations, scenarios, and serious games

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It is our goal to provide the best research based on the best data. Indeed, with well over 27,000 e-Learning professionals – designers, developers, managers, and executives who are passionate about the art and science of e-Learning – The Guild has an unmatched and enormously rich and varied pool from which to gather data.

But let us be very clear that this data represents one thing and one thing only: the preferences, opinions, loves, loathings, trials, and triumphs of eLearning Guild members. Does the information represent the e-Learning industry as a whole? Probably, but we cannot – and will not – make that claim.

And anyone else publishing articles or research that makes that claim – and makes it using a much smaller data set than we would ever consider using – is presumptuous at best.

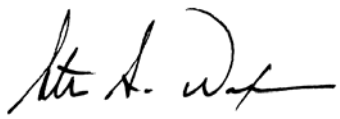
Here are the five articles of practice that drive eLearning Guild Research:

1. **Live, interactive, always-up-to-date.** In addition to providing members with truly useful visual analytics tools, the underlying data is *always* up to date and displayed in real time.
2. **Number of respondents.** Our research reflects the opinions of *thousands* of e-Learning professionals. The Guild has more, and better, data than is available any place else. *Indeed, we will never publish results from a survey unless we have received at least 760 fully-vetted responses.*
3. **No reliance on outside sources that will bias our reports.** With thousands of members updating their profiles and completing surveys, the Guild does not need to rely on outside sources for contacts to complete surveys.
4. **Funding**. The eLearning Guild funds its own research. We do not accept any form of sponsorship from vendors and/or suppliers for public research activities.
5. **Guaranteed Fresh.** Every 90 days we remind members to update their profiles and survey information. If a member goes a year without updating information, that information is filtered out of our live reports.

For the Guild's 360º Reports we carefully review respondents' data for accuracy and consistency. If we detect an anomaly, we contact that respondent and ask that he/she clarify his/her responses. If any issue cannot be resolved, the data from this respondent is discarded and is not included in our report.

The Guild is truly an amazing organization and I feel privileged to be a part of it. It is my goal to leverage the depth, breadth, and spirit of the Guild's members to produce the gold standard in e-Learning research.

Sincerely,



Steven S. Wexler
Director of Research and Emerging Technologies

Contents

Report Overview

By Steve Wexler
The eLearning Guild

Who Should Read This Report

We've written this report to address the concerns of many different types of Guild members. As it is likely that some section will not be applicable to your needs, please review the table below to determine which items in the first column best describes you, and then read the pertinent sections.

If you…	Report Overview	ILS Survey Results	Sim Tools Survey	Essays	Case Studies	Interviews	2007 Report	Resources; Checklist	DDA Portfolio
…want to learn what ILS/serious games are about and determine if they are right for your organization	✓	✓		✓	✓		✓	✓	
… want to gauge where you and your organization are with respect to other organizations	✓	✓							✓
… need ammunition to sell ILS into your organization	✓	✓		✓	✓	✓			
… want to know the capabilities and ratings of popular simulation tools	✓		✓						✓
… want to see examples and get an idea of the different things people are doing with ILS/Serious Games	✓				✓	✓	✓	✓	
… want to know how to design and build Immersive Learning Simulations	✓						✓	✓	
… are a vendor and want to see what features members want, and what you can do to create highly-desirable products and services	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 1 – Which Guild members should read which sections.

Note: If you are new to this subject, and have not read last year's report, I encourage you to do so, but skip the survey data and analysis section. That information is old, but the essays from experts like Mark Oehlert, Jeff Johannigman, Clark Quinn, and Clark Aldrich are as applicable today as they were when we first published them in 2007. The same goes for the excellent case studies. So, do not view this year's report as a replacement for last year's but instead think of it as a complement.[1]

The Big News

The big news from last year's report, if I were to distill it down to one single item, was how many people indicated they planned to do more games and simulations. If Guild members followed-through on this, then simulations and games would be a high-growth area. Big time.

Guild members have weighed in on their personal experiences creating and deploying ILS and their experiences are overwhelmingly positive, with more then 93% rating ILS as being somewhat or much better than other forms of rich-skill practice.

The big news this year is that, well, Immersive Learning Simulations work. Big time! Over 1,100 Guild members have completed and or updated the ILS survey. Of these, 380 Guild members representing over 320 different organizations have weighed in on their personal experiences creating and deploying ILS and their experiences are overwhelmingly positive, with more then 93% rating ILS as being somewhat or much better than other forms of rich-skill practice.

But before we get too far a field we better clear just what we mean by a "serious game" as there is still a widespread perception that this term (and its corporate-friendly synonym, ILS) means big, 3-D, virtual worlds that cost huge sums to money. Certainly, we've seen some very expensive undertakings (some of which, regrettably, are truly horrible wastes of money.) However, we've also seen some great examples, many of them fashioned with modest budgets.

In a moment we'll send you off to explore some of these examples on your own, but first let's make sure we have our terms straight.

[1] Or, think of this as an ongoing story. As for the question of why not include everything in one document, many people have already read the 2007 report, and the length of such a combined effort would top 600 pages.

What is an Immersive Learning Simulation (ILS)?

An Immersive Learning Simulation, also known as a Serious Game, is an optimized blend of simulation, game element, and pedagogy that leads to the student being motivated by, and immersed into, the purpose and goals of a learning interaction. Serious games use meaningful contextualization, and optimized experience, to successfully integrate the engagement of well-designed games with serious learning goals.

Notice there's nothing about 3-D, avatars, Orcs, etc.

In case you are still having trouble "grocking"[2] all this, It may be useful to pull some thoughts from the 2007 report as two of the report authors, Clark Aldrich and Clark Quinn, had some great insights on how to think about this.

How Clark Quinn and Clark Aldrich see the world

Clark Quinn and Clark Aldrich have spent a lot of time working to define this magic we want to capture. Like former Supreme Court Justice Potter Stewart's definition of obscenity, when it comes to serious games both authors "know it when they see it," but Quinn takes a sequential view of what comprises the magic, while Aldrich sees it as the proper balance of three distinct elements.

[2] See http://en.wikipedia.org/wiki/Grok as well as the original source, Robert Heinlein's *Stranger in a Strange Land*.

The figure below shows Clark Quinn's view of the world, so to speak.

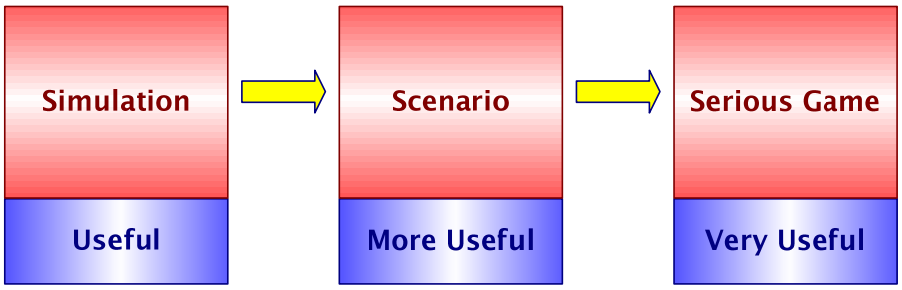


Figure 1 – Clark Quinn's sequential approach

As Clark writes his book *Engaging Learning,* and as he reiterates in his essay "Creating 'Hard Fun' – Systematically Designing Immersive Learning Simulations" in the 2007 edition of this report:

> *"A simulation is just a model; it becomes a scenario when we put the simulation in an initial state and ask the learner to achieve a goal state (and we typically wrap a story around it), and it becomes a game when we tune that experience to achieve engagement."*

Clark Aldrich, in his book *Learning by Doing,* refers to the magic as an "educational simulation" and sees it as being the proper balance of the following three elements:

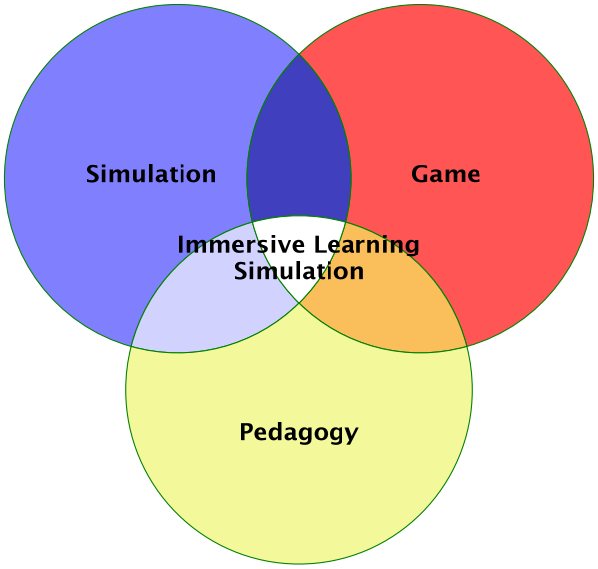


Figure 2 – How Clark Aldrich combines the essential elements.

So, whether you prefer to see what we seek as a progression from simulation, to scenario, to something special, or see it as the optimal balance of simulation,

game, and pedagogy, both views have three things in common: They involve learning, simulation, and engagement (also known as immersion).

Examples of Learning Games

If you've not kicked the tires on learning games, we've assembled a short list that will help you get up to speed with some different types of learning games.

Cisco Binary Game

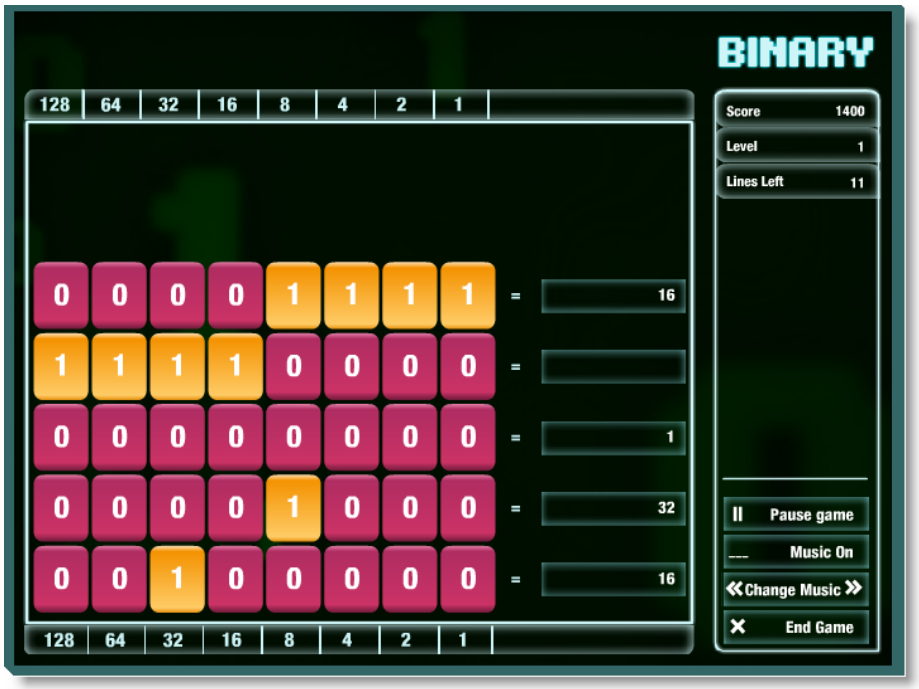


Figure 3 – Cisco Binary game.
See http://forums.cisco.com/CertCom/game/binary_game_page.htm.

This is an example of a **frame game**[3], in that the structure of the game really has nothing to do with the content or the skills to master. There's no simulation, no scenario, but there is certainly some fun, and it does add life to what would otherwise be rote memorization.

[3] For definitions of this term and others (such as linear scenario, branching scenario, etc.) please see the Glossary of Terms on page 229.

Tips on Tap

Figure 4 – Tips on Tap.
See http://www.webcourseworks.com/tipsontap/.

I like this example in that it comprises some very good things (e.g., the "Score Your Pour" activity) as well as some not good things (e.g., you essentially earn more points, or "tips" based on your ability to twitch quickly.)

The main concept is that you will earn more tips if you provide better service to customers ordering beer at a bar. Better service comes from being attentive (fulfilling orders and clearing dirty glasses) and from being able to pour a perfect draft beer.

This example combines frame game and twitch elements (how many customers can you service by clicking things with a mouse) and very good simulation elements (moving a virtual glass to exactly the right position and filling the glass correctly so that you get a head that is half an inch to one-inch tall.)

While the frame game or twitch part does convey the importance of responding to customer needs quickly, being able to perform well on this does not mean I will be able to do this well in real life. The tutorial and interactive game session on pouring beer, however, does work very well, in that I am con-

fident that I can immediately apply what I learned in the game in real life and pour a draft beer with a perfect head of foam.

Performance Development Group Selling Simulation

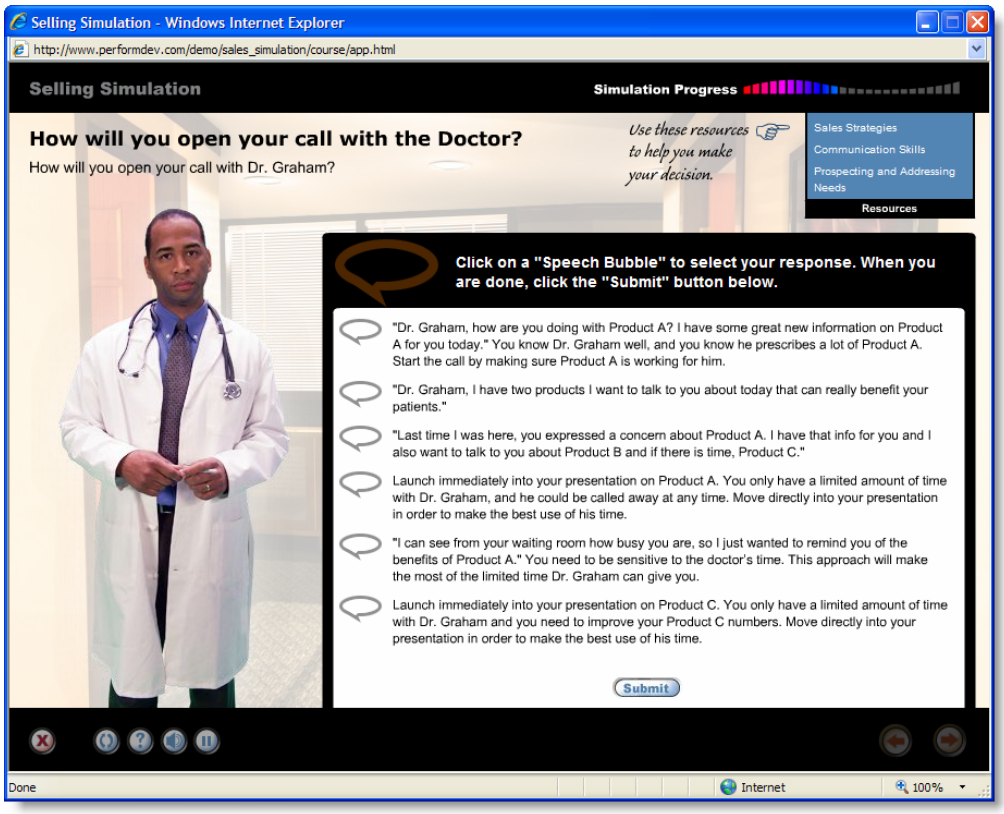


Figure 5 – Performance Development Group Selling Simulation.
See http://www.performdev.com/demo/sales_simulation/.

This simulation reinforces a selling model for a pharmaceutical sales force. It allows sales reps to practice new behaviors in a realistic environment, receive feedback on their performance, and explore links to tools and resources that can help them on their job.

The system uses both linear and branching scenarios, and learners are encouraged to play the game several times to see the ramifications of their decisions. I wanted to run the simulation (that is, play the game) several times, and found the system very effective.

PIXELearning Business Game and Enterprise Game

Figure 6 – PIXELearning Enterprise Game.
See http://www.pixelearning.com/trialrequest.aspx.

PIXELearning has made two very rich Immersive Learning Simulations available to Guild members for test driving at the link listed above. Both games use complex rule or engine-driven scenarios, and have many interrelated variables that engage the learner in various high-fidelity business management exercises. These are both very good examples of "serious games."

Other examples

Kevin Corti cites several additional examples in his essay "Demystifying Immersive Learning Simulations – Moving From the Potential to the Practical" on page 121, and Angela van Barneveld has assembled a very large list starting on page 225.

Key Findings

Here are some of the key findings from conducting discussions with numerous Guild members and vendors, and in analyzing results from over 1,100 Guild members.

Immersive Learning Simulations Work: Over 93% of Guild members who have created an ILS report that their efforts produce results that are either somewhat or much better than other forms of rich-skill practice.

Members are Reporting a Good ROI: Of the Guild members who have weighed in on this, more than 76% indicate they have received either a modest or a very good return on investment.

More Vendors are Coming Forward with Corporate Case Studies: We have many more vendors and customers coming forward with cases studies. We'll discuss the full ramifications of this in a moment, but the main point is that more people are developing more ILSs this year.

ILS and Mobile Learning is Converging: We're seeing a convenient marriage of learning games and mobile devices, as mobile devices are proving to be a perfect vehicle for delivering ILSs of modest scope.

Guild Members Still Have a Problem with the Term "Game": Over 80% of Guild members have a problem with the term "Serious Game," and 77% totally or somewhat agree with the statement "Games are great; it's the name that's a problem."

Guild Members Believe that ILSs are More Expensive to Develop than they Really are: When we ask Guild members to indicate what they think an ILS will cost, and we compare it with what Guild members who have created an ILS tell us they cost, we see that the actual costs, on average, are quite a bit less than the anticipated cost.

Median and Average Costs Per Learner: The median cost per learner for an ILS is $102.08, and the average cost is $281.51.

Guild Members Plan to do a Lot More: 70% of Guild members plan to do more simulations and scenarios, 48% plan to do more mini-games, and 36% plan to do more serious games and/or Immersive Learning Simulations.

Guild Members Still Thirst for Great Examples: Over 90% of Guild members want, or very much want, examples of great e-Learning games.

Let's explore these findings in detail.

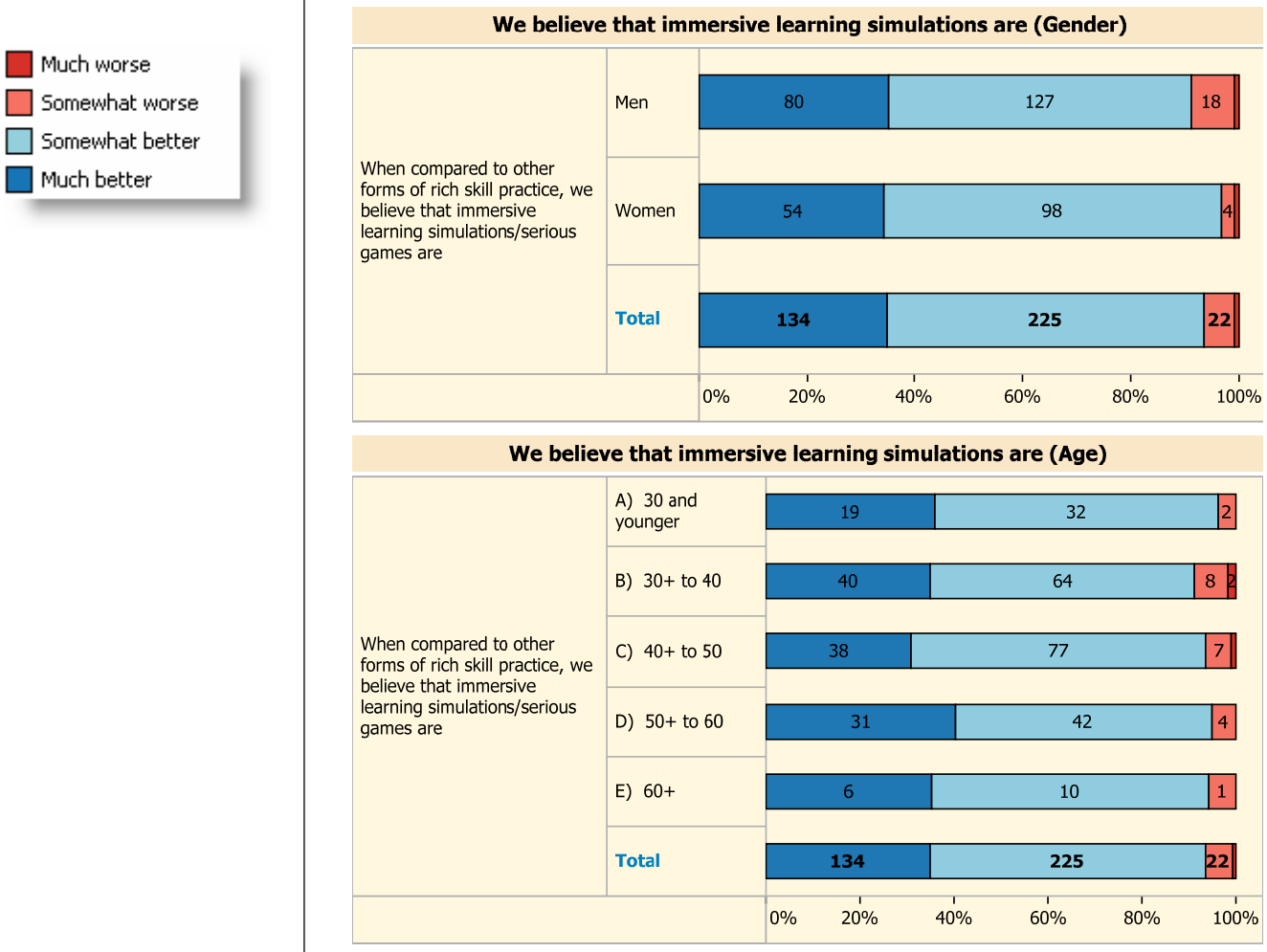
Immersive Learning Simulations work

We asked Guild members to the following:

When compared to other forms of rich-skill practice, we believe that Immersive Learning Simulations or Serious Games are:

- Much better
- Somewhat better
- Somewhat worse
- Much worse

Here are the responses.



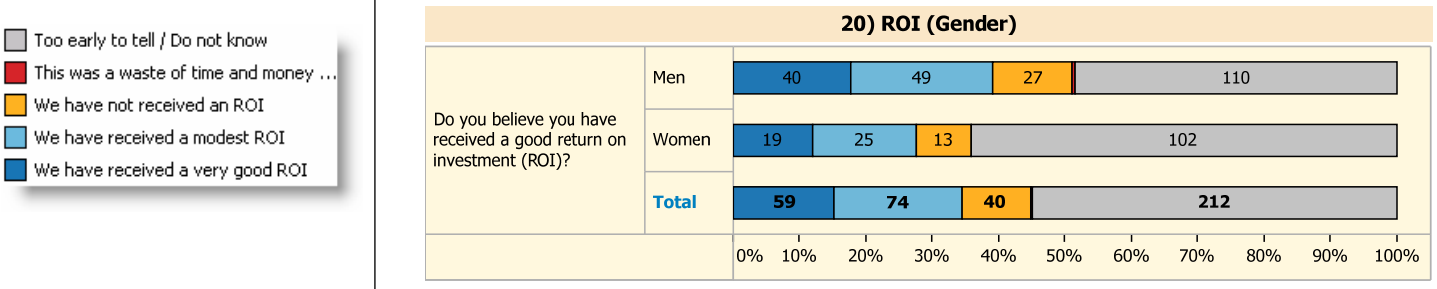
Source: The eLearning Guild Research

Figure 7 – The Guild members who created an ILS weigh in on their effectiveness.

Guild members looking for ammunition in support of ILS need go no further than Figure 7. Here we asked Guild members who created ILS or Serious Games to compare the effectiveness of an ILS with other forms of rich-skill practice. Of the 384 Guild members who answered this question, 93.4% rate ILS or Serious Games as being somewhat better or much better than other forms of rich-skill practice.

Members are reporting a good ROI

We asked Guild members who had created an ILS to indicate whether they believed they had received a good return on investment.



Source: The eLearning Guild Research

Figure 8 – Guild members indicate whether they believe they received a good ROI on their investment in ILS.

While most Guild members indicate that they do not yet know, but if we focus on the 47% that were able to respond the ROI results are high, with 76.4% reporting a very good or modest ROI.

More Vendors are Coming Forward with Corporate Case Studies

It was considerably easier to find vendors that had some very compelling corporate case studies in the works.

Unfortunately, not all of these vendors could provide us with these case studies just yet, as their clients all saw what they were doing with ILS as being a type of "secret weapon," and they did not want their competitors to see these things in action just yet.

While this is anecdotal information, as opposed to survey results, we do see ILS getting nearer the tipping point of widespread acceptance as more and more

very large, mainstream, and in fact, conservative organizations are starting to embrace game-based learning.

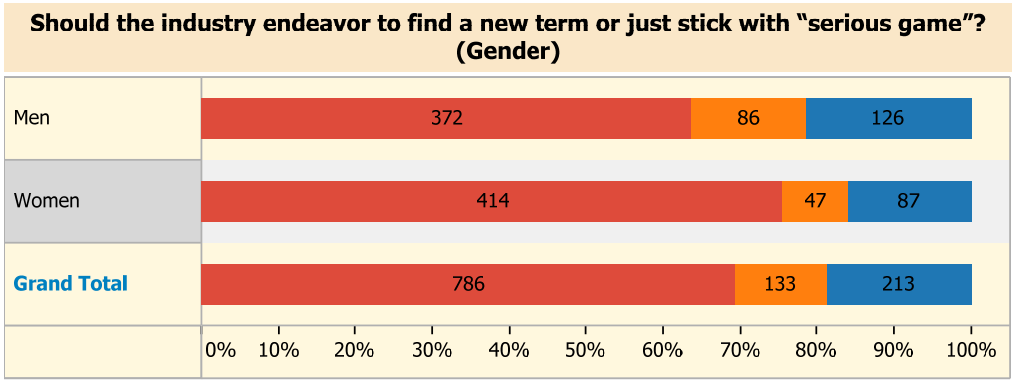
ILS and Mobile Learning is converging

In preparing its *360° Report on Mobile Learning*, the Guild observed many organizations marrying the convenience and ubiquity of mobile devices with the appeal of game and simulation-based learning.

Indeed, this report showed that 29% of Guild members indicated that they want to deploy their solutions on mobile devices, and that they were concerned about finding a standardized platform for such delivery.

Guild Members still have a problem with the term "Game"

As with last year's report, a great deal of effort in getting people to embrace this approach to learning is spent just overcoming antipathy towards the term "game." We discuss this – and the need for e-Learning professionals to just get over the aversion – in "Name Game Nonsense" on page 151.



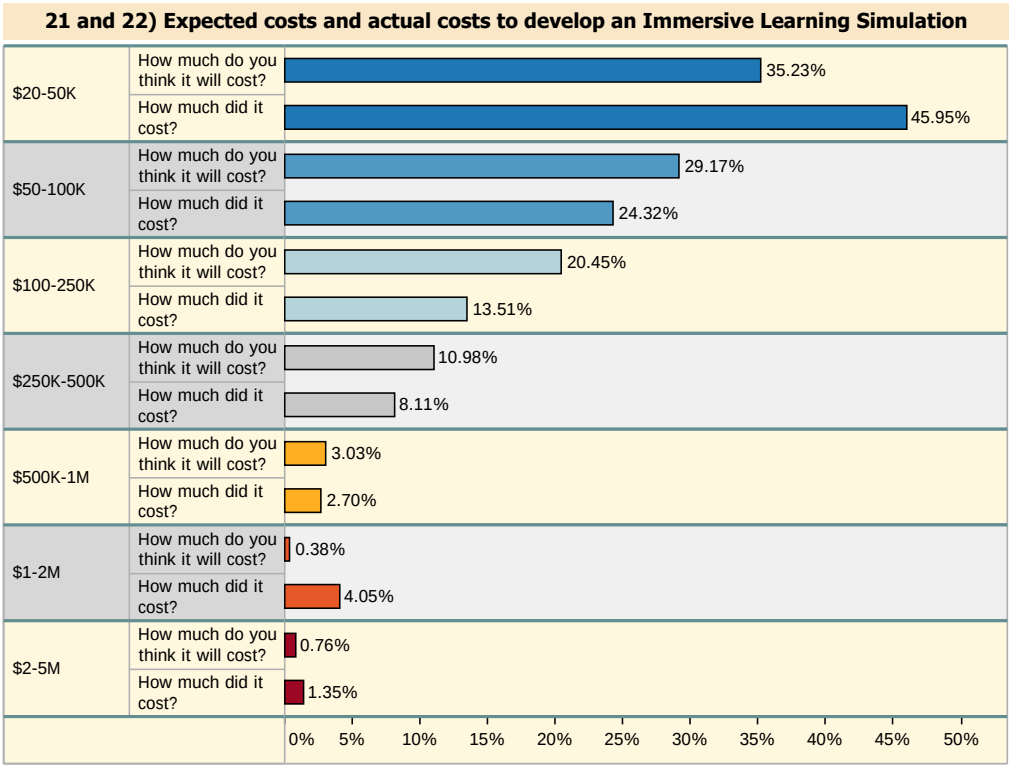
Source: The eLearning Guild Research

Figure 9 – Attraction or antipathy towards the term "serious game" broken down by gender. Neither group cares for the term, with only 22% of men and 16% of women showing approval.

Costs: anticipated and real

In Figure 10 we compare anticipated costs with actual costs. In the first questions, we did not tell Guild members how many learners would be involved, or the depth of the ILS that was to be developed. Our goal was to probe Guild member perceptions.

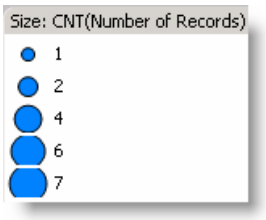
For the most part, Guild members believe that an ILS will cost more than it actually does.

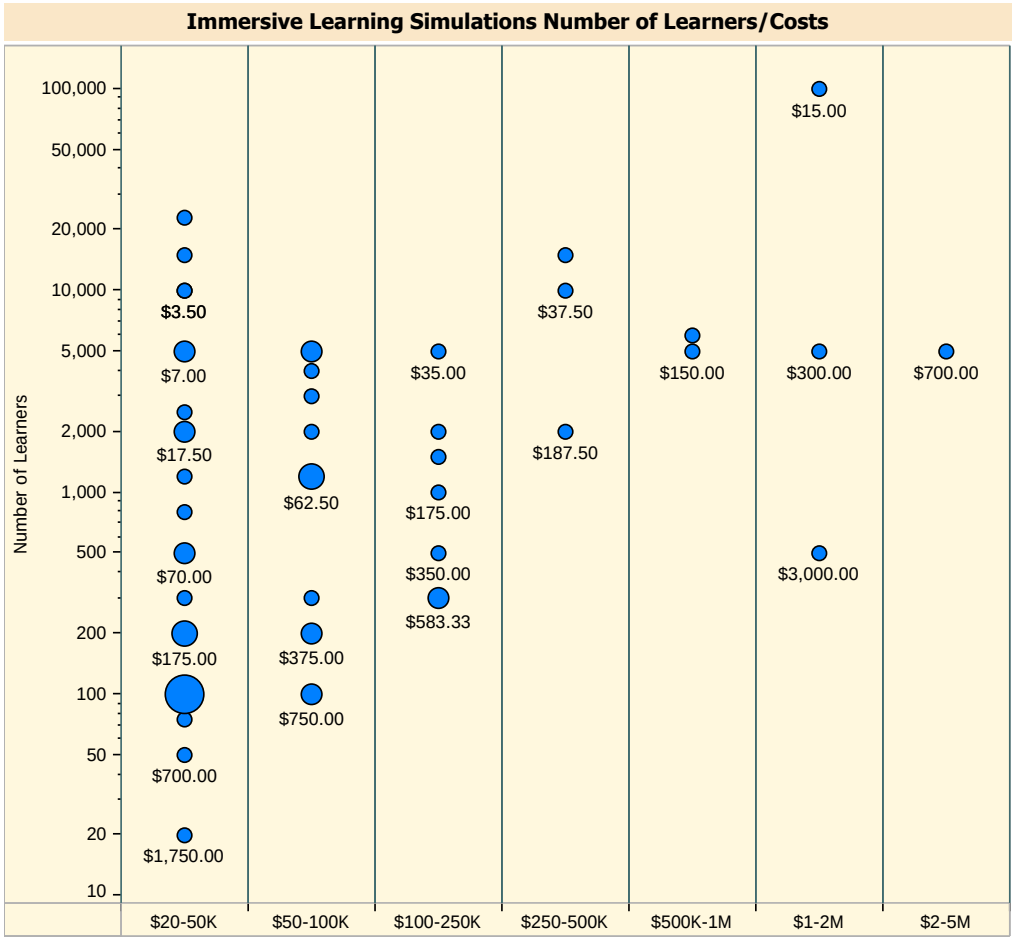


Source: The eLearning Guild Research

Figure 10 – Expected vs. actual costs for ILS implementations. 264 Guild members answered the "How much do you think it would cost?" part, and 74 members who actually created an ILS answered the second part.

In Figure 11 we plot Guild the actual costs reported by Guild members against the number of learners in using the ILS. Notice that the vast majority of projects fall into the $20-50K and $50-100K range.





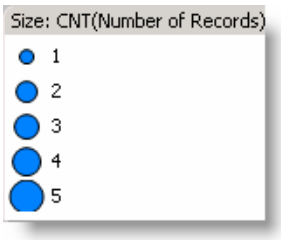
Source: The eLearning Guild Research

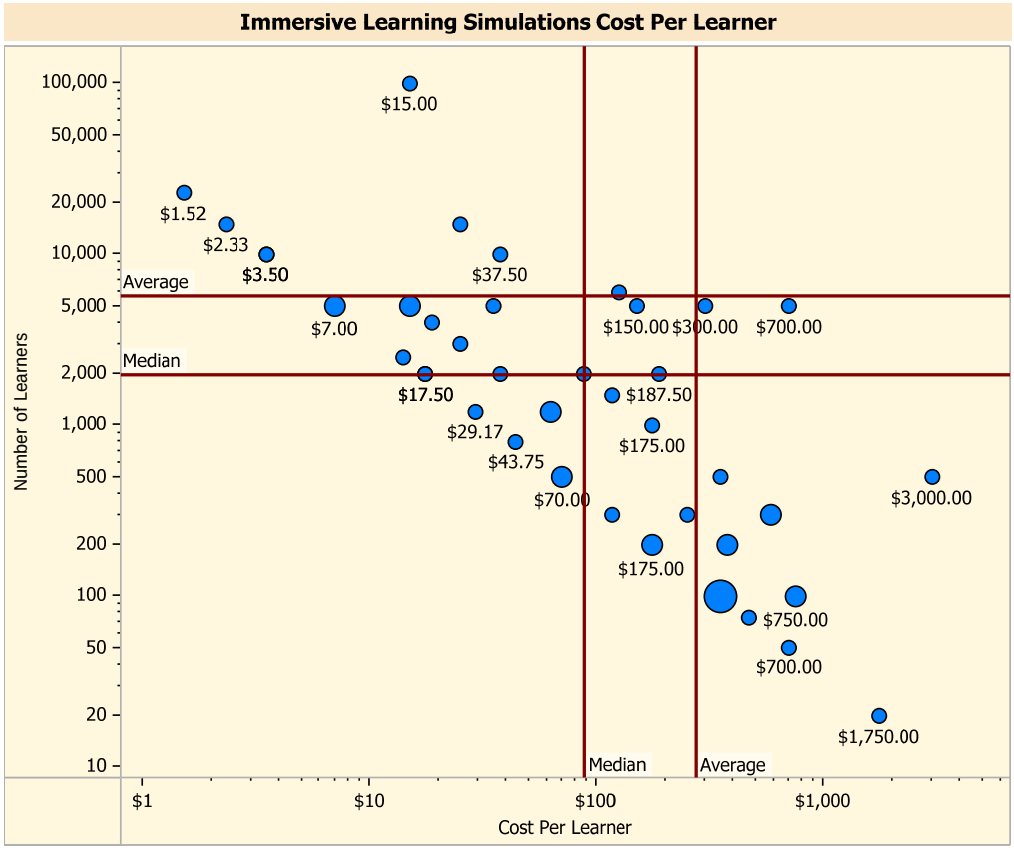
Figure 11 – Actual costs plotted against number of learners. Notice that the vast majority of projects fall into the $20-50K and $50-100K buckets, and that even the $2-5M project had a relatively modest $700 per learner cost.[4]

[4] We derived the $700 per learner cost by taking an average cost of $3,500,000 (the average of $2M and $5M) and dividing it by the number of learners (5,000).

In Figure 12 we see a scatter plot diagram showing cost per learner plotted against number of learners. The median number of learners is 2,000, and the average number of learners is 5,787. The median cost per learner is $87.50, and the average cost per learner is $273.88.

Note: We asked Guild members for a specific number of learners, but we offi-cered them different cost ranges ($20-50K, $50-100K, $100-250K, $250-500K, $500K-1M, $1-2M, $2-5M). In calculating the cost per learner, we took the average of the cost range (e.g., $35K for $20-50K, $75K for $50-100K, etc.)

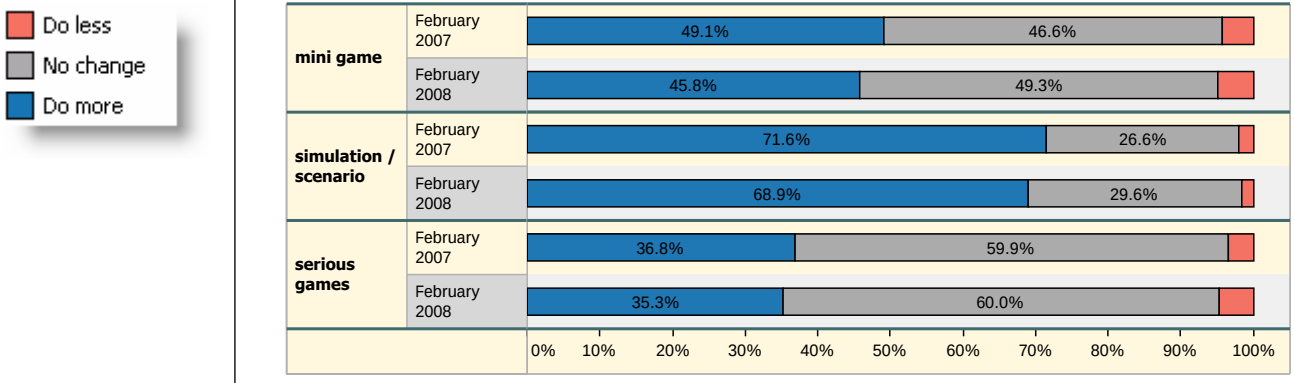




Source: The eLearning Guild Research

Figure 12 – Scatter plot diagram showing Cost Per Learner on the x-axis, and Number of Learners on the y-axis.

Guild Members plan to do a lot more



Source: The eLearning Guild Research

Figure 13 – Guild members' plans then, and now.

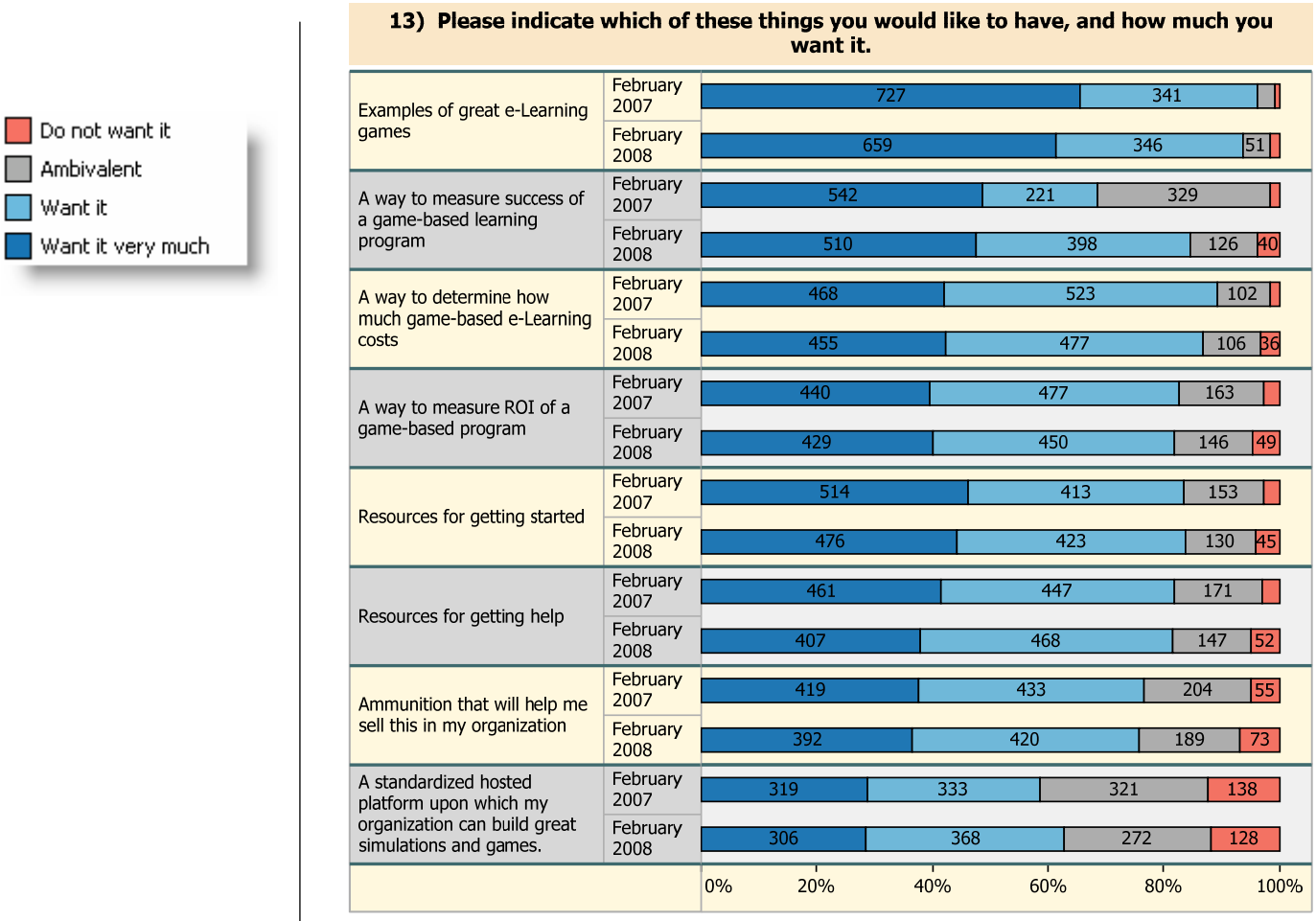
The big news last year was that so many members planned to engage in more mini-games, simulations, and serious games. While Guild members have stepped back ever so slightly from "games" bullishness (see Figure 13), the infatuation with game-based learning is still very high.

Guild members still thirst for great examples

If there's anything that shows that Guild members are clearly very interested in learning games, but that learning games have not yet entered the mainstream, it's the results we see in Figure 14.

Here we asked Guild members to indicate which things they would like to have, and how much they would like to have it.

The fact that over 90% of Guild members want, or very much want, examples of great e-Learning games indicates a strong interest in this area. However, the fact that so many people want or need to see examples indicates that they are, in fact, not familiar with the approach yet (otherwise why would they need to see examples?).



Source: The eLearning Guild Research

Figure 14 – What members want, and how much they want it (year over year).

Other Observations

In the myriad discussions and e-mail correspondences that have taken place in preparing this report, a number of important observations have come to light:

There's some very good stuff out there; there's also a lot of, well, not very good stuff. While "serious games" may be old hat to some, for the vast majority of people this is new territory, and we're seeing both very useful and very wasteful efforts. In this report (and on the authors' various blogs), we try to steer you towards the good stuff and away from the bad.

Conservative organizations are embracing the term "game." Yes, we still see the value of, and recommend people use, the term "Immersive Learning Simulation," but this is mostly to get the concept of "serious games" in the cor-

porate door using a corporate-friendly moniker, if this is what you have to do. So, to those Guild members who complain that nobody will accept the term "game," I strongly encourage you to read our interview with Katie Salen on page 184. Katie is the executive director of the Institute of Play, and she and her colleagues have convinced the New York City school system to sanction a game-based school for grades 6 through 12 that they plan to open in the fall of 2009.

"Un"-simulation Tools and Dedicated Game Tools: We have a large section of this report devoted to popular simulation tools, and we explore what they can do (and not do), and what members think about these tools (page 67.)

If you are developing software simulations, a crop of performance support system tools that work *inside* the actual host application, as opposed to simulating it are available. Examples of these "un"-simulation tools you may want to consider using include Transcensus' Sho Guide, LearningGuide Solutions' Learning Guide, and Assima's ePSS.

Members may also want to know if there are any tools dedicated to creating games (vs. simulations). There is indeed a new crop of tools emerging, and the Guild will be conducting a "deep" survey on these tools later this year.

Developing an ILS is a software development project, not a content development project: Kevin Corti articulates this thought very effectively in his essay "Demystifying Immersive Learning Simulations – Moving From the Potential to the Practical" on page 121. Indeed, the tools available for creating an ILS are not yet at the point where a subject matter expert can fire-up a truly well honed ILS (vs. a simple frame game) in a matter of a few days. Because developing an ILS resembles a software development project more than a rapid e-Learning project, you will probably not want to embark on creating an ILS that has a limited shelf life.

How This Report is Organized

Section	Description	Page
Survey Results	Comprehensive analysis of the Immersive Learning Simulations survey responses from over 1,100 eLearning Guild Members.	21
Simulation Tools Satisfaction Summary	Quick-reference summarization of satisfaction results for the most popular Simulation tools.	67
Simulations Tools Survey Results	Comprehensive review and analysis of survey results for the ten most popular Simulation tools. Also includes market share analysis broken down by corporate and education or government markets.	79
Debunking Myths about Serious Games	Report author, serious games maven, and principal of IMSerious.net, Anne Derryberry takes on – and successfully debunks – some of the more popular myths surrounding serious games and ILS.	109
Demystifying Immersive Learning Simulations – Moving From the Potential to the Practical	Report author Kevin Corti, CEO of learning-games pioneer PIXELearning, shares his many years of experience in getting corporations to see beyond the potential, and embrace the practical, of ILS.	121
On the Costs of Games, and Perceptions Thereof	Report author Clark Quinn, returning from his successful engagement as an author of last year's report, shares his analysis on what Guild members have to say about perceived and real costs of developing learning games.	143
Name Game Nonsense	The Guild's director of research, Steve Wexler, makes his case for Guild members to get beyond wasting time arguing about terminology.	151
Case Study – Transit Training in Immersive Virtual Reality	David Abitbol of uMindSoft shares his firm's experience in helping Sociéte de Transport de Montréal embrace ILS to significantly improve transportation safety, while at the same time decreasing costs.	159
Case Study – Using a Virtual Incident Management Training System for Transportation First Responders	Michael Armentrout and Anne Derryberry of IMSerious.net chronicle Forterra's collaboration with the I-95 Corridor Coalition and the University of Maryland CATT LAB to develop an ILS that will help train personnel, and reduce response time to emergencies on one of the United States busiest highways.	171

Survey Results

By Steve Wexler, Director of Research and Emerging Technologies, The eLearning Guild

Steve brings to the Guild a passion for learning, and for teaching, and over 20 years experience in electronic performance support systems, software development, and technology-enhanced learning systems. He has consulted to, and developed training and learning systems for, major corporations including Microsoft, Chase, American Express, and Citigroup Global Markets Holdings. He has also written several best-selling computer books, was chief architect for *Microsoft Windows 95 Starts Here*, the official learning companion to Microsoft Windows 95, and is a top presenter at trade shows and conferences.

Previously, Steve was founder and president of WexTech Systems, where he pioneered the development and use of single-source publishing software and embedded help systems. Steve was also instrumental in the creation of AnswerWorks®, a natural-language search engine embedded in scores of commercial products that are used by millions of people every day. Steve attended Princeton University, and was awarded a fellowship from the University of Miami.

You can reach Steve at swexler@elearningguild.com

Introduction

In preparing the questions for our survey, my co-authors and I solicited feedback from other Guild members, as well as from vendors and solution providers. The first version of the survey went live in January 2007, and we posted an updated version with several new questions in December 2007.

Guild members may take any Guild survey at any time. Indeed, one of the hallmarks of the Guild's research system is that we are always gathering fresh data and are able to view this data at any time, in real time.

As of this writing, 1,133 Guild members had completed the Simulations, Games, and Immersion Learning survey within the last 12 months, with more than half of the members submitting responses within the past 90 days.[5] By default, when the Guild publishes reports we filter the results so as to exclude data that has not been updated within the past 365 days.

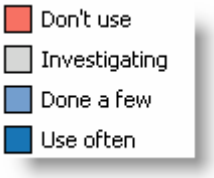
Note: As with any printed report, the charts in this section represent a snapshot of results as of a certain day. To avoid working with stale data, we strongly encourage you to view up-to-the-minute, real-time results using the Guild's Direct Data Access portfolios. In addition to viewing up-to-date information, you will also be able to find answers to *your* specific needs by filtering the information based on *your* specific requirements. In addition, using DDA you can expand and contract the "freshness" date so that you can review survey responses for a particular time period.

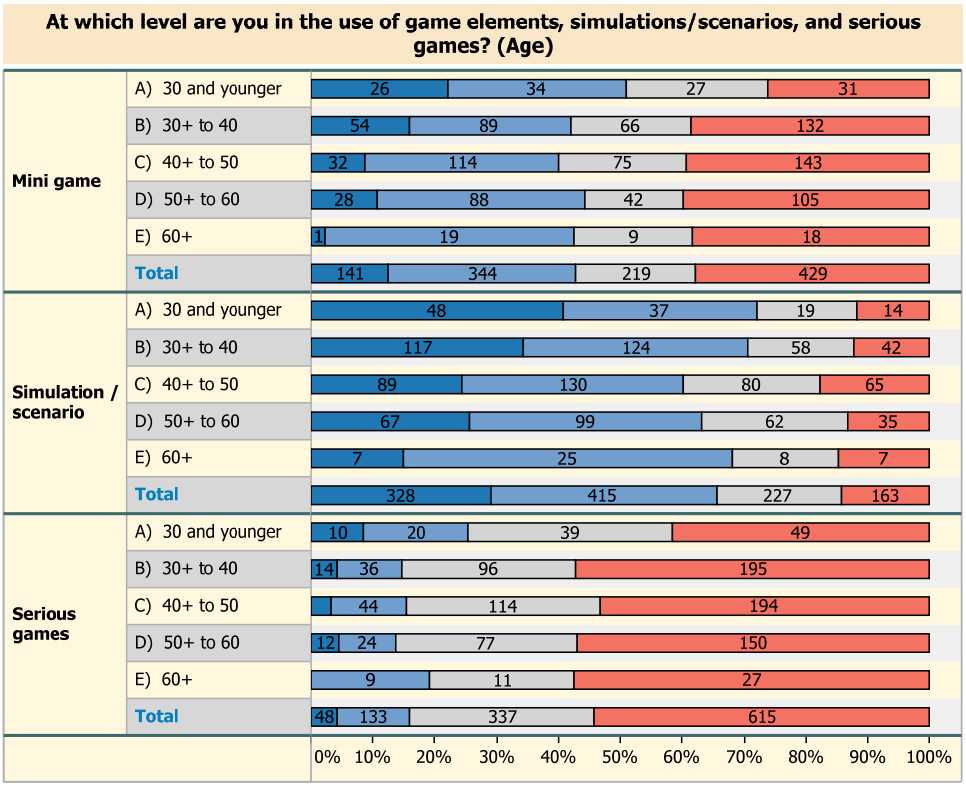
For more information on DDA, see "Appendix B – Using Direct Data Access" on page 243.

[5] For demographic information on members who completed the survey, see "Appendix A – Respondent Demographics" on page 237.

Where Guild Members are Today

Breakdown by age

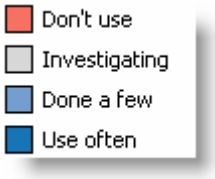


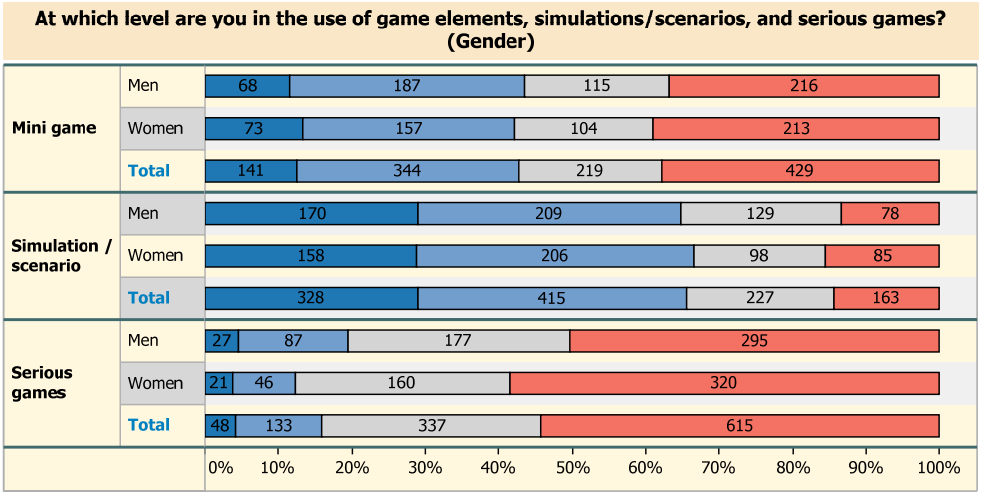


Source: The eLearning Guild Research

Figure 15 – Where Guild members are today, broken down by age.

Breakdown by gender

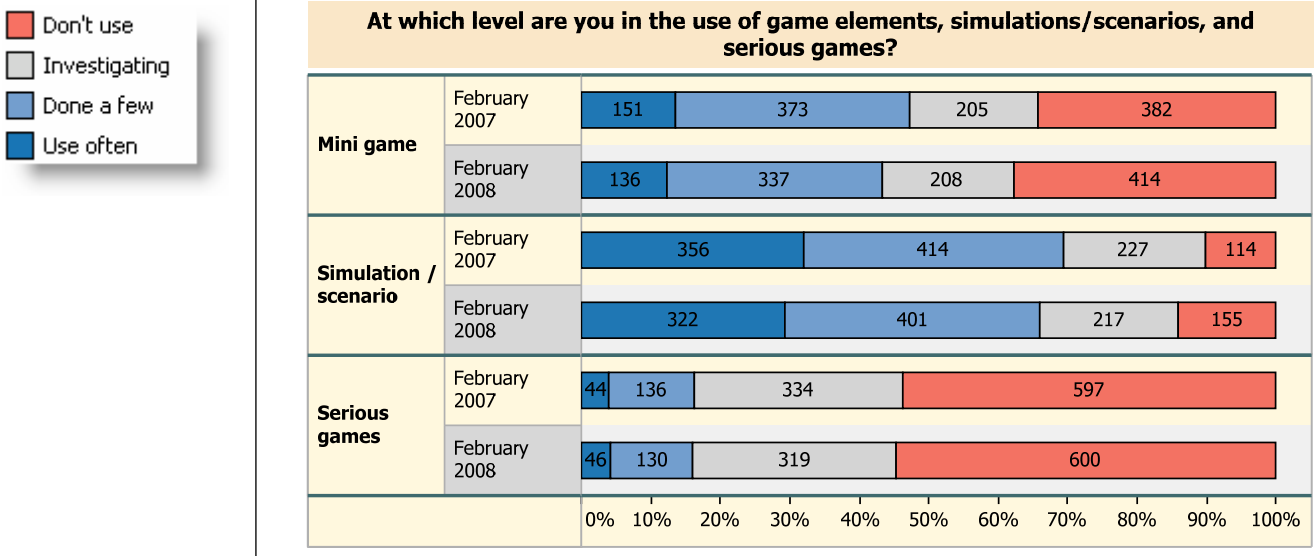




Source: The eLearning Guild Research

Figure 16 – Where Guild members are today, broken down by gender.

Trends



Source: The eLearning Guild Research

Figure 17 – Where Guild members are today, and where they were one year ago.

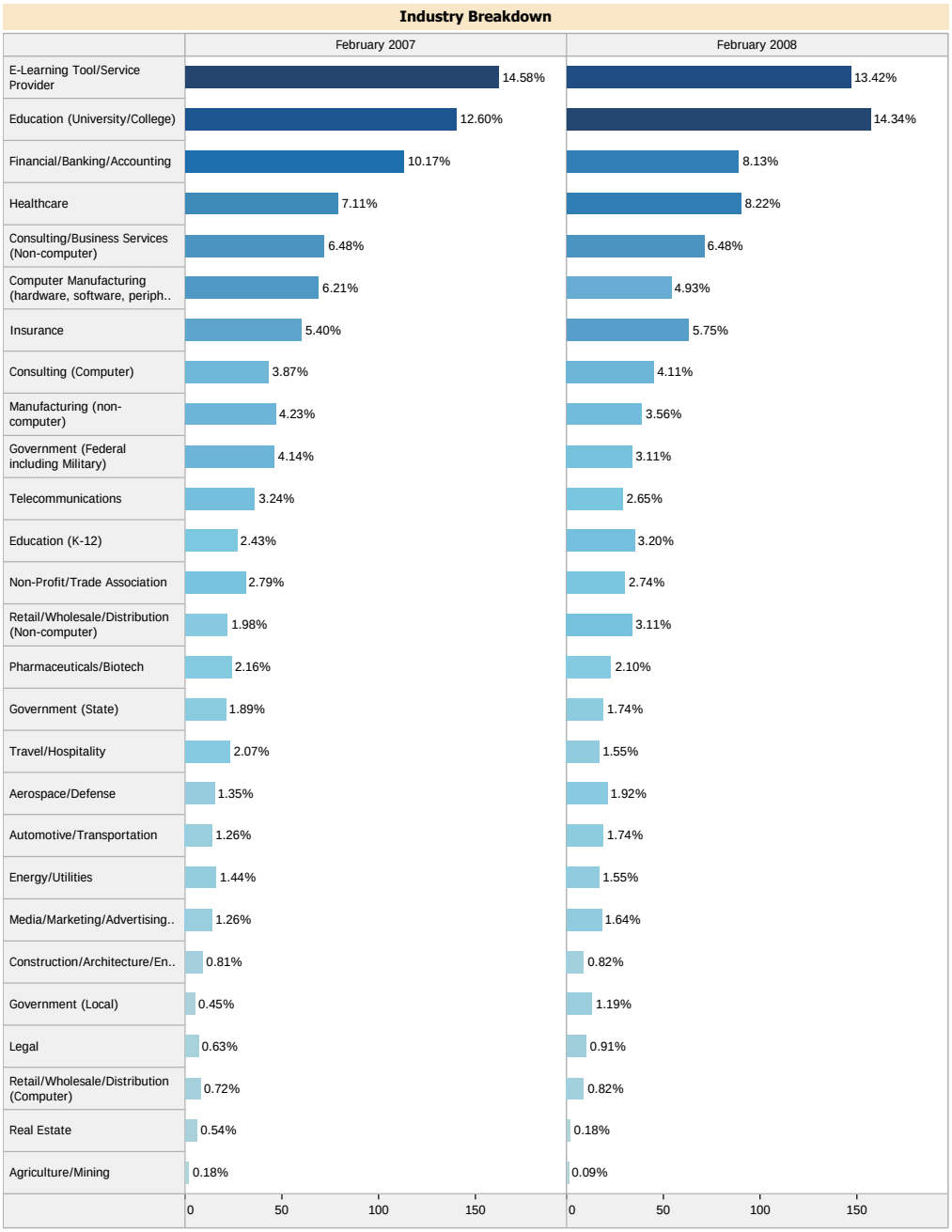
Analysis

In Figure 15 we see that members 30 and younger show greater comfort with "games," with over 55% using mini-games sometimes or often (vs. 43% for all ages) and over 25% using serious games sometimes or often (vs. 16% for all ages.)

In Figure 16 we see that men, too, also show a greater attraction to serious games with 19.4% using serious games sometimes or often, vs. 12.2% for women. We'll explore the ramifications of this later on when we examine members' familiarity with standalone and multi-player games and simulations (see "Familiarity with Simulations, Virtual Worlds, and MMOGs" on page 32.)

In examining responses from February 2008 and February 2007 (see Figure 17), we see members stepping back a bit from simulations, scenarios, and serious games. There are two possible reasons for this.

1. In February 2007, the Guild had accrued data from members who had submitted responses in the previous 60 days (vs. a full years worth of data for the February 2008 response). People who flocked to take the survey early on may have had a greater interest in learning games than those that took the survey in later months.
2. The demographics of people completing the survey in 2007 are different from those completing it in 2008, as shown in Figure 18.



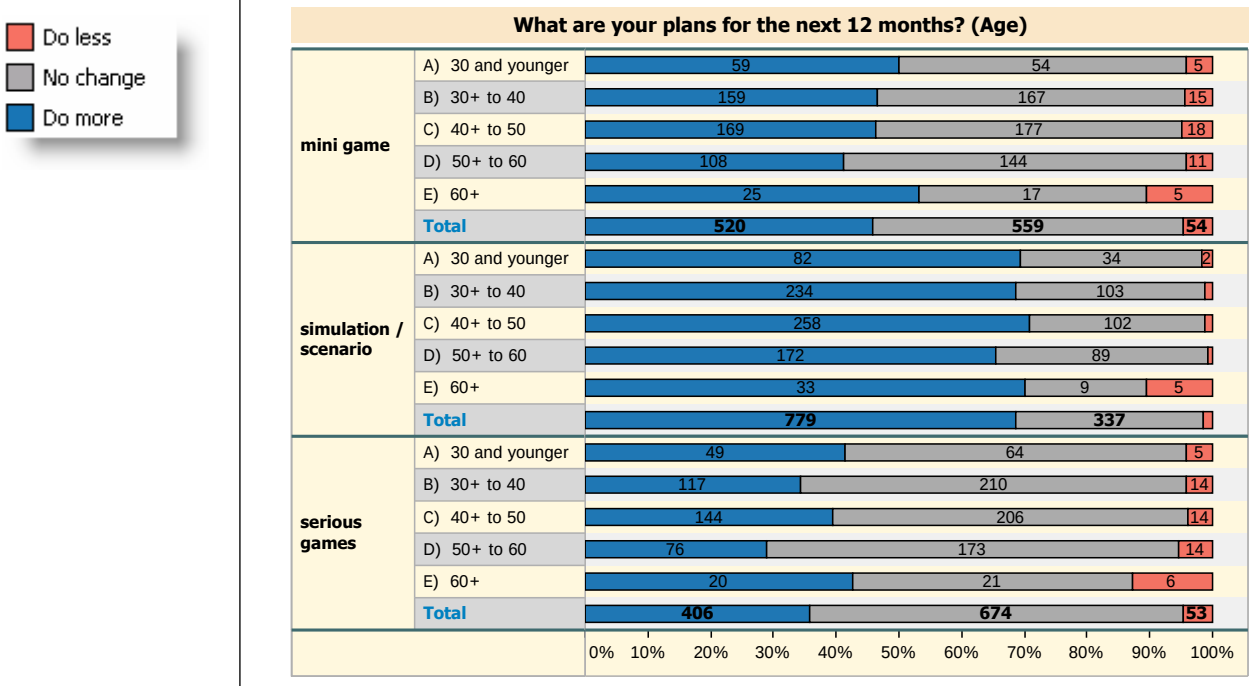
Source: The eLearning Guild Research

Figure 18 – Demographics of members who completed the survey in 2007 vs. those who completed or updated the survey in 2008.

Given the steadier accrual of information from the 2008 survey, The Guild believes the 2008 responses are a more accurate reflection of Guild members' adoption of simulations and games. Either way, the numbers show a strong interest in this area.

What Are Your Plans for the Next 12 Months

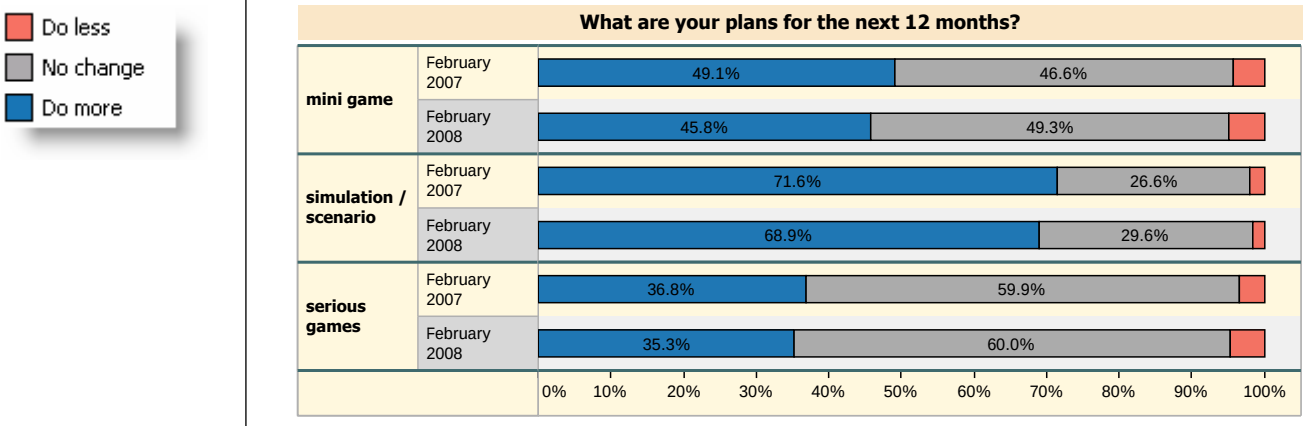
Breakdown by age



Source: The eLearning Guild Research

Figure 19 – Guild members' plans for the next 12 months, broken down by age. Note that the gender differences for this question were insignificant, so we did not include them.

Trends



Source: The eLearning Guild Research

Figure 20 – Guild members' plans then and now.

Analysis

The big news last year was that so many members planned to engage in more mini-games, simulations, and serious games. While Guild members have stepped back ever-so-slightly from "games" bullishness (see Figure 20), the infatuation with game-based learning is still very high (and results from members who have engaged in game-based learning indicate that such infatuation is warranted, as we'll see in a little bit.)

Also noteworthy, is the relative steadiness of inclination to create learning games across various age groups. Indeed, the two groups most inclined towards creating serious games are those 30 and under and those 60 and over (see Figure 19.) While this willingness to embrace a new approach in developing a learning program is heartening, a much more important measure is members' personal familiarity with certain approaches to learning games, as this will likely reflect learners' familiarity as well (see "Familiarity with Simulations, Virtual Worlds, and MMOGs" on page 32.

Did those who planned to do more, in fact, do more?

Let's step back for a moment and focus on Guild members who, in February 2007, had indicated that they planned to create more serious games. Did they, in fact, create more games? Or, like people who at the beginning of the year state they plan to lose 20 pounds, did various vicissitudes of life distract them from this goal?

As part of this report, we contacted 478 members who, between December 2007 and March 2007, had indicated that they planned to create more serious games. Eighty-four members responded to our inquiry, and here's what they had to say.

Did you create more serious games?

Answer Options	Response Percent	Response Count
Yes	32.1%	27
No	67.9%	57
answered question		84
skipped question		0

Figure 21 – Responses from Guild members who had indicated they planned to create more serious games.

Of the 84 that responded to our follow-up survey, just shy of one-third of members had in fact created more serious games. But, of the 57 Guild members who have not, in fact, followed through yet, 19 indicated that the project is still under development, as shown in Figure 22.

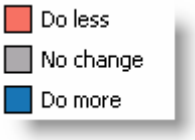
If you indicated "No" please let us know why not (please check all that apply).

Answer Options	Response Percent	Response Count
Could not get management buy-in	23.7%	14
Underestimated budget, time, or scope	20.3%	12
Were able to achieve what we wanted with another approach	10.2%	6
Didn't understand how to build it	10.2%	6
Still under development	32.2%	19
Other (please specify):	33.9%	20
answered question		59
skipped question		25

Figure 22 – Reasons why members who planned to create serious games have not yet done so.[6]

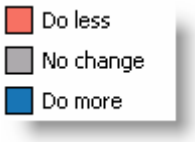
[6] "Other" reasons include "Combination of factors, budget, know-how and appropriate project," "Did not have client need or budget," "Relevant project has not come up," "I have changed jobs and my current position is still developing, but I hope to use this in the future," "We were too busy with other projects that didn't need this training method," "We will develop some simulations/serious games in 2008," "It takes more time with teachers as coordinators," "Changed job," "We do not have a client willing to purchase," "Time and tools," "Lack of time," "Management, thankfully, is supportive, but this is only part of my job and it's been very difficult to find a dedicated time to even get started," "Haven't worked on a project where this would be appropriate," "Targeted projects were de-prioritized, and resources redirected," "Culture-change issues," and "Did not work on any projects where it would have been appropriate or applicable to use e-Learning games or simulations."

Plans for selected industries



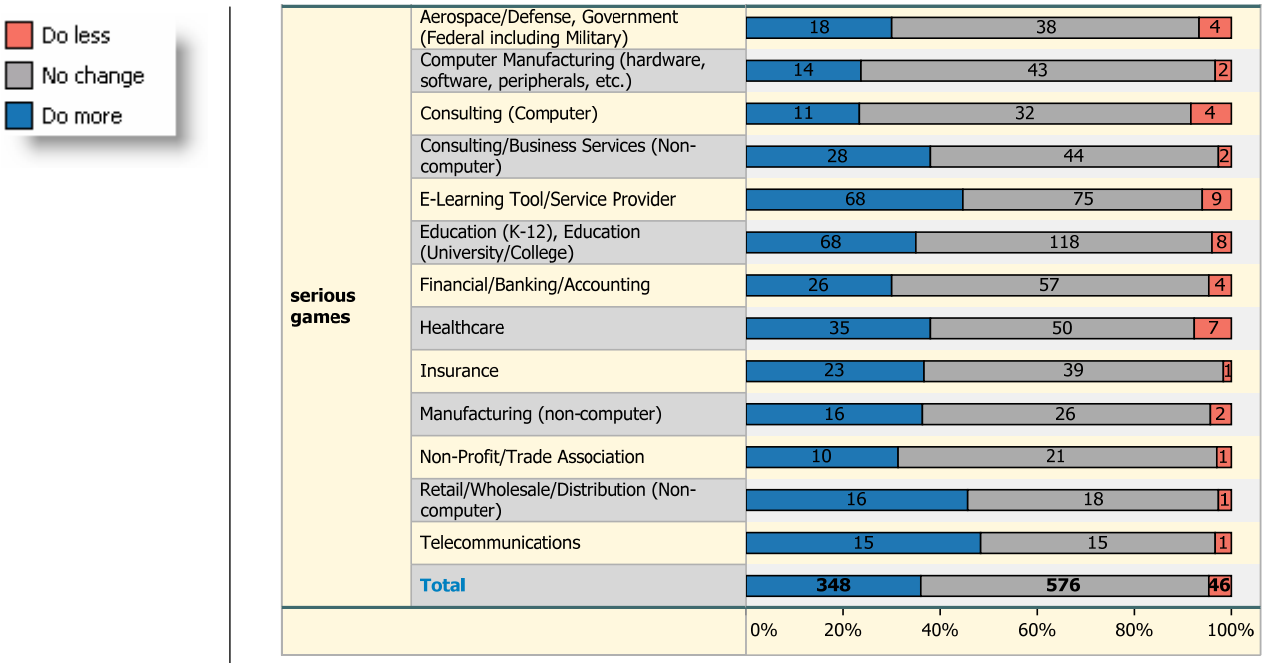
	Plans for selected industries			
mini game	Aerospace/Defense, Government (Federal including Military)	20	35	5
	Computer Manufacturing (hardware, software, peripherals, etc.)	19	36	4
	Consulting (Computer)	16	27	4
	Consulting/Business Services (Non-computer)	29	42	3
	E-Learning Tool/Service Provider	80	65	7
	Education (K-12), Education (University/College)	90	100	4
	Financial/Banking/Accounting	35	47	5
	Healthcare	44	43	5
	Insurance	32	29	2
	Manufacturing (non-computer)	28	13	3
	Non-Profit/Trade Association	12	20	
	Retail/Wholesale/Distribution (Non-computer)	18	14	3
	Telecommunications	10	20	1
	Total	**433**	**491**	**46**

Figure 23 – Plans for mini-games in selected industries.



simulation / scenario	Aerospace/Defense, Government (Federal including Military)	41	17	2
	Computer Manufacturing (hardware, software, peripherals, etc.)	38	21	
	Consulting (Computer)	26	20	1
	Consulting/Business Services (Non-computer)	45	28	
	E-Learning Tool/Service Provider	106	43	3
	Education (K-12), Education (University/College)	138	54	
	Financial/Banking/Accounting	55	31	
	Healthcare	64	27	
	Insurance	47	15	1
	Manufacturing (non-computer)	30	13	1
	Non-Profit/Trade Association	22	10	
	Retail/Wholesale/Distribution (Non-computer)	31	3	1
	Telecommunications	21	9	1
	Total	**664**	**291**	

Figure 24 – Plans for simulations or scenarios in selected industries.

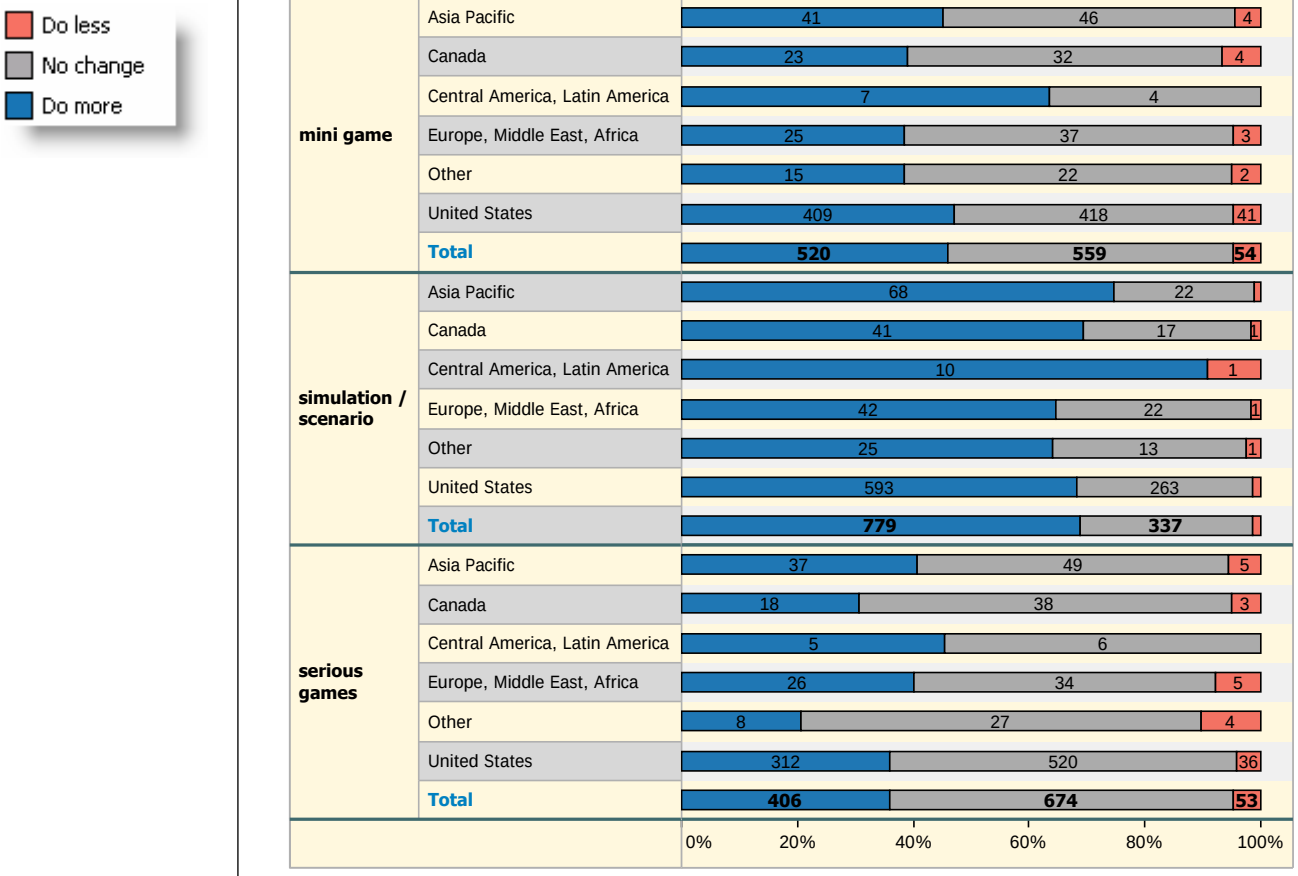


Source: The eLearning Guild Research

Figure 25 – Plans for serious games in selected industries.

As we can see in Figures 23, 24, and 25, planned adoption of simulations, scenarios, and games varies wildly among different industries. Vendors may want to target their marketing efforts toward industries that show a propensity towards adopting certain modalities sooner than other industries.

Plans by Region



Source: The eLearning Guild Research

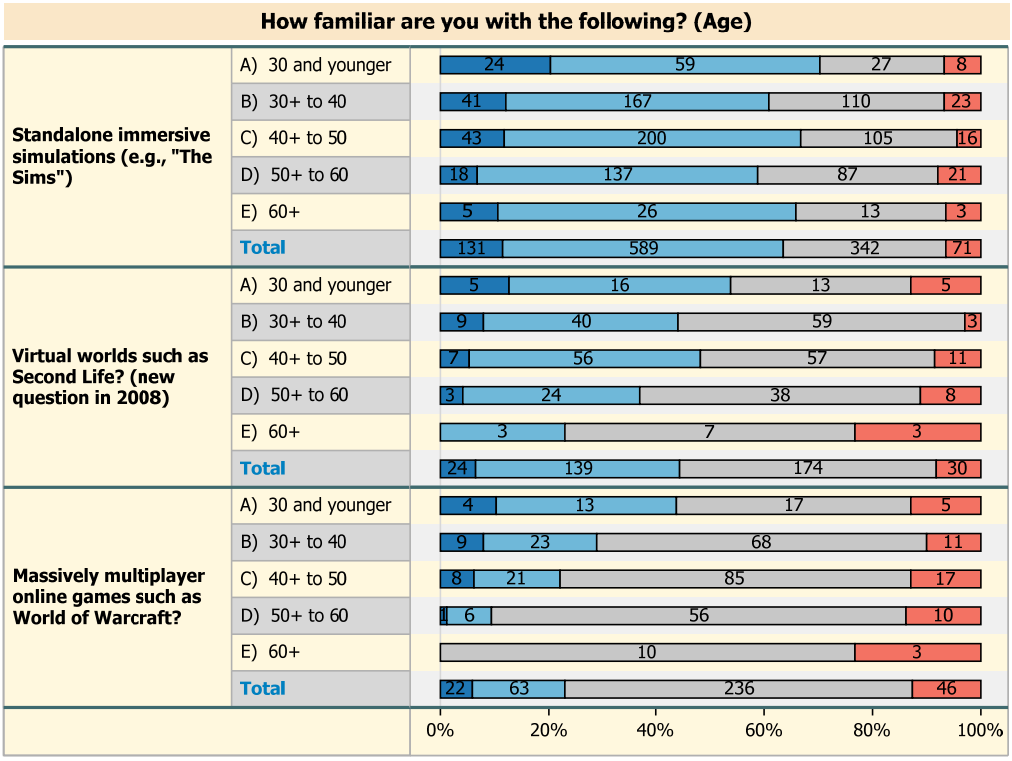
Figure 26 – Plans for simulations, scenarios, and games, broken down by region.

While only a handful of responses come from CALA (Central America and Latin America) members working in this region show their proclivity towards adopting more games and simulations. Canada shows one of the slowest adoption rates.

The Guild will continue to track this, and we'll post an update when we get more input from areas outside the United States and Canada.

Familiarity with Simulations, Virtual Worlds, and MMOGs [7]

Breakdown by age

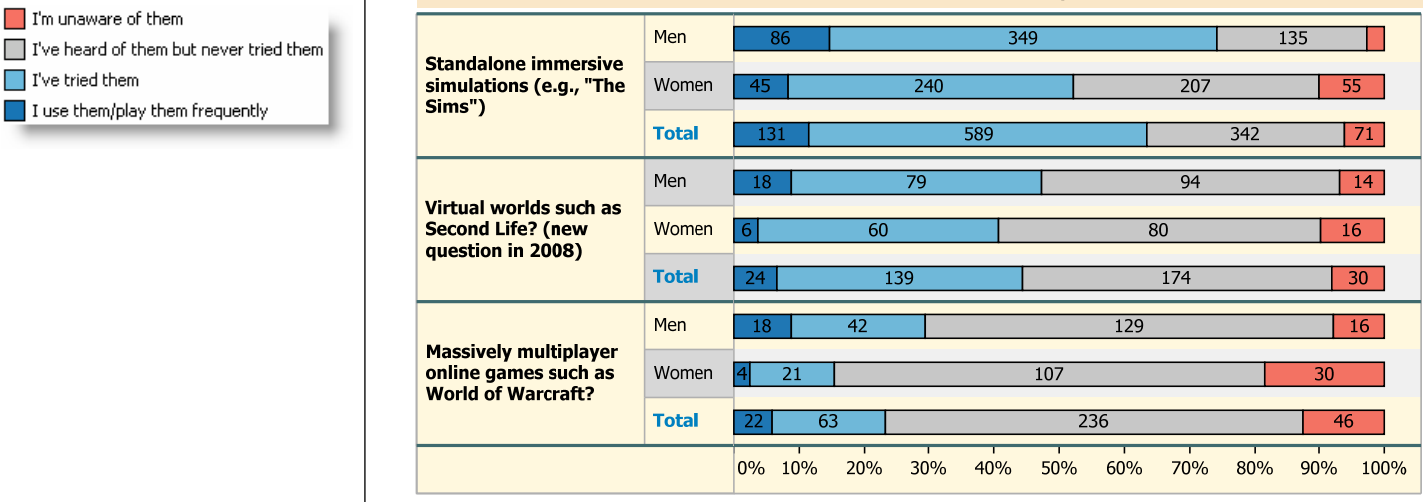


Source: The eLearning Guild Research

Figure 27 – Familiarity with Sims, Virtual Social Worlds, and MMOGs, broken down by age. Notice in particular the familiarity with massively multiplayer online games as it relates to age.

[7] Massively Multiplayer Online Game.

Breakdown by gender



Source: The eLearning Guild Research

Figure 28 – Familiarity with Sims, VSWs, and MMOGs, broken down by gender. Notice that the gender gap is smallest for virtual social worlds, indicating a more widespread use by women. This supports Linden Lab's assertion that the ratio of men to women that use Second Life is roughly 50-50.

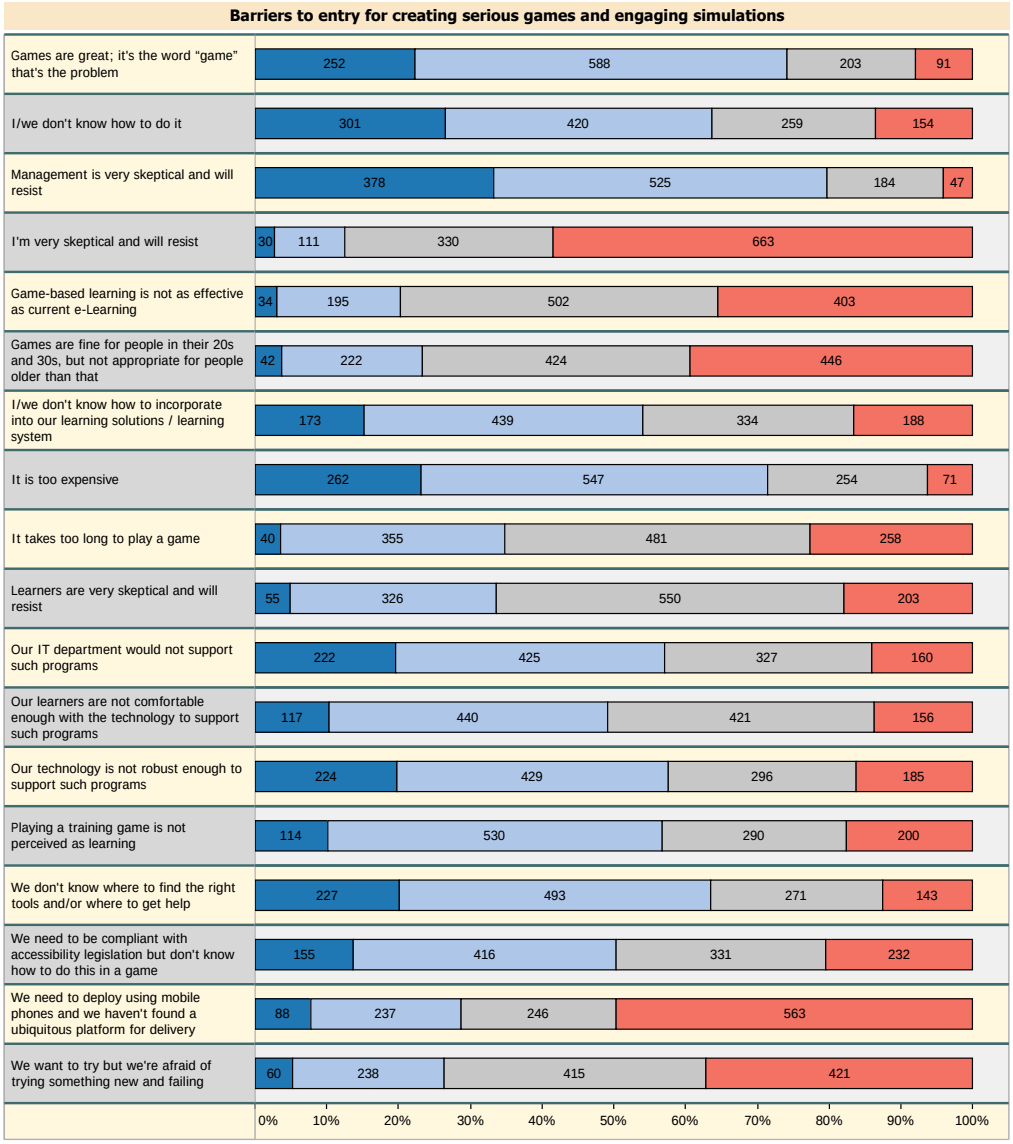
Analysis

The important thing to ask when evaluating Guild members' familiarity with various forms of simulations, social worlds, and games, is whether the leanings shown in Figure 27 and Figure 28 are indicative of the learners that will be taking the learning interventions Guild members create. This underscores the importance of Guild members knowing who their learners are, as certainly younger workers will be familiar with – and gravitate towards – game-based forms of learning.

This information is not new to myriad higher education institutions that are actively embracing game-based learning; including Harvard, MIT, and the Wharton School of Business (see our interview with Wharton's Alec Lamon on page 195.) Indeed, freshly minted MBAs exposed to Immersive Learning Simulations in graduate school will likely expect the same when they enter the workforce. IBM, too, recognizes the effectiveness of this approach, and has recently made available a free download to institutions of higher learning of a very rich Immersive Learning Simulation designed to help students develop a combination of business and information technology (IT) skills (see https://www-304.ibm.com/jct03001c/software/solutions/soa/innov8.html.)

Barriers to Entry

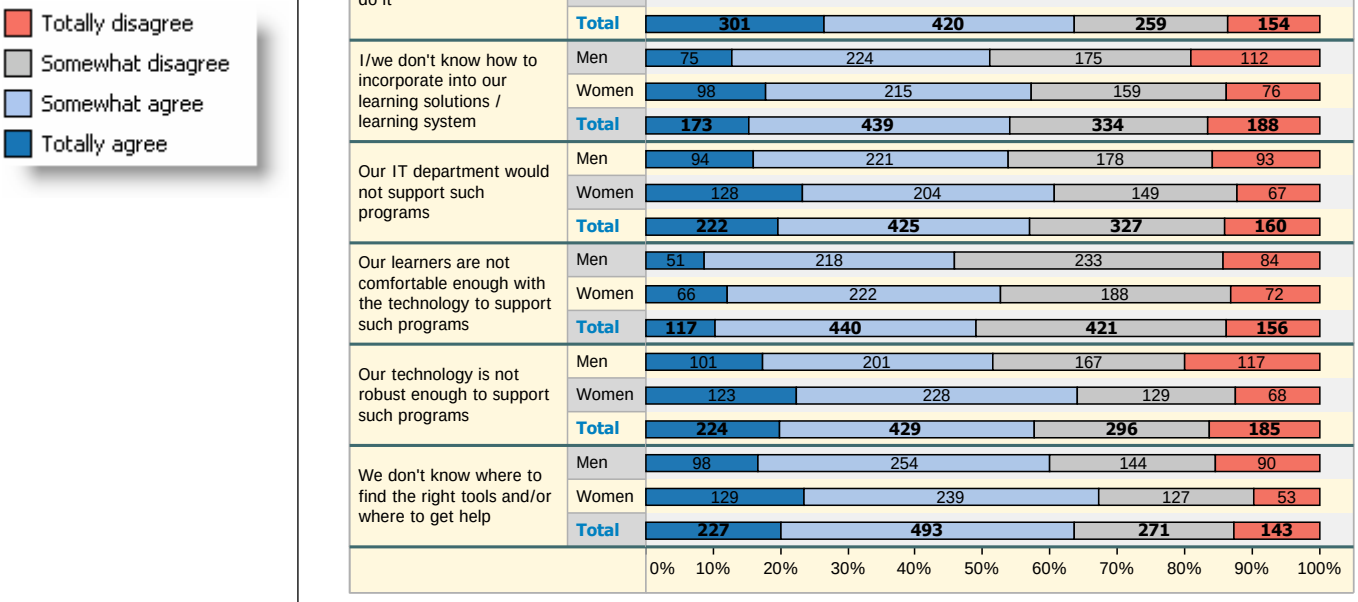
Current findings



Source: The eLearning Guild Research

Figure 29 – Guild members indicate which things are impediments to the adoption of serious games.

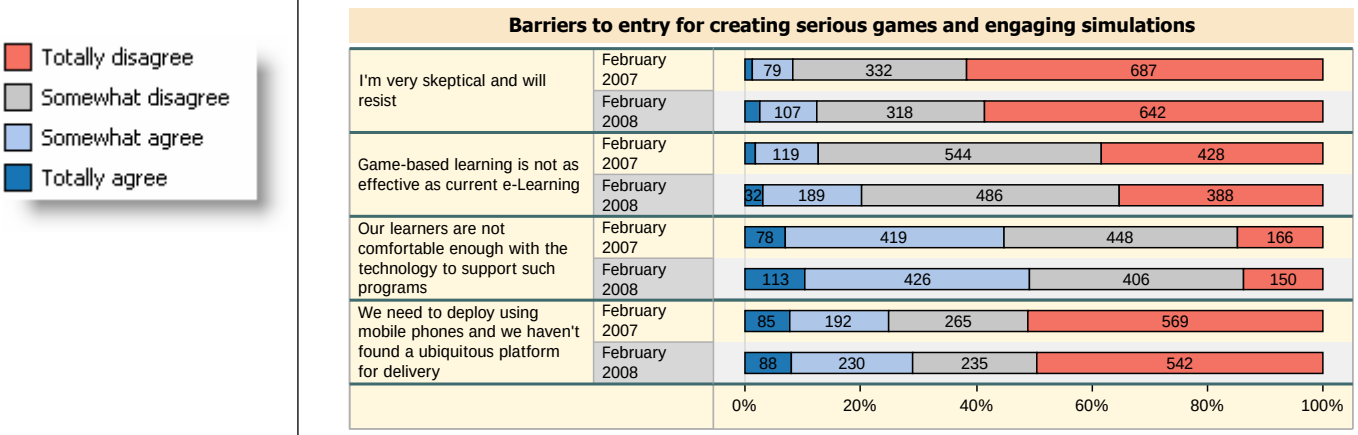
Breakdown by gender



Source: The eLearning Guild Research

Figure 30 – Barriers to entry with notable gender differences.

Trends

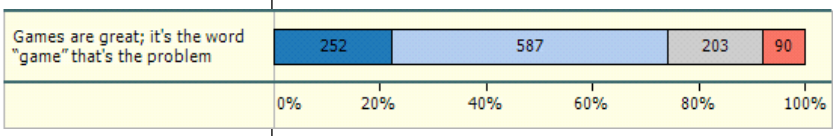


Source: The eLearning Guild Research

Figure 31 – Barriers to entry with notable differences between 2007 and 2008.

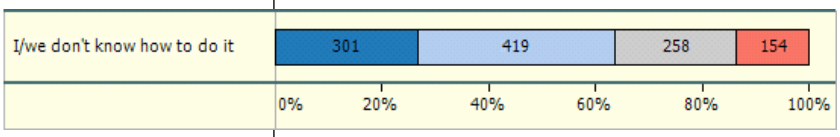
Analysis

Games are great; it's the word "game" that's a problem



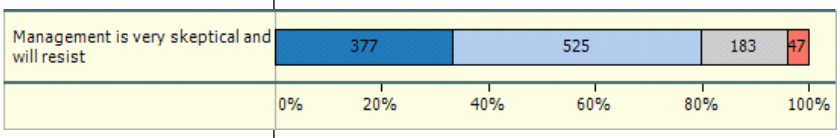
Despite some strides, the vast majority of Guild members still have a problem with the term "game." Our advice to Guild members is: Get over it! You, as a learning professional need to get over whatever conceptual hurdles stymie you (see "Name Game Nonsense" on page 151). That said, the Guild does understand the up-hill battle members may face within their organizations when it comes to "games," and we still recommend using the term "Immersive Learning Simulations" in these cases.

I/We don't know how to do it



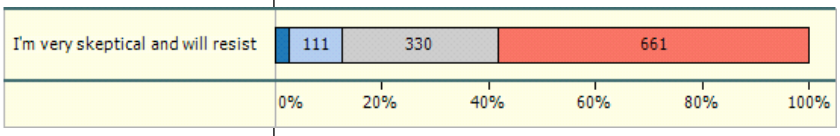
This remains a hurdle, with more than 60% of Guild members agreeing with the statement. Particularly noteworthy is the differences in responses from men and women as shown in Figure 30. About 58% of men totally or somewhat agree with the statement vs. 68% for women.

Management is very skeptical and will resist



Just shy of 80% of Guild members totally or somewhat agree with this statement, but, as we indicated last year, if you filter the results to just show survey responses from managers, directors, and senior officers, these people themselves believe in the potential in Serious Games or Immersive Learning Simulations. We again encourage you to give your organization's upper management a chance, as approval for such initiatives continues to be found in surprising places (see our Interview with Katie Salen on page 184.)

I'm very skeptical and will resist



The vast majority of Guild members (more than 87%) disagree with this statement, but the number of people expressing skepticism has increased from last year (12.4% in 2008 vs. 8.3% in 2007). As we indicated earlier, two items that may explain the difference is the difference in demographics between members completing the survey this year

vs. last year, as well as the fact that we took last year's "snap shots" of the data when the members most prone to adopting this technology had completed the survey (Figure 31). In either case, the number of skeptical Guild members is very small, and may become smaller as we see more success reported by ILS implementers (see "When Compared to Other Forms of Rich-skill practice, We Believe that Immersive Learning Simulations or Serious Games are…" on page 45).

Game-based learning is not as effective as current e-Learning

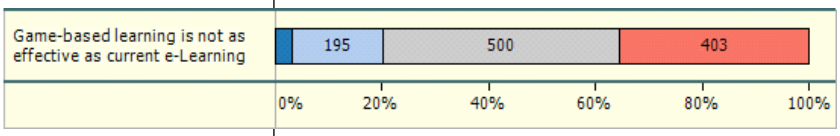
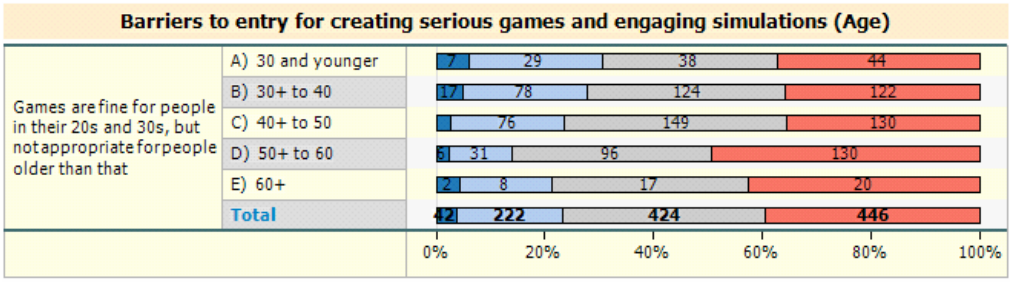


Figure 31 shows a fairly large jump in people who agree with this statement, with 12.5% agreeing in 2007, while close to 20% agree in 2008.

Games are fine for people in their 20s and 30s, but not appropriate for people older than that

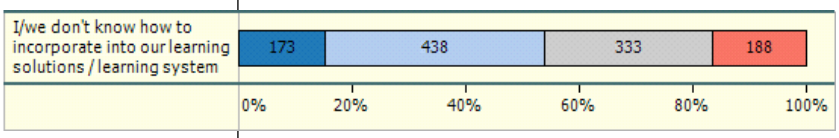
About 24% of Guild members agree with this statement. What's truly interesting is that younger Guild members agree more often with this statement than older Guild members, as Figure 32 shows.



Source: The eLearning Guild Research

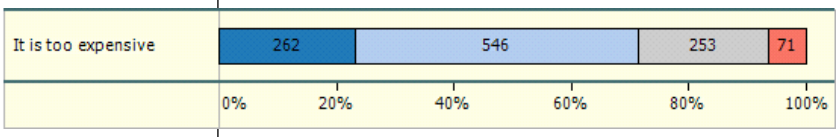
Figure 32 – How Guild members of different ages feel about games and age. Perhaps younger members should give older learners a chance.

I / we don't know how to incorporate into our learning solutions or learning systems



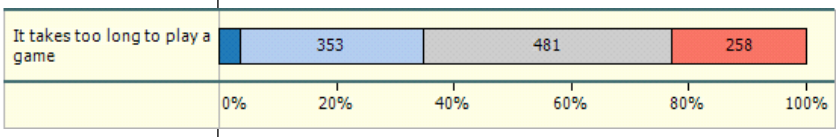
Fifty-five percent of Guild members agree that this is a problem, but as we saw with "I/We don't know how to do it" on page 36, there's a fairly sizable gap between the number of male members who agree with the statement (51%), and the number of female members (59%).

It is too expensive



Despite evidence to the contrary that we explore in other portions of this report, over 70% of Guild members strongly or somewhat agree with this statement. Members who are concerned about costs should read Anne Derryberry's essay "Debunking Myths about Serious Games" on page 109, and Clark Quinn's essay "On the Costs of Games, and Perceptions Thereof" on page 143.

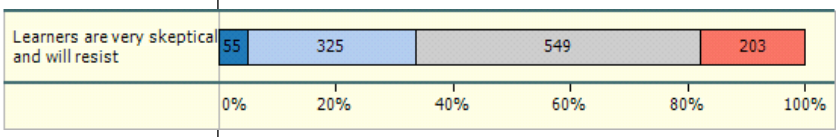
It takes too long to play a game



Thirty-five percent of Guild members believe that "serious games" will occupy too much of an employee's time. Part of this concern is warranted, as a well-designed game invites, and even requires, that people try it repeatedly until they master a particular skill.

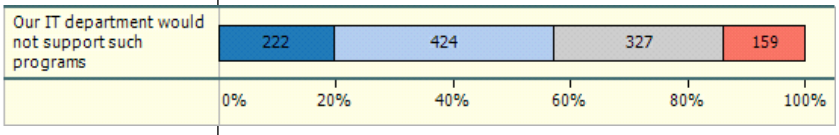
It's certainly easier to measure the time needed for more traditional e-Learning approaches, as one does not expect a learner to take a course over and over, but a well-designed learning game will have learners coming back for more, so that they may master new skills.

Learners are very skeptical and will resist



Thirty-five percent of Guild members totally or somewhat agree with this statement. Our recommendation to Guild members is to know your learners. For example, do you know how many of your learners are women? How many are under 30? Over 60? Do you know that they will embrace or reject game-based learning, or is it just a hunch?

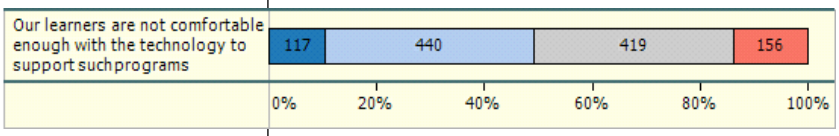
Our IT department will not support such programs



About 57% of Guild members agree with this statement. Indeed, if your ILS is technology intensive you may have trouble succeeding without the support of your IT department, but as we've seen in "Examples of Learning Games" on page 5, some great learning games do not ask for anything that is not already running

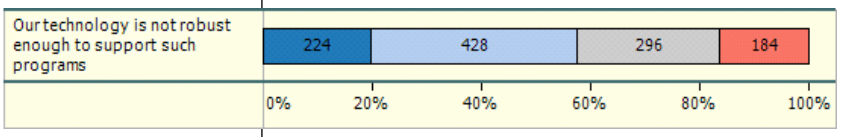
in most corporations. Notice the gender gap in Figure 30, as 62% of female members agree with this statement vs. 53% for male members.

Our learners are not comfortable enough with the technology to support such programs



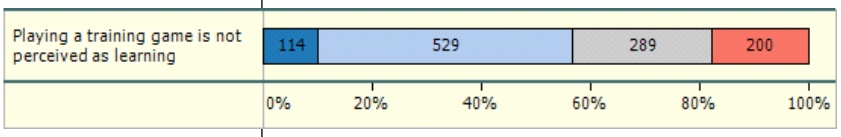
About 50% of Guild members agree with this statement, up from about 45% last year. Again, we ask Guild members to make sure that they know their learners, and to remember that a good learning game is more a matter of design than technology.

Our technology is not robust enough to support such programs



Almost 60% of Guild members agree with this statement, and if you believe an ILS requires a robust 3-D environ-ment with the hardware to match, then you may be correct. But, as Anne Derryberry explains in her essay "Debunking Myths about Serious Games" on page 109, a well-designed learning game does not require a 3-D environment with well-rendered avatars. If the system truly calls for it, and you have the budget, great; but there's a lot you can do to create an engaging experience without having to invest in new technology. Note the very large gender gap in Figure 30 where 51% of male members agree with this statement vs. 64% for female members.

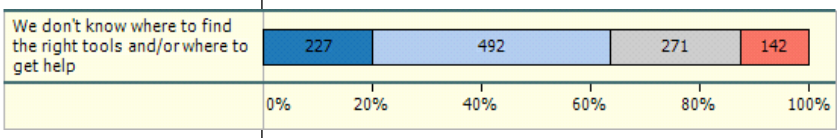
Playing a training game is not perceived as learning



Around 57% of Guild members agree with this statement, and it all goes back to our collective problems with the terms "game" and "fun." Indeed, despite my acceptance of the term "serious game," I can see why the thought of an FBI agent having "fun" playing a "serious game" in which the goal is to disarm a hostage crisis would put people off.

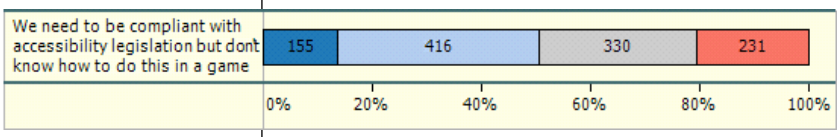
But if you substitute the term "Immersive Learning Simulation" for "serious game" and "engagement" for "fun" I suspect you'll be quite a bit more comfortable.

We don't know where to find the right tools and/or where to get help



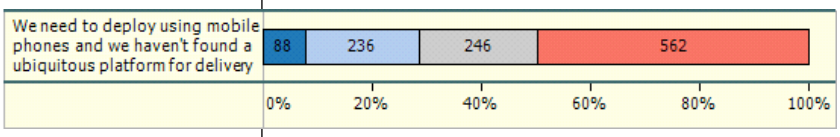
Just shy of 64% of Guild members somewhat or totally agree with this statement. Indeed, one of the reasons for producing this report is to address Guild members' efforts to find the right tools and resources. The somewhat flummoxed state of Guild members presents a strong opportunity for tool vendors and consultants.

We need to be compliant with accessibility legislation but don't know how to do this in a game



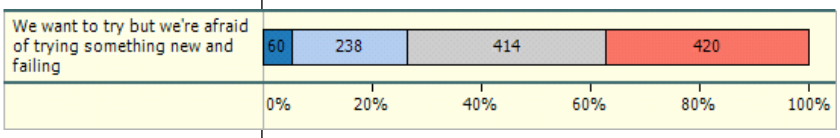
A slight majority of Guild members disagree with this statement, but this may because they are not far enough along with their investigation into ILS to consider this issue. As with integration with a LMS, vendors and consultants have made great strides over the last 12 months, and we suspect this will not present a major hurdle to those attempting to implement a ILS.

We need to deploy using mobile phones, and haven't found a ubiquitous platform for delivery



The slight increase here from the previous year (29% that agree this year vs. 25% last year, Figure 31) suggests that support for mobile learning initiatives is starting to be of greater importance to Guild members.

We want to try, but we are afraid of trying something new and failing



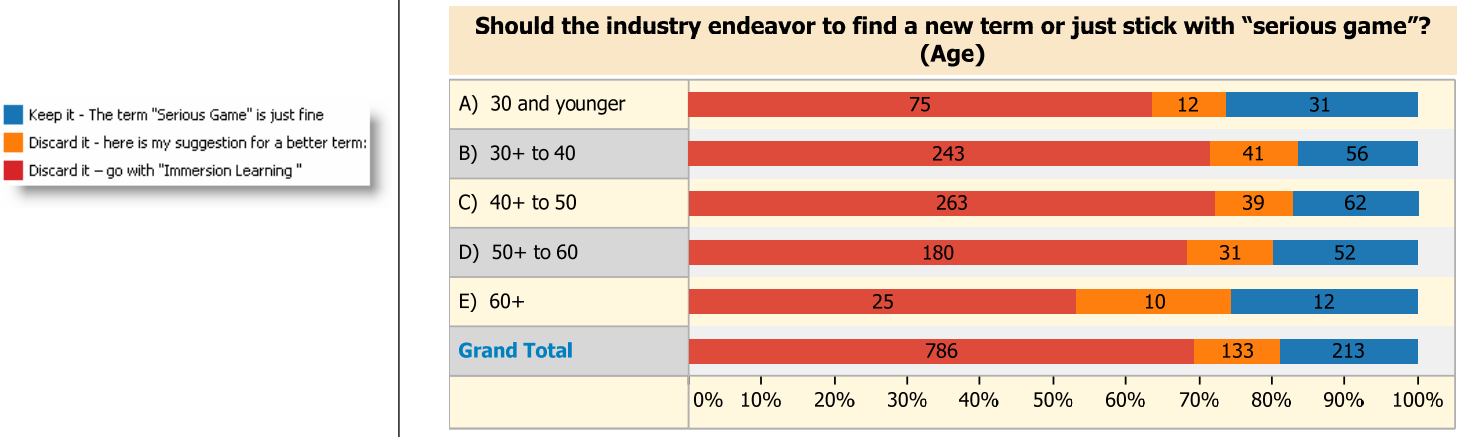
The vast majority of Guild members disagree with this statement, but, as we stated last year, we wonder if people are more afraid of failure than they want to admit. Both Kevin Corti in "Demystifying Immersive Learning Simulations – Moving From the Potential to the Practical" on page 121, and Clark Aldrich in his essay "The Top 13 Ways to Sell Immersive Learning Simulations to Your Organization"[8] address how to

[8] From the Guild's 2007 edition of this report. See http://www.elearningguild.com/research/archives/index.cfm?action=view&frompage=1&StartRow=1&MaxRows=40&selection=doc.30.

deal with the emotional and funding issues of attempting something new and unproven.

Should the Industry Find a New Term

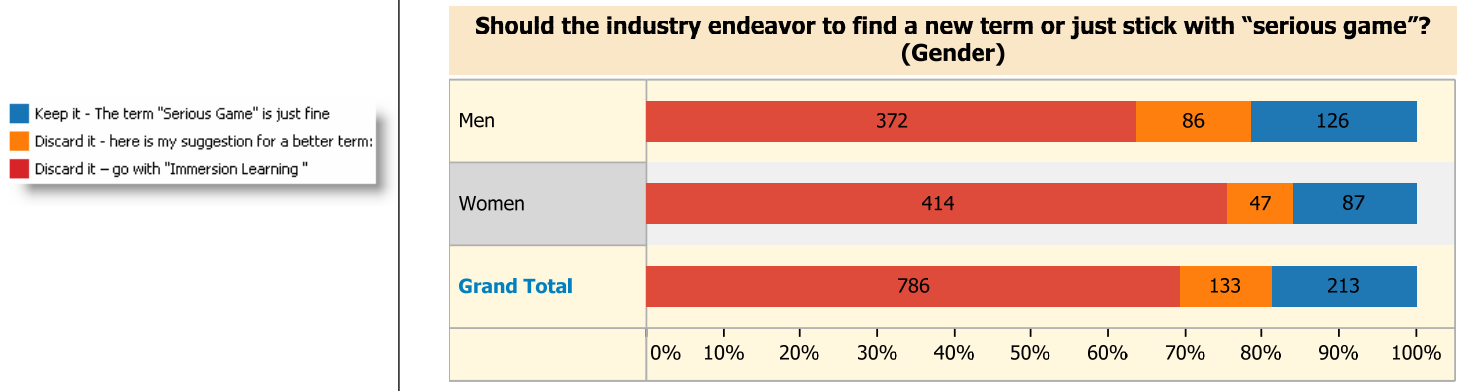
Breakdown by age



Source: The eLearning Guild Research

Figure 33 – Guild members' attraction and antipathy towards the term "serious games," broken down by age. The youngest and oldest Guild members dislike the term less than other members do.

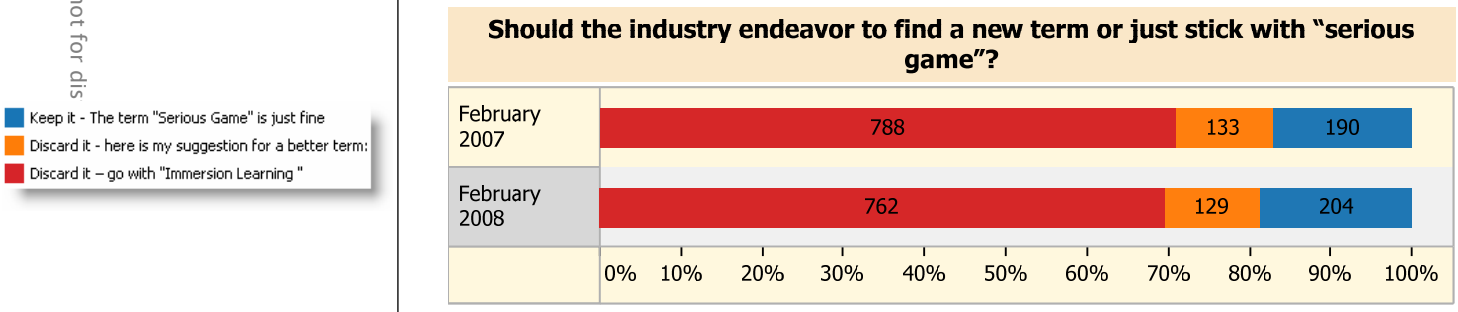
Breakdown by gender



Source: The eLearning Guild Research

Figure 34 – Attraction and antipathy towards the term "serious game," broken down by gender. Neither group cares for the term, with only 22% of men and 16% of women showing approval.

Trends



Source: The eLearning Guild Research

Figure 35 – Attraction and antipathy towards the term "serious game" comparison between this year and last year. Guild members have shown an ever-so slight willingness to embrace the term, going from 17% to 18.5%.

Analysis

We've already covered this issue *ad nauseum* elsewhere in this report, but it is this overwhelming, visceral reaction to the term "serious game" that prompted the Guild to suggest using the term Immersive Learning Simulation, as a corporate-friendly "Trojan Horse" for getting the modality in the door (see "Name Game Nonsense" on page 151.)

As for members' ideas for alternative terms, here are some of the suggestions we received:

- Experiential learning;
- Cognitive learning;
- G-Learning;
- Reality Learning; and,
- We label things too much; just call it "training" or "learning" – as anything more just confuses the issue needlessly.

What is the Most You Could Spend Per Employee to Train the Entire Organization?

Note: The full text of the entire question presented in the survey is "If you had a great portfolio of serious games that had a strong ROI, and the more expensive program had an even better ROI, what is the most you could spend per employee to train the entire organization?"

If you ponder this question, and think, "Gee, this seems to be a trick question," you are correct, as the answer is already *in* the question: The more expensive program yields a better ROI.

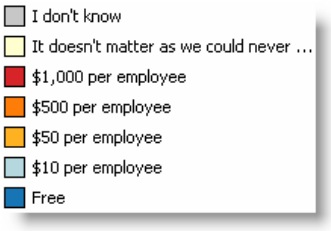
So, why did so many Guild members not choose the more – let alone, most – expensive program, given that it's guaranteed to give a larger return on investment? Perhaps Guild members thought that there were not enough funds in their organization to allow a large initial per-learner investment.

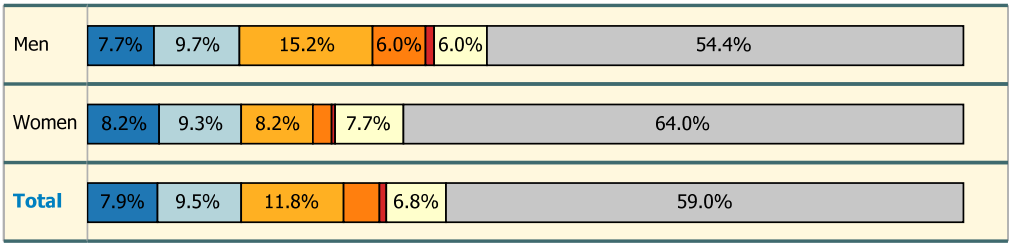
We suspect there is a disconnect between how some Guild members think about developing learning programs, and how they think about return on investment and measuring things that add value to their organizations. Indeed, this was the crux of *The eLearning Guild's 360° Report on Measuring Success*, as we found that many Guild members could not, in fact, show that their learning interventions benefited their organizations.

Let's explore the responses to this question in detail.

Breakdown by gender

12) If you had a great portfolio of serious games that had a strong ROI, and the more expensive program had an even better ROI, what is the most you could spend per employee to train the entire organization? (Gender)





Source: The eLearning Guild Research

Figure 36 – The most Guild members can spend, broken down by gender.

In Figure 36, you will notice the significant difference between the number of men who answered "I don't know," and the number of women (54.4% vs. 64%). Why are so many people putting up their hands in uncertainty? Why do a much larger percentage of women do this? This is something that Guild Research will address in the coming year, but it suggests that Guild members are more comfortable with the "learning" part of the "learning business" than they are with the business part.

Breakdown by gender (excluding "I don't know")

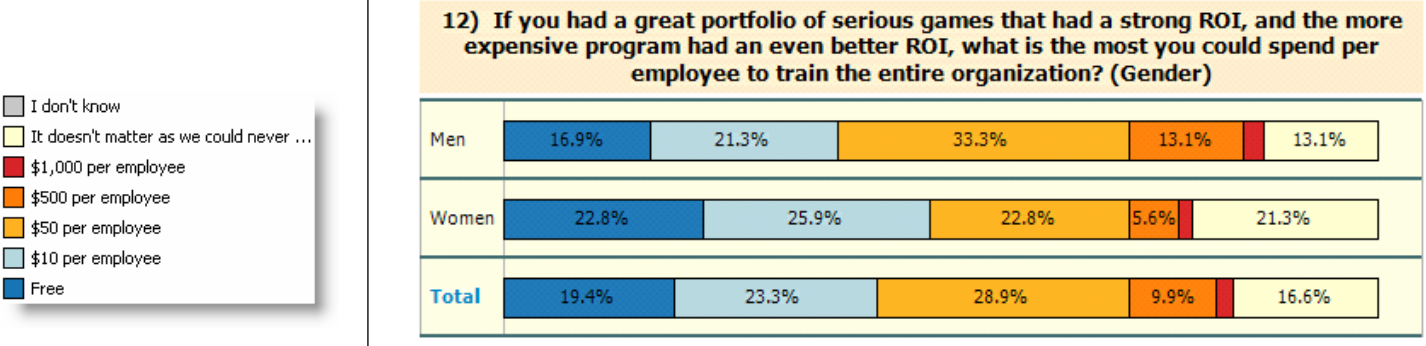
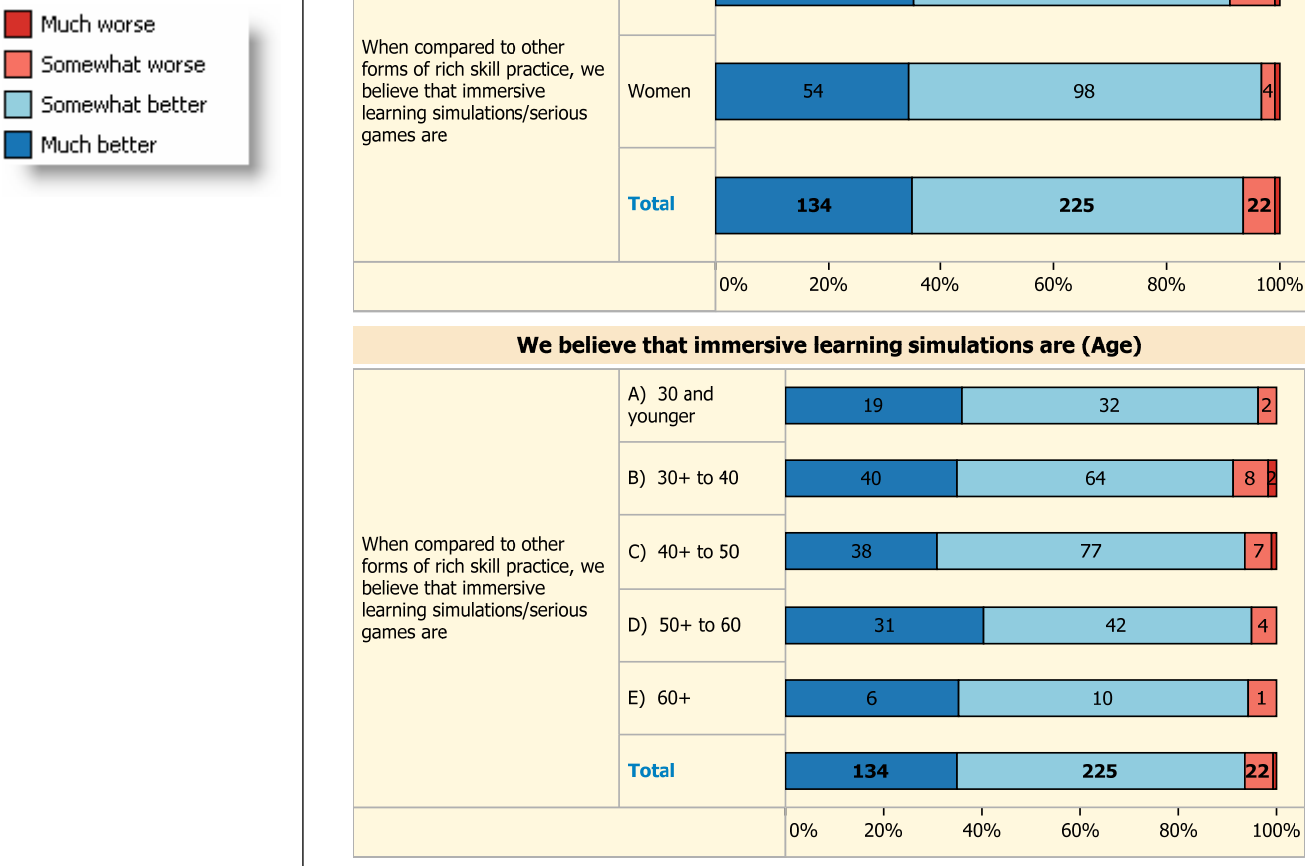


Figure 37 – The most Guild members can spend, excluding "I don't know."

In Figure 37 we filter out the "I don't know responses," and the difference between responses from men and women are even more pronounced with 44.1% of women gravitating towards "free" and "it doesn't matter as we could never do it," vs. 30% for men. Men are also more comfortable spending larger amounts, with approximately 48% willing to spend $50 or more per learner vs. 31% for women.

Note that other variables are the same, in that company size, education, job level, and purchasing authority split equally among men and women.

When Compared to Other Forms of Rich-skill practice, We Believe that Immersive Learning Simulations or Serious Games are

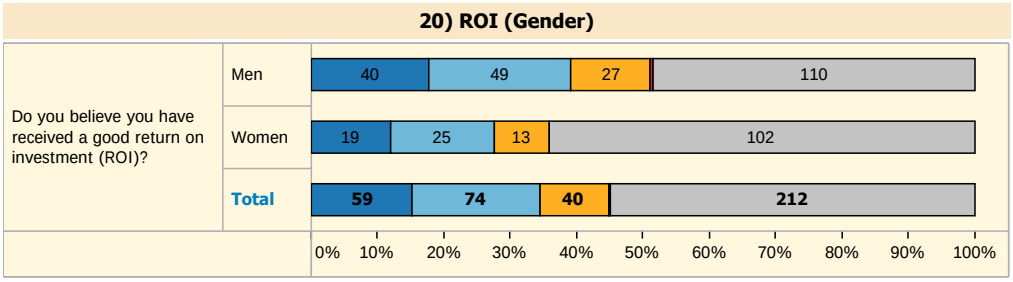


Source: The eLearning Guild Research

Figure 38 – The Guild members who have created an ILS weigh in on their effectiveness.

Guild members looking for ammunition in support of ILS need go no further than Figure 38. Here we asked Guild members who have created ILS or Serious Games to compare the effectiveness of an ILS with other forms of rich-skill practice. Of the 384 Guild members who answered this question, 93.4% rate ILS or Serious Games as being somewhat better or much better than other forms of rich-skill practice.

Do You Believe You Have Received a Good Return on Investment (ROI)?



Source: The eLearning Guild Research

Figure 39 – Guild members indicate whether they believe they received a good ROI on their investment in ILS.

As we've seen previously, and as we studied in depth in *The eLearning Guild's 360° Report on Measuring Success*, Guild members are somewhat flummoxed when it comes to determining whether a learning program had produced a return on investment. Indeed, more than half of the respondents indicate that it's too early to tell, or that they do not know.

But, of the 47% of Guild members who did provide an answer, the ROI results are high, with 76.4% reporting a very good or modest ROI.

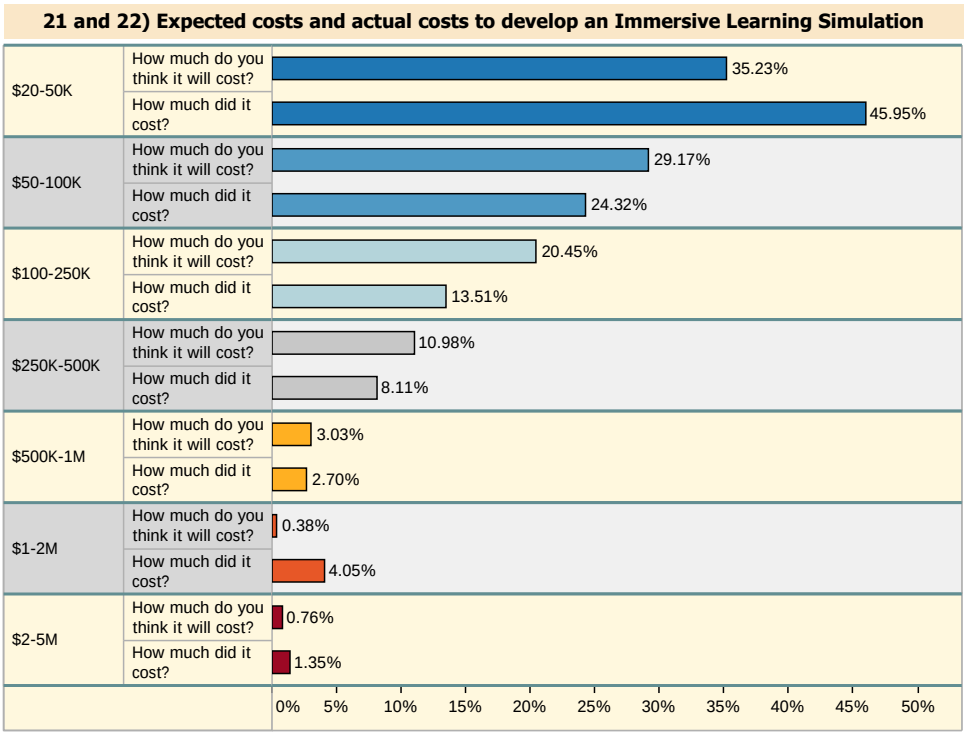
Expected and Actual Costs to Develop an Immersive Learning Simulation

We added two questions to the survey this year:

1. What would you expect the cost would be to develop an Immersive Learning Simulation or Serious Game that addresses a workplace skill-practice issue?
2. If you've developed an Immersive Learning Simulation or Serious Game, what was the number of learners impacted, and what was the budget?"

In Figure 40 we compare anticipated costs with actual costs. In the first questions, we did not tell Guild members how many learners would be involved, or the depth of the ILS that was to be developed. Our goal was to probe Guild member perceptions.

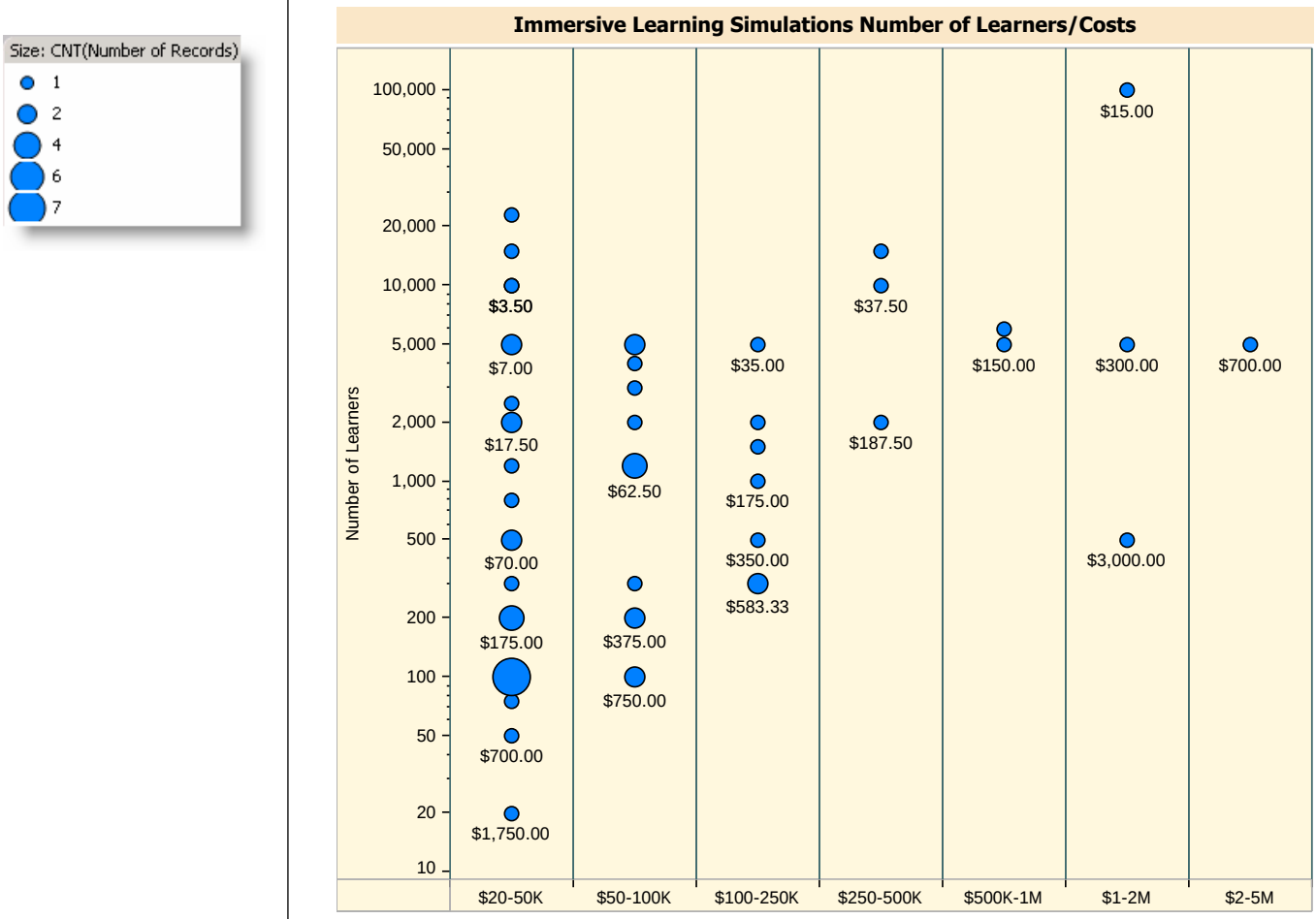
For the most part, Guild members believe that an ILS will cost more than it actually costs.



Source: The eLearning Guild Research

Figure 40 – Expected vs. actual costs for ILS implementations. Two hundred sixty-four Guild members answered the "How much do you think it would cost?" part, and 74 members, who have actually created an ILS, answered the second part.

In Figure 41 we plot the actual costs reported by Guild members against the number of learners using the ILS. Notice that the vast majority of projects fall into the $20-50K and $50-100K range.



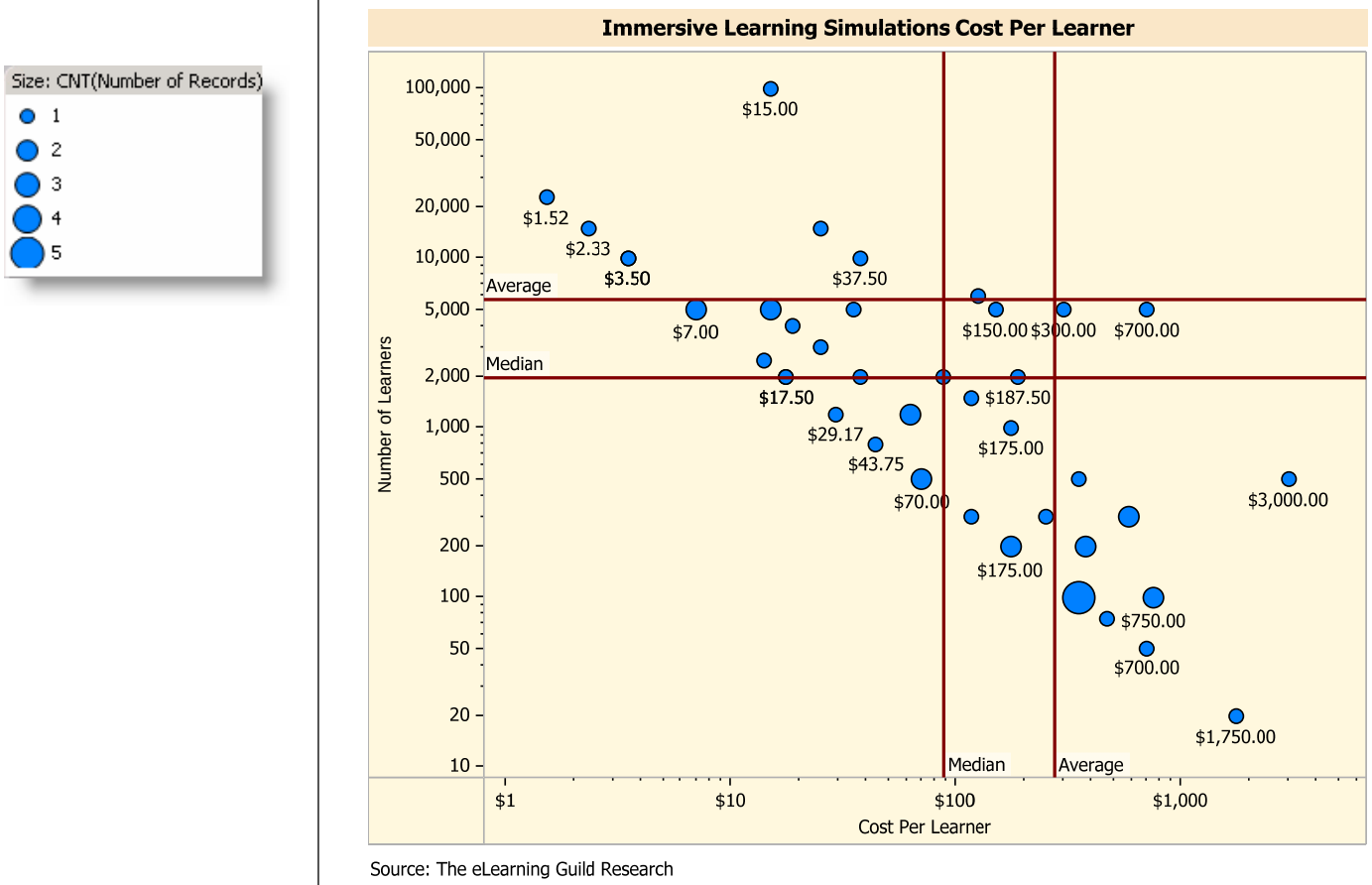
Source: The eLearning Guild Research

Figure 41 – Actual costs plotted against number of learners. Notice that the vast majority of projects fall into the $20-50K and $50-100K buckets, and that even the $2-5M project had a relatively modest $700 per learner cost.[9]

[9] The $700 per learner cost is derived by taking an average cost of $3,500,000 (the average of $2M and $5M) and dividing it by the number of learners (5,000)

In Figure 42 we see a scatter plot diagram that shows cost per learner plotted against number of learners. The median number of learners is 2,000, and the average number of learners is 5,787. The median cost per learner is $87.50, and the average cost per learner is $273.88.

Note that we asked Guild members for a specific number of learners, but we officered them different cost ranges ($20-50K, $50-100K, $100-250K, $250-500K, $500K-1M, $1-2M, $2-5M). In calculating the cost per learner, we took the average of the cost range (e.g., $35K for $20-50K, $75K for $50-100K, etc.)



Source: The eLearning Guild Research

Figure 42 – Scatter plot diagram showing Cost per Learner on the x-axis and Number of Learners on the y-axis.

Which of the Following Do You Use or Implement?

Breakdown by age

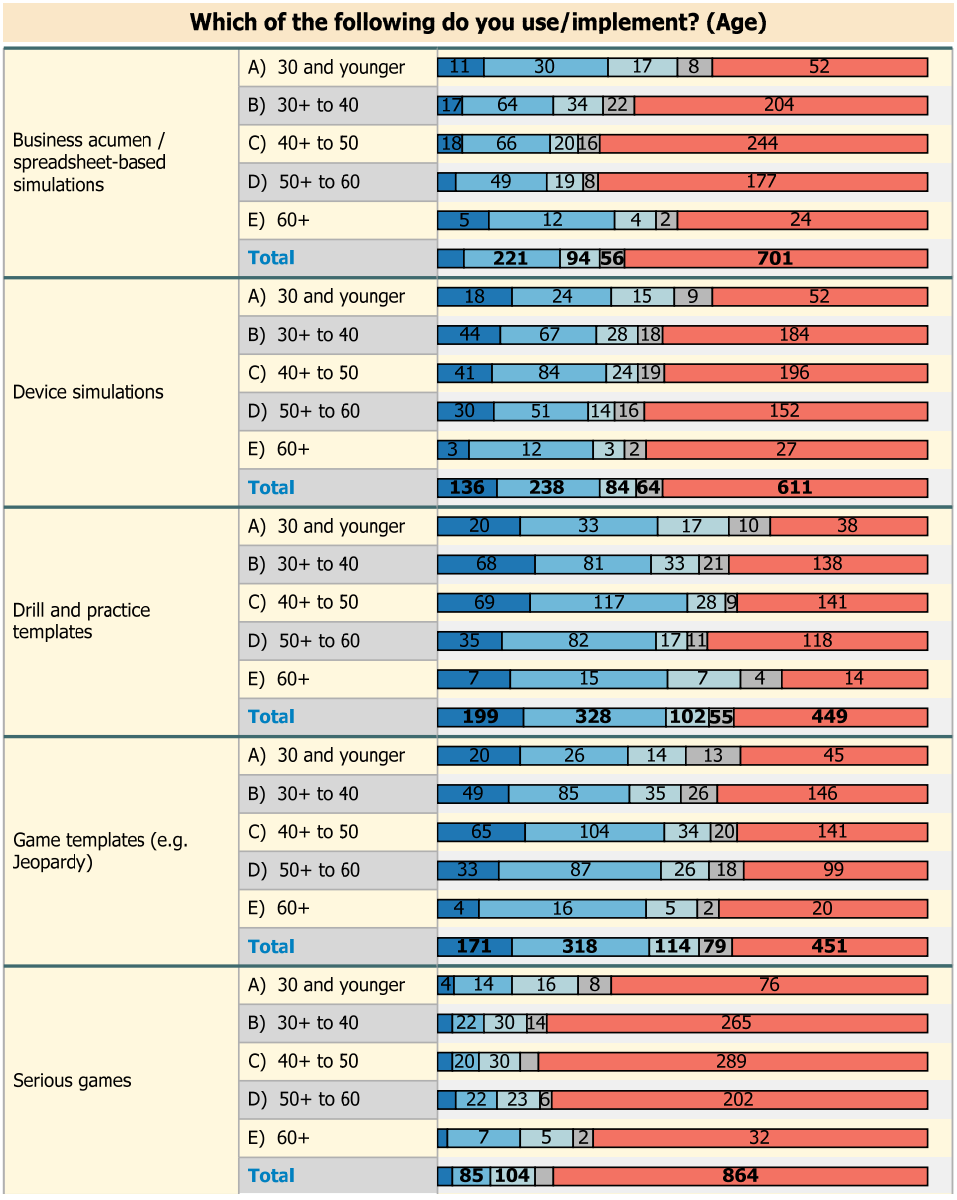


Figure 43 – Drilling down into specifics on Guild members' use of various simulation and game learning approaches, broken down by age (continued, below).

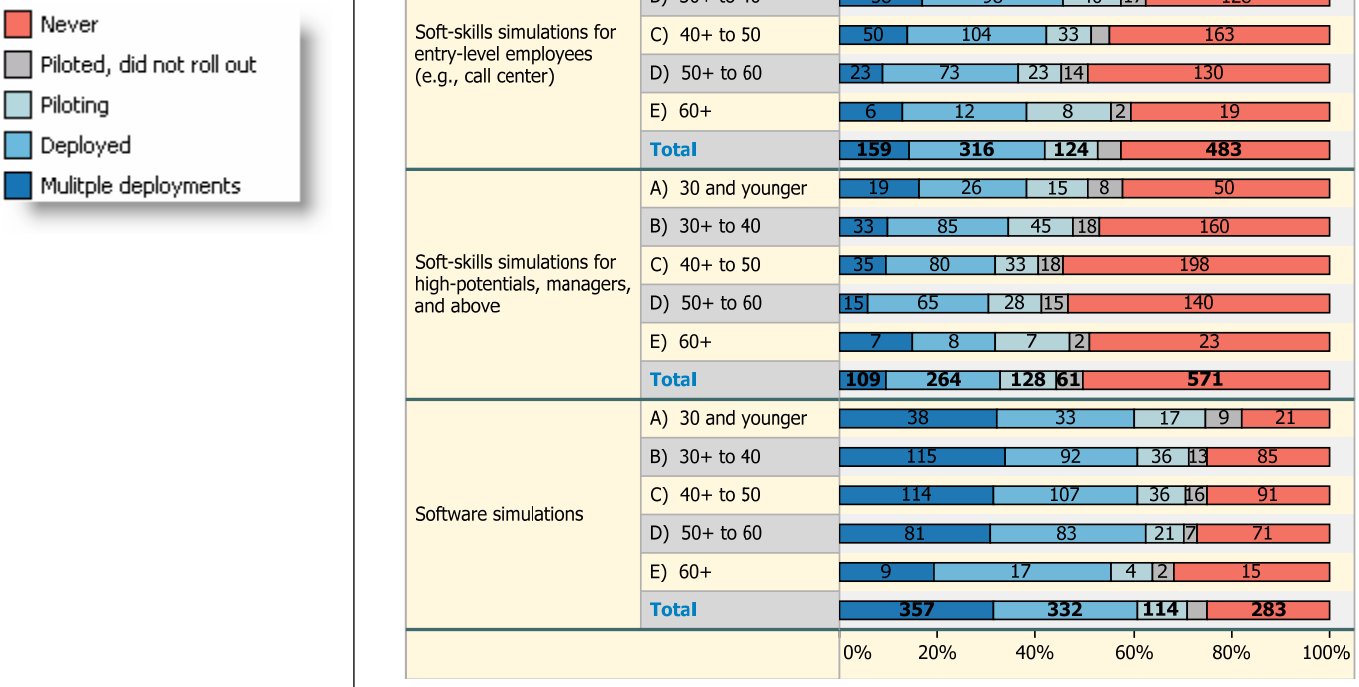


Figure 44 – Continuation of specifics on Guild members' use of various simulation and game learning approaches, broken down by age.

Breakdown by gender

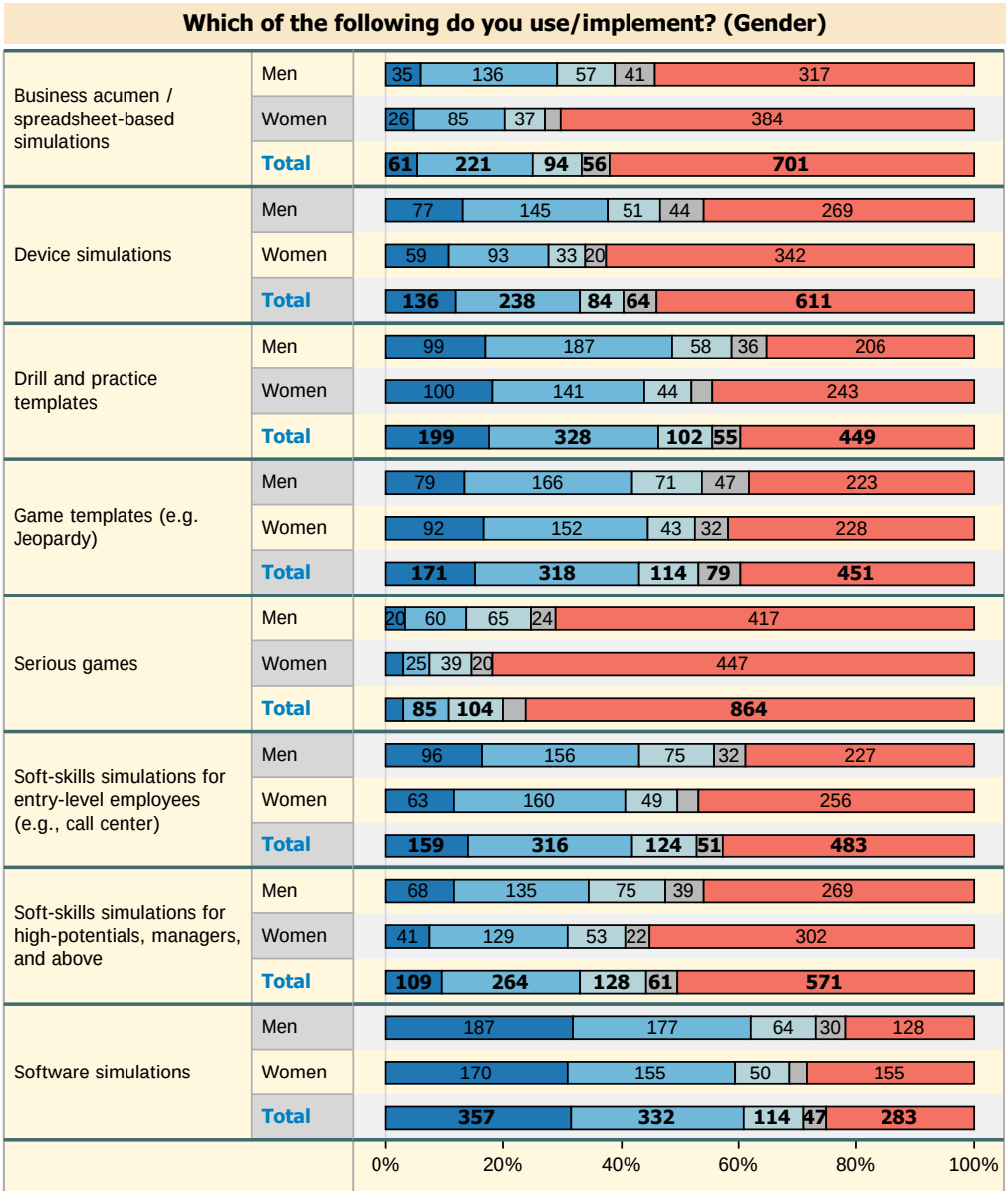
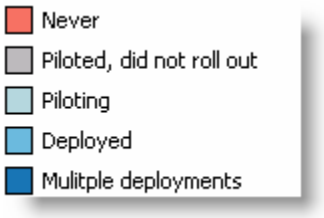


Figure 45 – Specifics on Guild members' use of various simulation and game learning approaches, broken down by gender.

Trends (all respondents)



Which of the following do you use/implement?

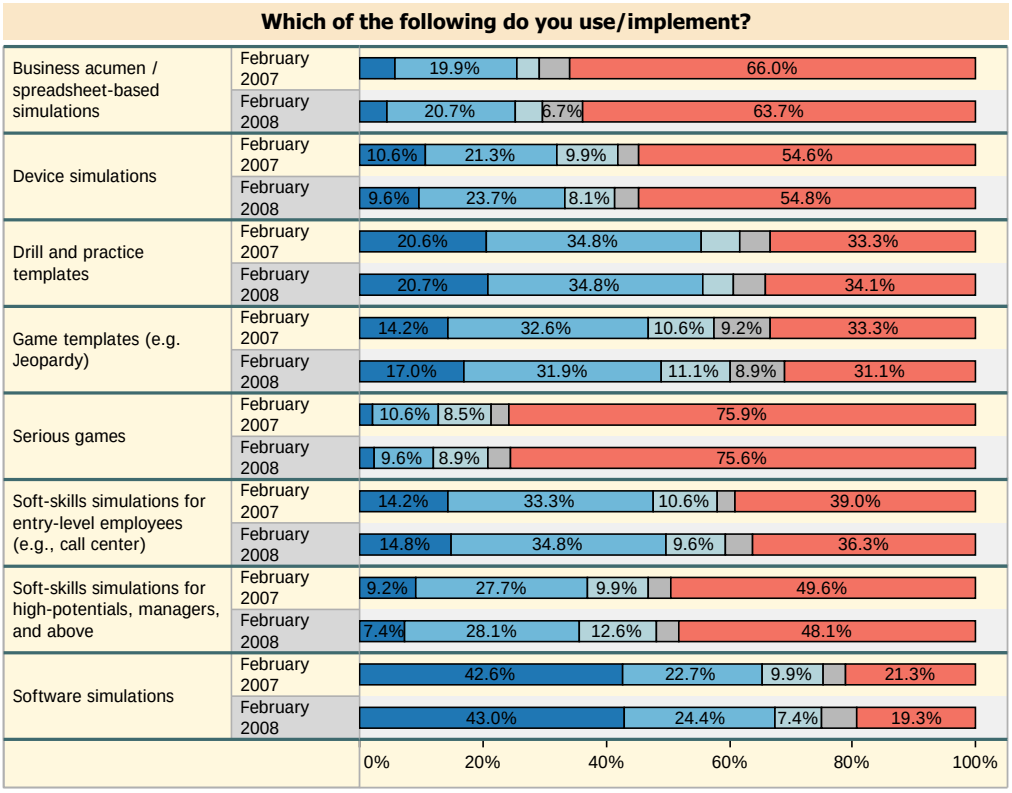
		Never	Piloted, did not roll out	Piloting	Deployed	Mulitple deployments
Business acumen / spreadsheet-based simulations	February 2007	61.7%		7.6%	18.6%	8.6%
	February 2008	62.0%		8.1%	19.7%	
Device simulations	February 2007	52.5%		7.7%	22.8%	12.5%
	February 2008	53.5%		7.6%	21.1%	12.1%
Drill and practice templates	February 2007	34.4%		7.7%	31.8%	21.8%
	February 2008	39.2%		9.0%	29.0%	17.9%
Game templates (e.g. Jeopardy)	February 2007	39.2%	7.2%	9.8%	28.5%	15.2%
	February 2008	40.0%	7.1%	10.0%	27.9%	15.0%
Serious games	February 2007	77.3%			8.3%	8.0%
	February 2008	76.4%			9.1%	7.5%
Soft-skills simulations for entry-level employees (e.g., call center)	February 2007	39.7%		11.0%	27.3%	17.3%
	February 2008	42.3%		10.9%	28.1%	14.1%
Soft-skills simulations for high-potentials, managers, and above	February 2007	48.9%		10.2%	23.1%	12.6%
	February 2008	50.5%		11.1%	23.4%	9.6%
Software simulations	February 2007	22.8%	9.2%		29.4%	34.2%
	February 2008	24.9%		10.0%	28.9%	31.9%

0% 20% 40% 60% 80% 100%

Source: The eLearning Guild Research

Figure 46 – Year-over-year comparison on specific approaches to simulations and games.

Trends (members who completed the survey both years)



Source: The eLearning Guild Research

Figure 47 – Year-over-year comparison of simulation and game specifics for 150 Guild members who took the survey in early 2007 and updated it the survey in early 2008.

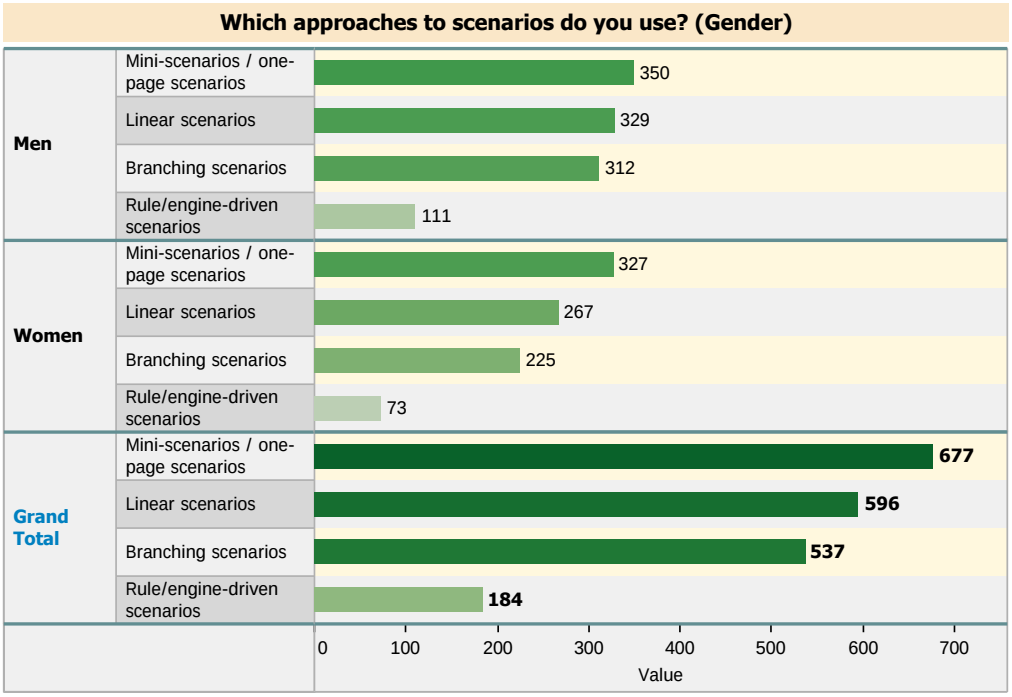
Analysis

As with many of the other items we've explored, in this question we see that the youngest and oldest members do more in all areas, and that women are slightly more conservative than men in the adoption of certain approaches to games and simulations.

In Figure 46 we see what appears to be a downward trend by Guild members towards utilization of various simulation and game modalities (with the exception of serious games, which enjoys a slight up-tick). This is not surprising, given that we've already noted that survey respondents this year are somewhat more conservative than the members who completed the survey between December 2006 and February 2007. However, in Figure 47 we compare responses from 150 Guild members who first completed the survey in early 2007, and

then updated it in early 2008. Here we see a slight up-tick in every area except "Drill and practice templates" and "Device simulations."

Which Approaches to Scenarios Do You Use?



Source: The eLearning Guild Research

Figure 48 – Approaches to scenarios, broken down by gender. The harder it is, the fewer people you have doing it.

It's no surprise to see the numbers decrease as the skills and time required increase. (Rule or engine-driven scenarios are more complex than branching scenarios, which are in turn more complex than linear scenarios, etc.)

For the e-Learning Simulations and Games You *Design*, How Much is…

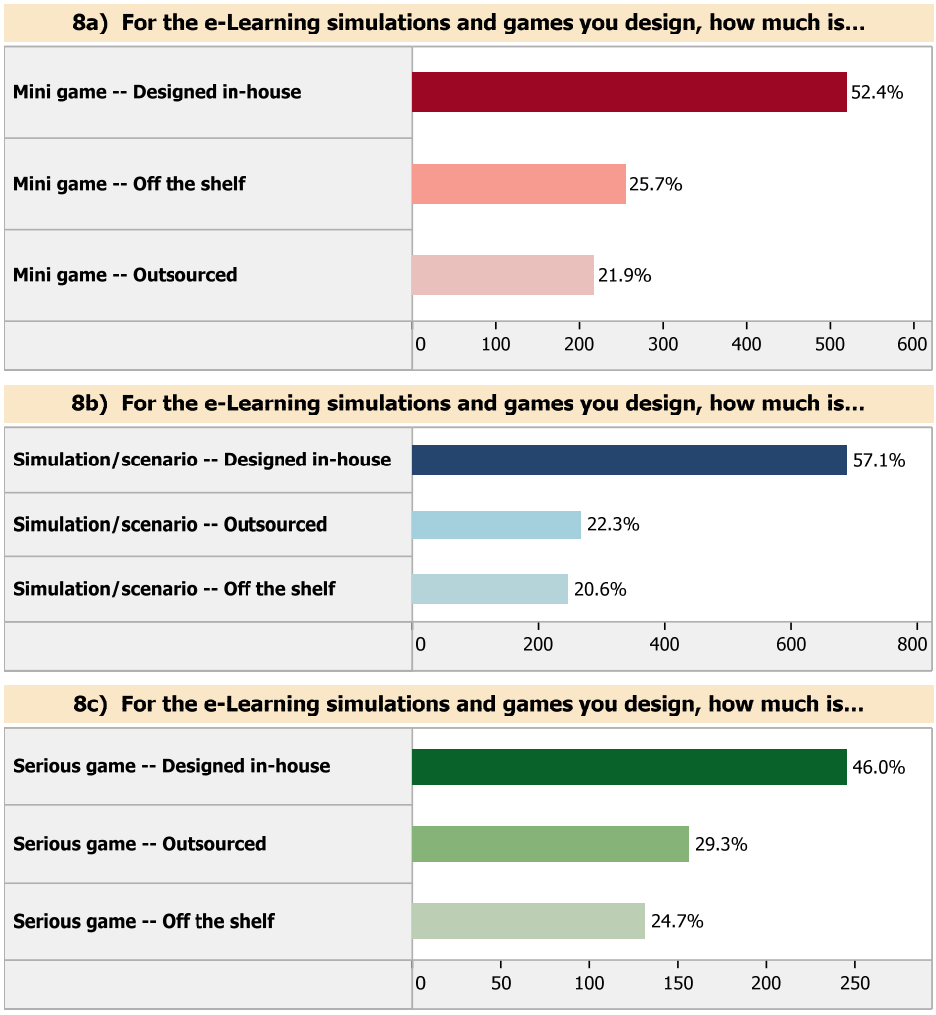


Figure 49 – Comparison of off-the-shelf, in-house, and outsourced simulation and game design.

For the e-Learning Simulations and Games You *Implement*, How Much is…

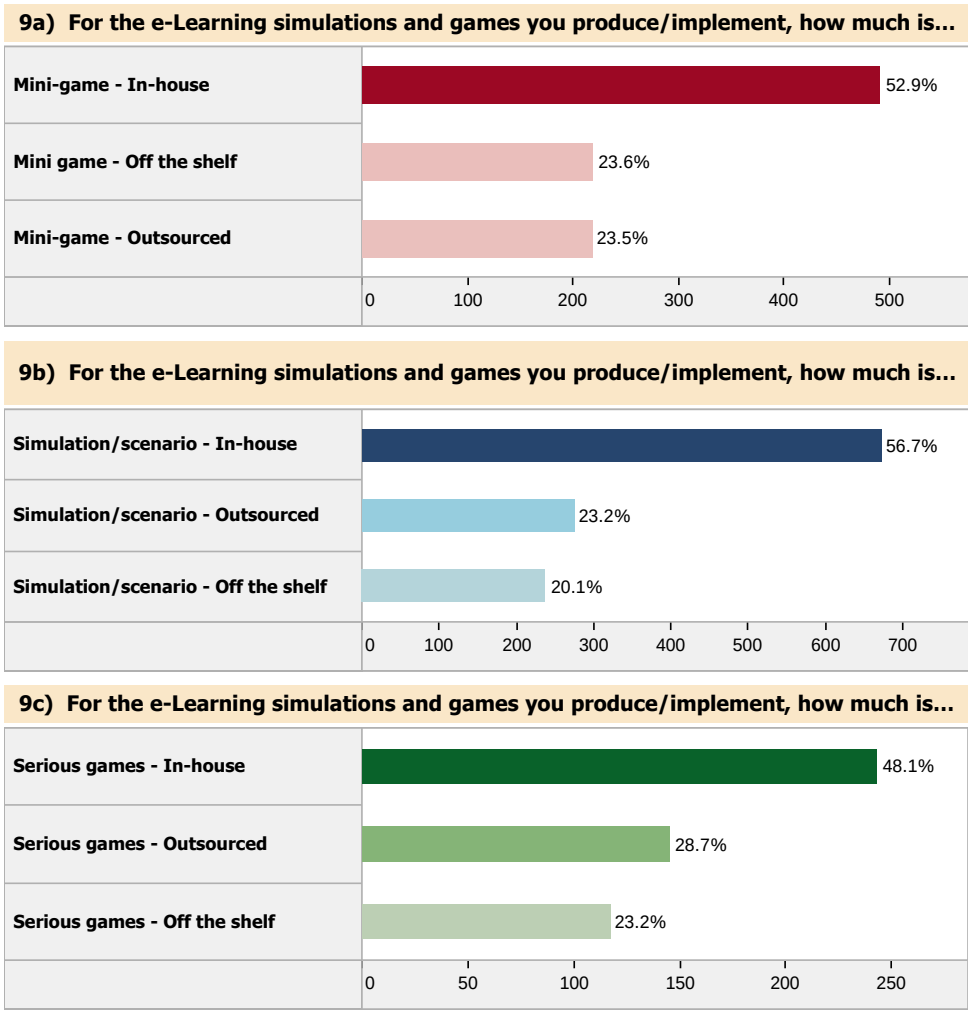
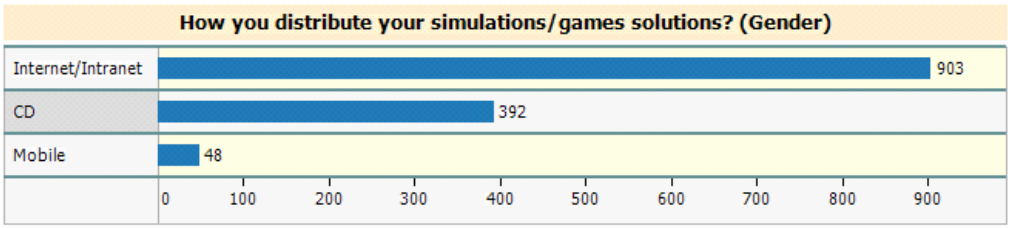


Figure 50 – Comparison of off-the-shelf, in-house, and outsourced simulation and game implementations.

In Figures 49 and 50, we compare frequency of off-the-shelf, in-house, and outsourced design and implementations. We're not surprised to see simulations and scenarios enjoying more in-house design and implementation, as Guild members are both more familiar with, and deploy this approach more often than, mini-games and serious games.

How Do You Distribute your Simulation or Game Solutions?



Source: The eLearning Guild Research

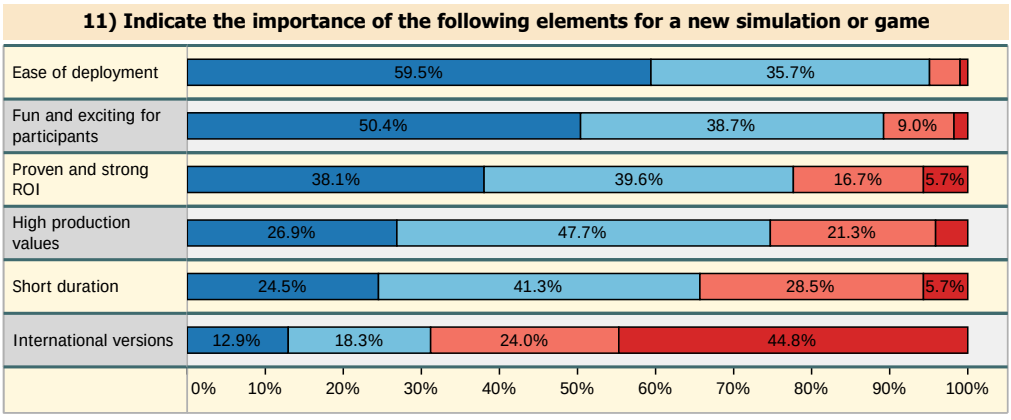
Figure 51 – Ways members distribute their solutions.

The large number of members indicating they use CD or DVDs may surprise some Guild members as we all move into a very Web-centric world, but there are some good reasons for this. First, many simulations and games people are developing are designed for an individual, not for a group. That is, these games and simulations do not require that several people all be online at the same time.

The second reason is that many games and simulations are designed to run on devices that are not connected to the internet.

Indicate the Importance of the Following Elements for a New Simulation or Game

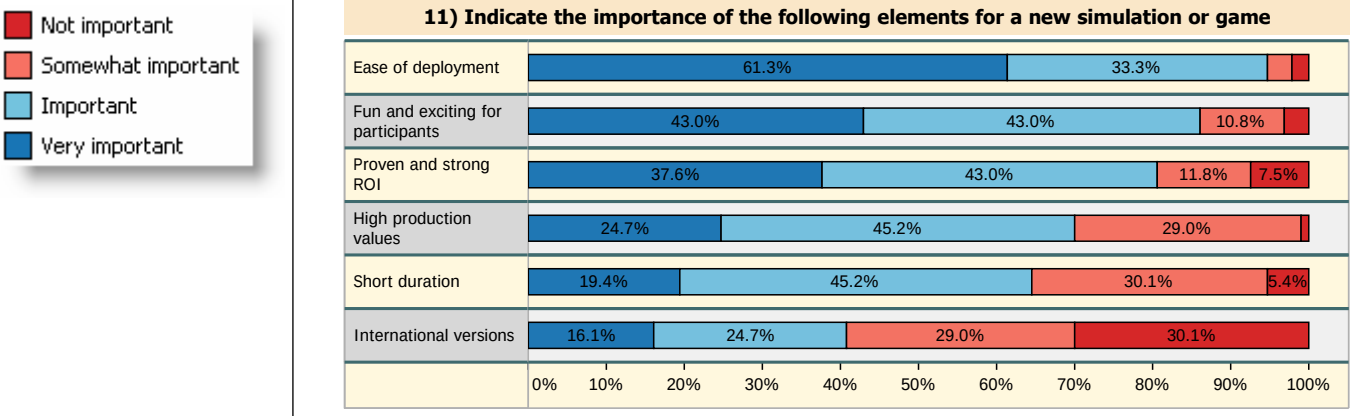
All respondents



Source: The eLearning Guild Research

Figure 52 – Guild members tell us what is important, based on 1,133 responses for members who work in all organizations.

Members working in very large corporations



Source: The eLearning Guild Research

Figure 53 – Guild members working in very large corporations share the same ranking as those in all organizations, but with different emphasis (based on 93 responses from members who work in corporations with more than 50,000 employees.)

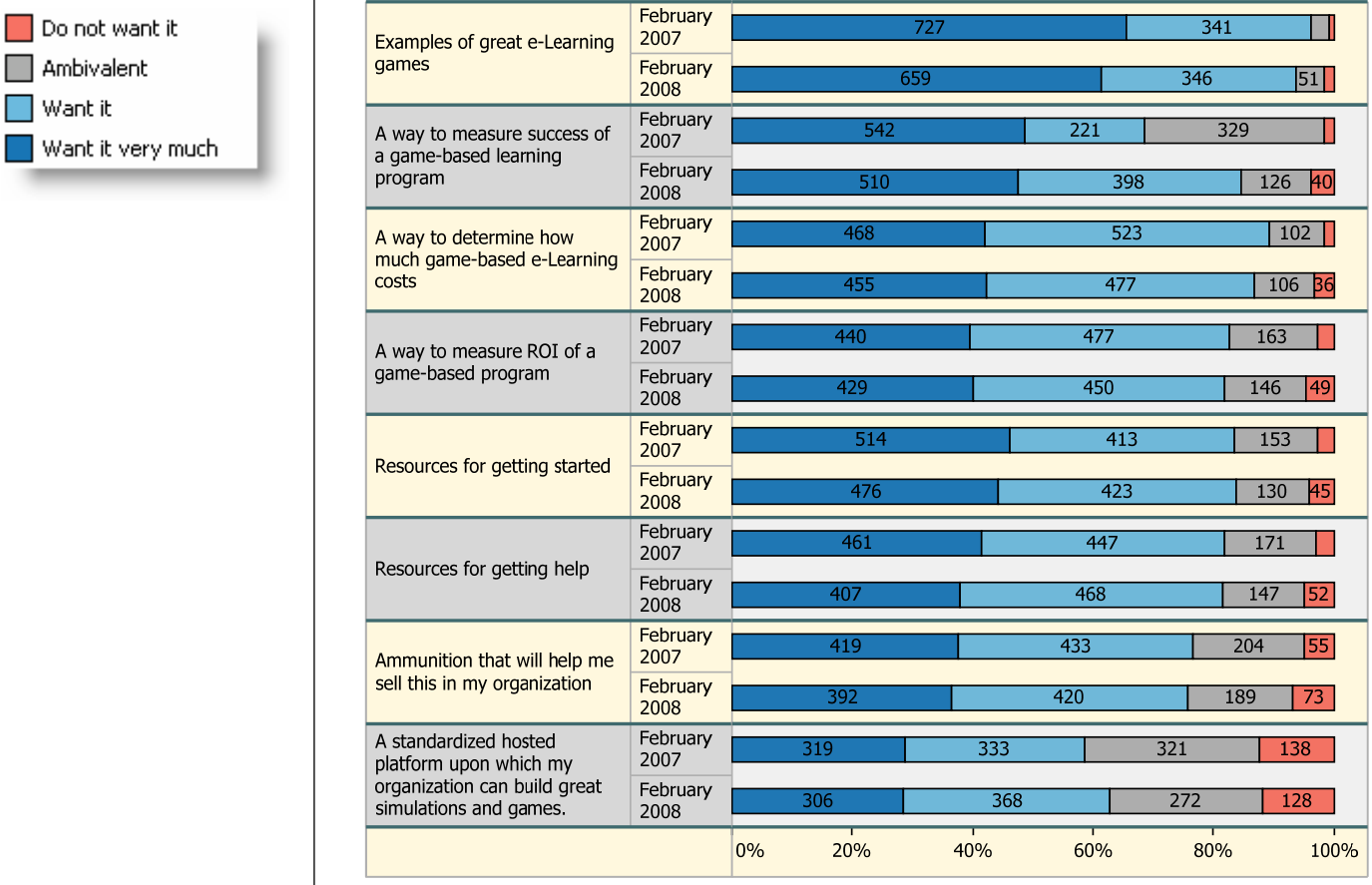
With the exception of "International versions," it appears that everything is important to Guild members, with "Ease of deployment" and "Fun and exciting for participants" leading the way (see Figure 52).

In Figure 53 we filter results to just show responses from members working in corporations (vs. educational or government institutions) with more than 50,000 employees. Notice the increase in importance of International versions from 31% to 41%. This is not surprising, as most very large corporations need to appeal to an international audience of learners.

Please Indicate Which of These Things You Would Like to Have, and How Much You Want it

Trends

13) Please indicate which of these things you would like to have, and how much you want it.



Source: The eLearning Guild Research

Figure 54 – What members want and how much they want it (year over year).

As we stated last year, we hope tool vendors and solution providers are looking at this, because Guild members are making it clear what they want and need. Certainly, the Guild is trying to step up to the challenge by providing resources, examples, and ammunition that will help sell it to member organizations.

Notice the small up-tick in Guild members' desire for a standardized hosted platform upon which they can build great simulations and games. It's abundantly clear that Guild members do want to try to embrace ILS, but they don't know how to do so. This presents a tremendous opportunity to the tool vendors

and service providers: If you can come up with a way to make it easy for Guild members to create an ILS, Guild members will beat a path to your door.[10]

Member Comments

As with previous surveys, some of the most enlightening information comes from Guild member feedback.

Here are some Guild member comments.

More problems with the term "game"

- *Find a name that doesn't scare management or sound too much like edu-speak. I like "Serious Game" but it takes too much explanation and the word "game" scares people who write the checks. In Europe, they use GBL or Game Based Learning, which I think is a little easier to understand. If you're planning a comprehensive sell of the concept, it would be nice if everyone spoke the same language and used the same term.*
- *I find it difficult to convince clients and organizations to adopt interactive games into their e-learning package, as they don't want to trivialize the learning. I think if it were possible to build a list of benefits of game play on online packages that would be fantastic. i.e. user interaction, length of use, attention span, etc.*
- *Legal and compliance are the biggest concerns in my environment. If these can be ensured and proven, it would be an easier sell to management. And the question about the perception of the word "game" is a big concern here: Too many interpret that to mean non-value-added play, so we need to show positive impact (level 4 or ROI) of any intervention we provide.*
- *Our client base is skeptical about the whole concept, and wary of people spending hours "playing games instead of working."*
- *The term "game" will never be accepted in all facets of e-Learning, and could potentially discredit individuals trying to promote it.*

[10] This is not a trivial undertaking, for as Kevin Corti points out in his essay "Demystifying Immersive Learning Simulations – Moving From the Potential to the Practical" on page 121, developing an ILS or Serious Game is much more like a software development project than it is a content development project. Nevertheless, we do expect to see some vendors rise to the challenge and come up with tools that make ILS creation easier.

- *My target audiences are HR professionals and Payroll or Financial professionals. We do simulations with our software, but we have found that electronic game playing is not widely acceptable among the students. They do not want to pay for what is perceived as a game, rather than what is perceived as "real learning."*
- *Working in Healthcare, I am having a very difficult time convincing people (including instructional designers in our organization) of the value of gaming strategies in education. What I'm hearing on the topic is "Doctors won't use or don't want games" and "How can we implement games in a highly-regulated environment like healthcare?" I'd like to see some resources for how to address these concerns. There is also a perception that gaming introduces too much levity for a serious business.*

Games are good

- *Games keep learners involved, and provide a great way to make courses interactive.*
- *Gaming is an integral part of our mid-term assessments. Our learners aren't aware that we're testing their knowledge. The only drawback we've seen is the differing levels of competitiveness with the learners that can cause some strain.*
- *Gaming is the future of learning – the younger generation will demand it ...*
- *I played "Jeopardy" with a very small department that had before been totally against games. The director loved it so much that he used it the next afternoon with a 18-40 person group to explain how his department operated. The group LOVED it and wanted more. Small steps ...*
- *I think gaming or simulations are becoming a great tool for IDs to use in their training for learners. Learners like to be active in their learning, as it makes the learning more engaging and they remember better.*
- *We've developed games in Authorware and Flash. Learners almost always give us rave reviews and say how much they like the training compared to the more traditional earlier approaches, particularly for tedious topics like regulatory compliance. We find that the greatest resistance comes from sponsoring internal clients. They often feel that games are not serious enough to use in corporate training. They sometimes are*

more focused on putting training out there, than they may be about ensuring the training is good.

It's the substance that matters

- *I think there are some great ideas floating around for serious games, but there's also a ton of hype around the subject. I hope we start seeing more-practical examples, and less of the full-blown super-expensive simulations. We have to keep in mind that the experience counts, not the flashy slick interface and special effects.*
- *Simulations and games have come a long way in the last five years or so, but still have yet to live up to their promise. I think this is due in part to skepticism of simulations as learning tools, as well as developers trying to mold simulations into tools that they are not. I'm of the opinion that simulations and games are best used to reinforce learning, not present new material, although there are certainly exceptions to this rule.*

Games are a distraction

- *I believe games are a distraction from learning, and as such reduce precious time available for the student. Check out Ruth Clark's book "The New Virtual Classroom" She cites references to back up the idea that games do not have a positive impact for learners. Based on my (admittedly anecdotal) experience, I agree.*

Dr. Ruth Clark Responds:

> *Asking whether games are useful for learning is not a meaningful question. It's kind of like asking whether e-Learning is useful for learning – it depends on the learning goal and the design features of the game. Research on games is quite new, and I do describe two games that depressed learning because they included design features (twitch games) that were counter-productive to learning, and which distracted learners from reflective processing.*

Editor's Note: Dr. Clark has a chapter on simulations and games in the second edition of her book *e-Learning and the Science of Instruction*. But, as I'm sure she would agree, do not condemn the entire genre because of some poorly-designed games. I've had some dreadful virtual classroom experiences, but I know, when properly designed and delivered, simulations and games are wonderful.

The Impracticable and the practicable

- *Here in Australia, it is difficult to find software developers with a proven track record in the development of successful immersive learning. Our board has a very traditional view of learning and development, and although we have recently implemented a very successful online learning program, they are not yet ready to take what they see as a gamble on more complex products. Such a move would also necessitate upgrading much of our IT infrastructure, adding to the cost of a roll out.*
- *I think the technology is cool but expensive, and tough for my leaders to buy into.*
- *Just a comment that simulations have great appeal in our organization; the challenge is the ability to develop the content (simulations). The authors are instructors or SMEs who do not have the skill set to develop the simulations, and the cost to contract out is beyond many of their budgets. One solution is applications like Captivate – great tool.*
- *"We do only externally-focused, online, and instructor-led software training for our clients. Low cost, ease of development, and high turnaround are key. Most software simulations we create are updated or recreated 1-2 times yearly. Because of our client needs, any gaming we use would have to be extremely brief, simple, and highly focused on the topic.*

Create a repository of examples

- *I would like to see the eLearning Guild help to better define the differences between different types of games and simulations. I believe that a great deal of the confusion is due simply to terminology and definitions. If there were a repository for game and simulation examples that everyone could reference in discussing projects (either internally or with vendors) I think we could much better manage expectations on both sides with an "encyclopedia" of examples we could all refer too.*

Give us tools, not consultants

- *Ideally we want relatively simple tools, so that we can build our own games and simulations – NOT services and consultants to build them for us.*

Lot's of progress

- *Our major client is starting to come around! We should be able to make some great strides this year, regarding things like funding to develop games, simulations, and mobile solutions being part of the budget… finally.*

No Progress

- *We don't seem to have made much progress over the last year! Still keen on developing and deploying serious games, but it's proving much more difficult and expensive than we'd anticipated. Also, corporate cutbacks mean zero support from our IT department.*

Simulation Tools Satisfaction Summary

Overview

We take members' ratings from the different satisfaction-based survey questions and apply the following weightings:

Ease of Use	Power and Flexibility	Time to Proficiency
Very easy = 5	Very = 5	One day or less = 5
Somewhat easy = 3	Somewhat = 3	One week = 4
Somewhat difficult = 1	Not very = 1	Two weeks = 3
Very difficult = 0	Not at all = 0	1-3 months = 1
		More than 3 months = 0

Cost Effectiveness	Vendor Responsiveness	Individual Features
Very cost effective = 5	Very responsive = 5	Excellent = 5
Somewhat cost effective = 3	Somewhat responsive = 3	Very good = 4
Not cost effective = 1	Somewhat irresponsive = 1	Good = 3
Wasteful – 0	Very irresponsive = 0	Fair = 1
		Poor = 0

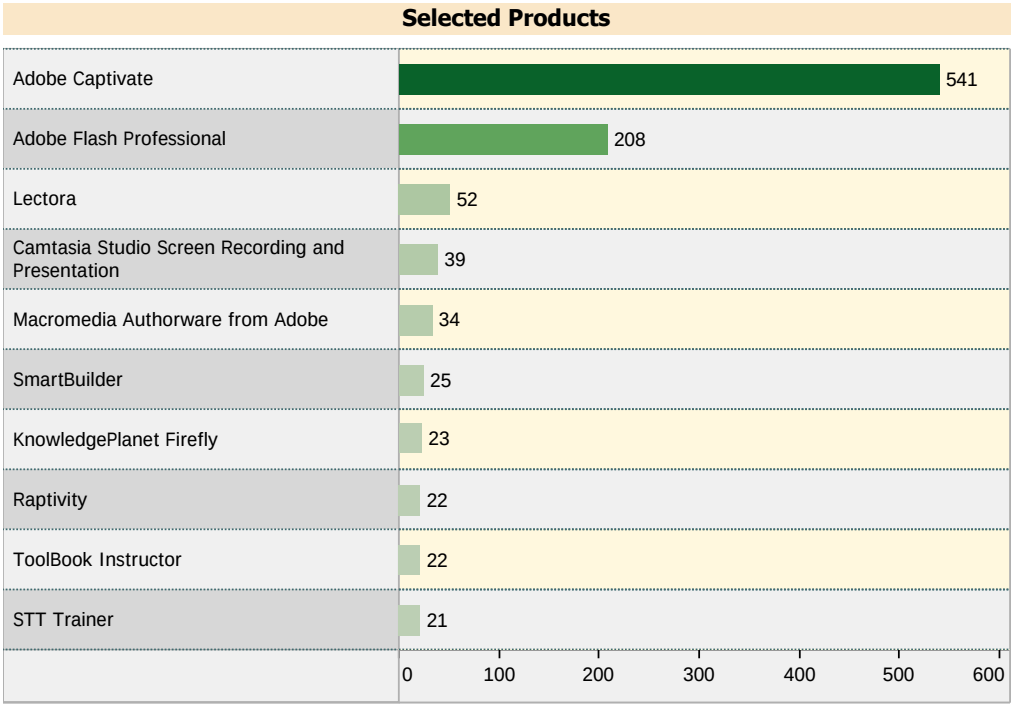
The difference between the top-ranked and second-ranked products may be very large, or practically non-existent. Use the **Computed Rankings** *to see if the gap between products is small or large.*

In the pages that follow, we summarize results for the Simulations Tools survey. The relative ranking charts show which product got the highest score, second highest score, etc., for each of the different survey questions.

The weighted score charts show the computed ranking for each product for each of the survey questions. We present weighted scores to show how large the gap is between products that rank next to each other.

Figure 55 shows how many members have rated a particular product. Our requirement for including products in this printed comparison is a minimum of 20 members providing responses.[11] We gave members the option of rating up to three products, and many of the 883 Guild members who completed the survey as of this writing chose to rate more than one.

Users of the report's Direct Data Access portfolio can compare any of the over 80 products for which Guild members provided responses (see "Appendix B – Using Direct Data Access" on page 243). Indeed, by the time we publish this report, we expect there to be more ratings from more members.



Source: The eLearning Guild Research

Figure 55 – Number of responses for selected Simulation tools. Note that products that received fewer than 50 responses may skew positive or negative depending on the mindset of an individual member. Products with many responses are less dependent on the mindset of an individual member.

[11] The Guild also tracks the number of different organizations that use a particular tool. See "Appendix A – Respondent Demographics" on page 237.

Simulation Tools Relative Rankings

Simulation Tools Computed Ratings

Feature	Adobe Captivate	Adobe Flash Professional	Camtasia Studio	mZinga Firefly	Lectora	Macromedia Authorware from Adobe	Raptivity	SmartBuilder	STT Trainer	ToolBook Instructor
Ease of Use	2	10	6	7	4	9	1	5	3	8
Power and Flexibility	9	2	10	6	7	5	8	1	3	4
Time to Proficiency	2	10	4	7	6	9	3	5	1	8
Cost Effectiveness	2	6	5	10	7	9	2	1	4	8
Vendor Responsiveness	9	8	7	4	6	10	3	1	2	5
Ability to capture and edit screen object properties (buttons, fields, etc.)	4	7	5	1	8	9	NA	3	2	6
AICC, SCORM Publishing	6	9	10	8	2	4	7	1	4	3
Automated recording of software procedures	3	6	4	2	7	NA	NA	NA	1	5
Automatic creation of navigation controls and sequencing of screens	4	10	8	2	6	5	9	3	1	7
Creation and placement of highlighting / visual cues	3	5	4	8	6	7	10	1	2	9
Creation and placement of text bubbles / captions	3	6	5	8	4	9	10	1	2	7
Customization and navigation controls	9	2	10	8	6	1	7	3	4	5
Embed and control avatar	5	1	NA	NA	3	4	NA	NA	NA	2
Import audio	6	4	5	10	7	2	9	1	3	8
Import external images and screen shots	8	2	7	10	6	3	9	1	4	5
Import Video	6	2	7	NA	5	4	8	1	NA	3
Inegration with coureware authoring and rapid e-Learning tools	5	3	8	9	4	10	1	2	6	7
Physical task demonstration and simulations	9	5	8	1	10	6	7	4	2	3
Real-time evaluation and feedback	9	7	10	6	8	3	2	1	5	4
Rule-based branching engine	9	6	10	2	8	3	5	1	7	4
Soft skills demonstrations and activities	8	6	9	10	7	4	5	1	3	2
Software demonstrations and guided tutorials	2	6	4	3	10	8	9	5	1	7
Support for mobile delivery	2	1	3	NA	4	NA	NA	NA	NA	NA
Word or printable document creation	5	9	8	3	6	10	NA	2	1	4

NA indicates fewer than ten responses for the question

Simulation Tools Computed Ratings

Simulation Tools Computed Ratings

Feature	Adobe Captivate	Adobe Flash Professional	Camtasia Studio	mZinga Firefly	Lectora	Macromedia Authorware from Adobe	Raptivity	SmartBuilder	STT Trainer	ToolBook Instructor
Ease of Use	3.74	1.51	3.30	2.78	3.47	2.00	**3.94**	3.38	3.56	2.48
Power and Flexibility	3.62	4.48	3.06	4.24	3.98	4.31	3.88	**4.71**	4.44	4.33
Time to Proficiency	3.29	0.79	3.06	2.26	2.57	1.03	3.13	2.95	**3.61**	1.48
Cost Effectiveness	4.25	3.79	4.17	3.39	3.67	3.45	4.25	**4.43**	4.18	3.48
Vendor Responsiveness	3.06	3.09	3.47	4.30	3.94	1.52	4.40	**5.00**	4.65	4.00
Ability to capture and edit screen object properties (buttons, fields, etc.)	3.85	3.59	3.83	**4.57**	3.53	3.48	NA	4.29	4.50	3.72
AICC, SCORM Publishing	3.81	3.52	3.28	3.65	4.28	4.13	3.67	**4.74**	4.14	4.20
Automated recording of software procedures	4.43	2.80	4.11	4.43	2.76	NA	NA	NA	**4.50**	3.21
Automatic creation of navigation controls and sequencing of screens	3.91	3.04	3.65	4.17	3.84	3.89	3.43	4.15	**4.29**	3.67
Creation and placement of highlighting / visual cues	4.25	3.95	4.06	3.71	3.89	3.76	3.27	**4.81**	4.50	3.43
Creation and placement of text bubbles / captions	4.27	3.80	4.03	3.55	4.09	3.50	3.00	**4.52**	4.39	3.67
Customization and navigation controls	3.21	4.31	3.13	3.30	3.78	**4.33**	3.38	4.24	4.13	3.86
Embed and control avatar	2.67	**3.62**	NA	NA	3.31	2.71	NA	NA	NA	3.55
Import audio	3.97	4.15	4.06	2.75	3.89	4.19	3.27	**4.61**	4.20	3.40
Import external images and screen shots	3.99	4.39	4.00	3.59	4.13	4.30	3.94	**4.60**	4.22	4.14
Import Video	3.50	4.28	3.46	NA	3.66	3.79	3.24	**4.58**	NA	3.83
Inegration with coureware authoring and rapid e-Learning tools	3.66	3.99	3.59	3.53	3.71	3.32	**4.13**	4.12	3.64	3.63
Physical task demonstration and simulations	3.25	3.69	3.53	**4.36**	3.11	3.60	3.56	3.83	4.21	3.89
Real-time evaluation and feedback	3.41	3.74	3.05	3.83	3.71	4.23	4.25	**4.71**	4.00	4.00
Rule-based branching engine	3.12	3.43	2.84	4.25	3.19	4.11	3.45	**4.58**	3.25	3.81
Soft skills demonstrations and activities	3.32	3.65	3.26	2.93	3.34	3.74	3.69	**4.43**	3.92	4.11
Software demonstrations and guided tutorials	4.40	3.46	4.11	4.26	2.82	3.42	3.31	3.67	**4.41**	3.45
Support for mobile delivery	2.94	**3.72**	2.85	NA	2.65	NA	NA	NA	NA	NA
Word or printable document creation	3.20	2.43	2.58	3.50	3.11	2.33	NA	3.91	**4.56**	3.33

Scale: 0 to 5 where 5 is best
NA indicates fewer than ten responses for the question

Notes on Ratings and Satisfaction

The Guild recognizes that its members look to Guild Research reports for clear guidance that's thorough, comprehensive, and *unbiased*.

While the Guild can fashion a composite score by applying different weights to each of the two-dozen or so features in the survey, our doing so would impose our bias on Guild members. Only you can determine which features are most important to you. And indeed, you *should* give more weight to the things that are critical to you and your organization.

Consider the 24 different satisfaction measures in the Simulation Tools survey:

1. How easy is it to use this tool?
2. How powerful and flexible is this tool?
3. How quickly did you learn to become proficient using this tool?
4. How cost effective is this tool?
5. How responsive is the vendor to your sales, service, and support needs?
6. Automated recording of software procedures
7. Software demonstrations and tutorials
8. Soft skills demonstrations and simulations
9. Physical task demonstrations and simulations
10. Ability to capture and edit screen object properties (buttons, fields, etc)
11. Rule-based branching engine
12. Creation and placement of text bubbles or captions
13. Creation and placement of highlighting or visual cues
14. Import audio (MP3, WAV, etc)
15. Import external images and screenshots
16. Automatic creation of navigation controls and sequencing of screens
17. Customization of navigation controls
18. Integration with courseware authoring or rapid eLearning tools
19. Import video (FLV, MPG, WMV, etc.)
20. Real-time evaluation and feedback
21. Embed and control an avatar
22. Publish to AICC or SCORM
23. Word or printable document creation
24. Support for mobile delivery

If we weigh each of these factors equally we get a ranking that looks like this:

Product	Overall
SmartBuilder	4.19
STT Trainer	4.12
Adobe Captivate	3.63
ToolBook Instructor	3.55
Raptivity	3.53
mZinga Firefly	3.52
Lectora	3.52
Camtasia Studio	3.48
Adobe Flash Professional	3.47
Macromedia Authorware from Adobe	3.32

Figure 56 – Ratings of popular Simulation Tools using one weighting system.

But if we apply different weighting to different features (for example, if we were to weigh vendor responsiveness as unimportant, SCORM compliance as essential, and customization of navigation controls as somewhere in between) we get something that looks like this:

Product	Overall
STT Trainer	4.12
SmartBuilder	4.01
Lectora	3.64
ToolBook Instructor	3.63
Raptivity	3.60
Adobe Captivate	3.60
mZinga Firefly	3.50
Adobe Flash Professional	3.50
Macromedia Authorware from Adobe	3.49
Camtasia Studio	3.47

Figure 57 – Ratings of popular Simulation Tools using a different, but equally valid, weighting system.

So, which is "right?"

Again, it depends on you and your organization, so instead of us anointing a particular product as best, we give you everything you need – in this report, and via live Direct Data Access to the underlying data – to determine which tools are best suited to you, your team, your learners, and your organization.

Use the Data to Draw Your Own Conclusions

In the survey results sections of this report we will share Guild member satisfaction ratings on *individual* features.

So, if the most important criterion for choosing a Simulation tool is power and flexibility, then you may gravitate towards SmartBuilder. If physical task demonstration and simulation is of paramount importance, then Firefly may best address your needs.

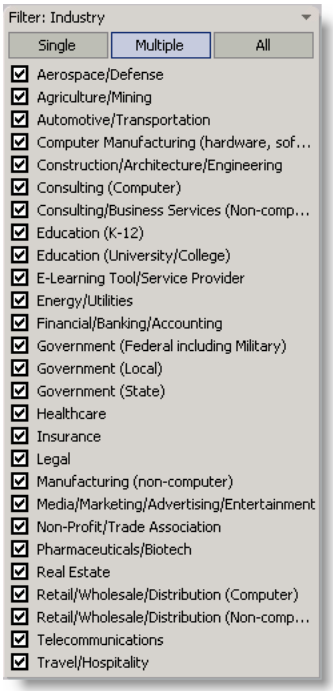
And finally, if you want to filter the results to see which tools best serve certain industries, or companies of a certain size, you should purchase the Immersive Learning Simulations Direct Data Access portfolio. This will give you unfettered access to up-to-the minute survey results that you can filter to address your specific needs (see "Appendix B – Using Direct Data Access" on page 243.)

Notes on the Tools and Products in this Section

In addition to the more than 1,100 members who completed the Immersive Learning Simulations survey, over 6,000 Guild members have indicated which tools and services they use in their member profiles. As of February 13, 2008, 1,939 members have told us which Simulation tools they use, and 879 have completed the Simulation Tools survey.

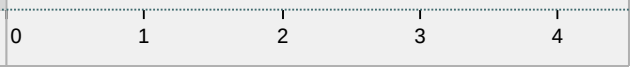
The list of tools that they use, and those which are well rated, will always be changing. Moreover, what is popular within one industry, or for a large organization, may not be popular for another industry, or for a small organization.

For example, consider the "Ease of Use" ratings for Simulation Tools for all industries, as shown in Figure 58, where Raptivity takes top honors.



5a) Ease of Use -- Weighted

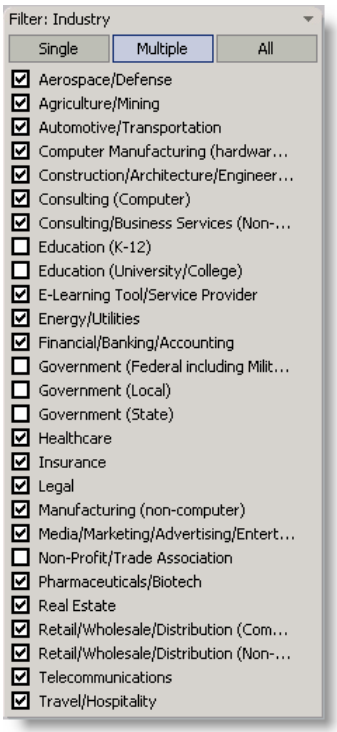
Tool	Count	
Raptivity	16	3.94
Adobe Captivate	527	3.74
STT Trainer	18	3.56
Lectora	51	3.47
SmartBuilder	21	3.38
Camtasia Studio Screen Recording and Presentation	37	3.30
KnowledgePlanet Firefly	23	2.78
ToolBook Instructor	21	2.48
Macromedia Authorware from Adobe	33	2.00
Adobe Flash Professional	200	1.51



Source: The eLearning Guild Research

Figure 58 – Ease of use ratings for Simulation Tools (all industries).

Suppose we just want to see ratings for corporations (meaning that we exclude survey results from members working in Education, Government, and Non-Profit organizations). The ratings change, and Adobe Captivate takes top honors, as Figure 59 shows.



5a) Ease of Use -- Weighted

Tool	Count	
Adobe Captivate	432	3.78
Raptivity	12	3.75
SmartBuilder	15	3.53
STT Trainer	17	3.47
Lectora	40	3.45
Camtasia Studio Screen Recording and Presentation	30	3.23
KnowledgePlanet Firefly	21	2.76
ToolBook Instructor	19	2.63
Macromedia Authorware from Adobe	24	2.13
Adobe Flash Professional	158	1.49

Source: The eLearning Guild Research

Figure 59 – Ease of use ratings for members working in corporations.

Important: We strongly encourage you to take advantage of the Direct Data Access portfolio, so you can focus on the market share and satisfaction leaders for your industry and your company size. You can further filter by job level, primary job responsibility, and number of learners affected.

Some Frequently Asked Questions about Product Listings and Ratings

Why Isn't a Particular Tool Listed in the Comparison?

As you review the printed report, you may notice that we don't list some tools you use, or are considering using, in the side-by-side comparisons. With over 1,000 submissions from vendors (86 of which they have classified as Simulation tools) we cannot compare *every* tool in a printed report. Instead, we limit our satisfaction comparisons to tools rated by at least 20 Guild members.[12] You can view ratings for other products using the Guild's Direct Data Access portfolios (see http://www.elearningguild.com/content.cfm?selection=doc.596.)

Why Wasn't the Tool I Use Listed in the Survey?

The Guild maintains an open system that allows *any* vendor or service provider to list their products and services in the Guild's supplier database free of charge (see http://supplier.elearningguild.com.) It is up to the vendors, and not the Guild, to enter products and to categorize these products.

When we receive feedback from a member stating that a product is missing or not correctly categorized, we contact the vendor of that product and encourage them to make the proper entry.

Note: If there is a product or service that you use that we did not list, please send an e-mail to feedback@eLearningGuild.com.

[12] The Guild sends notices to its members asking them to complete or update their survey responses. We also encourage all vendors that have created profiles in the Guild's supplier database to in turn encourage their customers that are Guild members to complete these surveys (only Guild members may participate in the surveys). We also vet all tool survey responses to avoid any attempts by vendors to skew results.

How Can I Compare Specific Tools

The Guild's Tools Comparables Model DDA shown in Figure 60 allows you to compare any of the tools rated by your fellow Guild members.

Select region

Select the tools you want to compare.

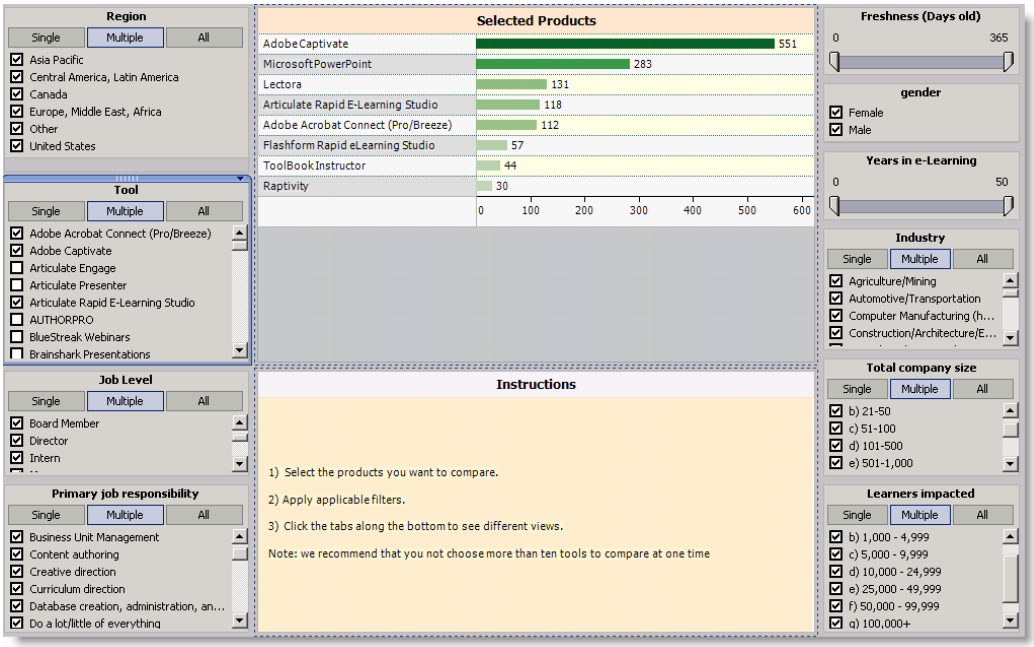


Figure 60 – The Guild's Comparables Model at work.

The comparables model also allows you to filter results by job level, industry, company size, and so on.

For information on how to acquire Direct Data Access, see http://www.elearningguild.com/content.cfm?selection=doc.596 and http://www.elearningguild.com/content.cfm?selection=doc.2.

Simulations Tools Survey Results

In this section, we will review market share, satisfaction ratings, and Guild members use of Simulation Tools.

At the time of this writing, 1,933 of the Guild's 28,700 members have told us which Simulation tools they use, and 880 have completed the Simulation Tools portion of the Authoring and Development Tools survey.

Different Types of Simulations

This survey gives us the opportunity to not only dig into specific capabilities of each tool, but also to see which tools lend themselves best to different types of simulations. Consider the following types of simulations:

Software simulations: Here learners have the opportunity to explore the features of a simulated version of a software program. The simulation may include guided instructions, experimentation, and auto-completion of tasks.

Physical task demonstration and simulations: Here learners see and interact with simulations of physical objects. Examples include how water flows through a river, how the heart pumps blood, and how to replace the oil in an engine.

Soft skill demonstrations and activities: Here learners can apply sales skills, leadership skills, recruiting skills, and so on, in a simulated environment.

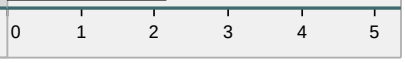
How This Section is Organized

Simulation Tools – Satisfaction

Note: The first of two items, "Automated recording of software procedures" is closely related to the second item "Software demonstrations and guided tutorials," in that being able to do the first well helps in the creation of the second.

Automated recording of software procedures

Feature	Tool	Count	
Automated recording of software procedures	STT Trainer	19	4.53
	KnowledgePlanet Firefly	23	4.43
	Adobe Captivate	508	4.43
	Camtasia Studio Screen Recording ..	35	4.11
	ToolBook Instructor	19	3.21
	Raptivity	9	2.89
	Adobe Flash Professional	66	2.80
	Lectora	29	2.76
	SmartBuilder	3	2.33
	Macromedia Authorware from Adobe	7	2.14



Source: The eLearning Guild Research

Figure 61 – Ratings for automated recording of software procedures. Note that Raptivity, SmartBuilder, and Authorware each received fewer than ten responses for this question, suggesting that members may not use the tool for this capability. Indeed, in our satisfaction summary tables we ignore questions that do not receive at least ten responses (see "Simulation Tools Relative Rankings" on page 69).

Software demonstrations and guided tutorials

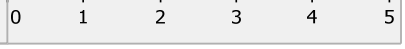
Feature	Tool	Count	
Software demonstrations and guided tutorials	STT Trainer	18	4.44
	Adobe Captivate	515	4.40
	KnowledgePlanet Firefly	23	4.26
	Camtasia Studio Screen Recording ..	35	4.11
	SmartBuilder	15	3.67
	Adobe Flash Professional	161	3.46
	ToolBook Instructor	20	3.45
	Macromedia Authorware from Adobe	26	3.42
	Raptivity	13	3.31
	Lectora	39	2.82

Source: The eLearning Guild Research

Figure 62 – Ratings of ability to create software demonstrations and guided tutorials.

Physical task demonstration and simulations

Feature	Tool	Count	
Physical task demonstration and simulations	KnowledgePlanet Firefly	11	4.36
	STT Trainer	15	4.27
	ToolBook Instructor	18	3.89
	SmartBuilder	18	3.83
	Adobe Flash Professional	157	3.69
	Macromedia Authorware from Adobe	25	3.60
	Raptivity	16	3.56
	Camtasia Studio Screen Recording ..	17	3.53
	Adobe Captivate	379	3.25
	Lectora	37	3.11

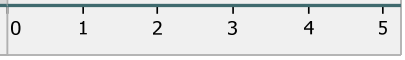


Source: The eLearning Guild Research

Figure 63 – Ratings of ability to create physical task demonstrations and simulations.

Soft skill demonstrations and activities

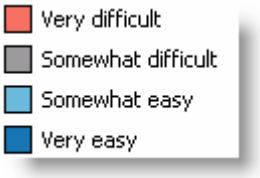
Feature	Tool	Count	
Soft skill demonstrations and activities	SmartBuilder	21	4.43
	ToolBook Instructor	19	4.11
	STT Trainer	13	3.85
	Macromedia Authorware from Adobe	23	3.74
	Raptivity	16	3.69
	Adobe Flash Professional	168	3.65
	Lectora	35	3.34
	Adobe Captivate	430	3.32
	Camtasia Studio Screen Recording ..	23	3.26
	KnowledgePlanet Firefly	15	2.93



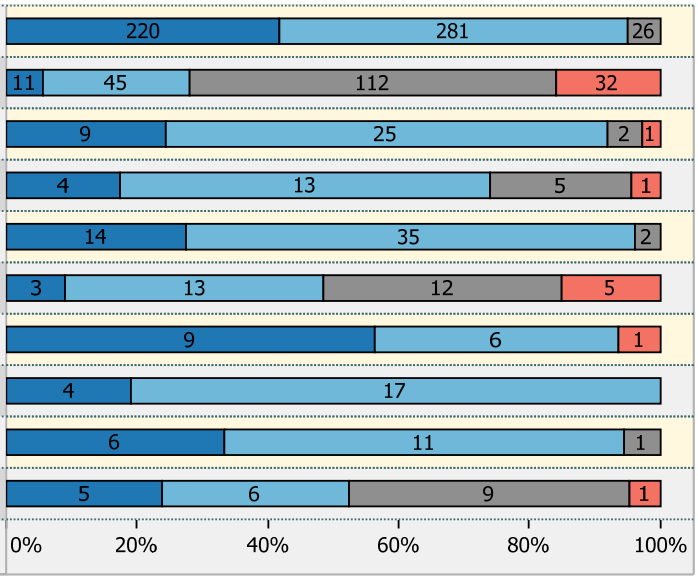
Source: The eLearning Guild Research

Figure 64 – Ratings of ability to develop and deliver soft skill demonstrations and activities.

Ease of Use

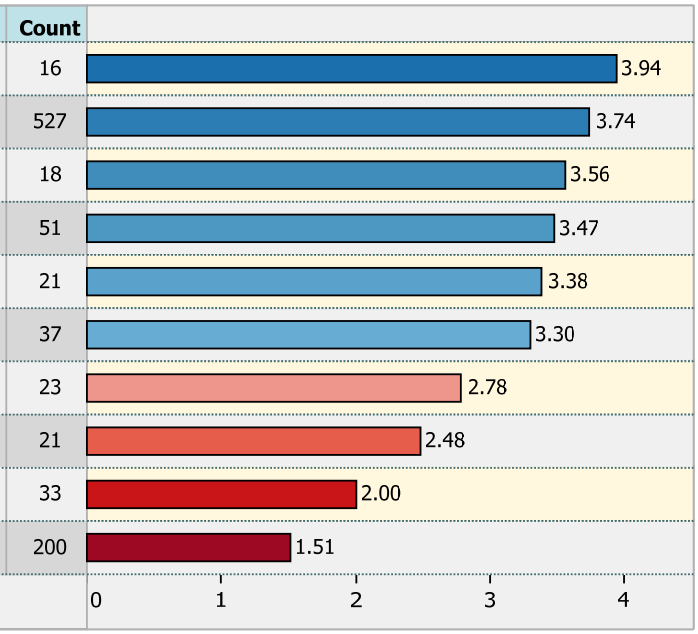


5) How easy is it to use this tool?



Source: The eLearning Guild Research

5a) Ease of Use -- Weighted



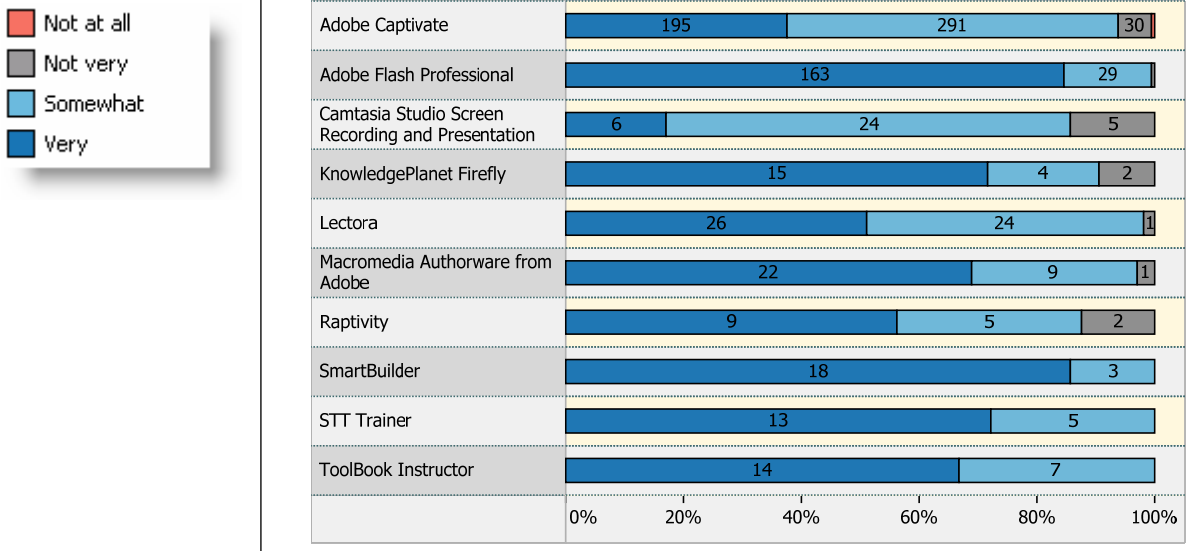
Source: The eLearning Guild Research

Figure 65 – Survey results for ease of use (based on minimum of 20 responses).

Raptivity enjoys top honors here, followed closely by Adobe Captivate. STT Builder is surprisingly strong given its high marks for Power and Flexibility, as there's usually an inverse relationship between ease of use and power and

flexibility (as is clearly the case with Adobe Flash Professional.) See Figure 66 below.

Power and Flexibility



Source: The eLearning Guild Research

6a) Power and Flexibility -- Weighted

Tool	Count	
SmartBuilder	21	4.71
Adobe Flash Professional	193	4.68
STT Trainer	18	4.44
ToolBook Instructor	21	4.33
Macromedia Authorware from Adobe	32	4.31
KnowledgePlanet Firefly	21	4.24
Lectora	51	3.98
Raptivity	16	3.88
Adobe Captivate	519	3.62
Camtasia Studio Screen Recording and Presentation	35	3.06

0 1 2 3 4 5

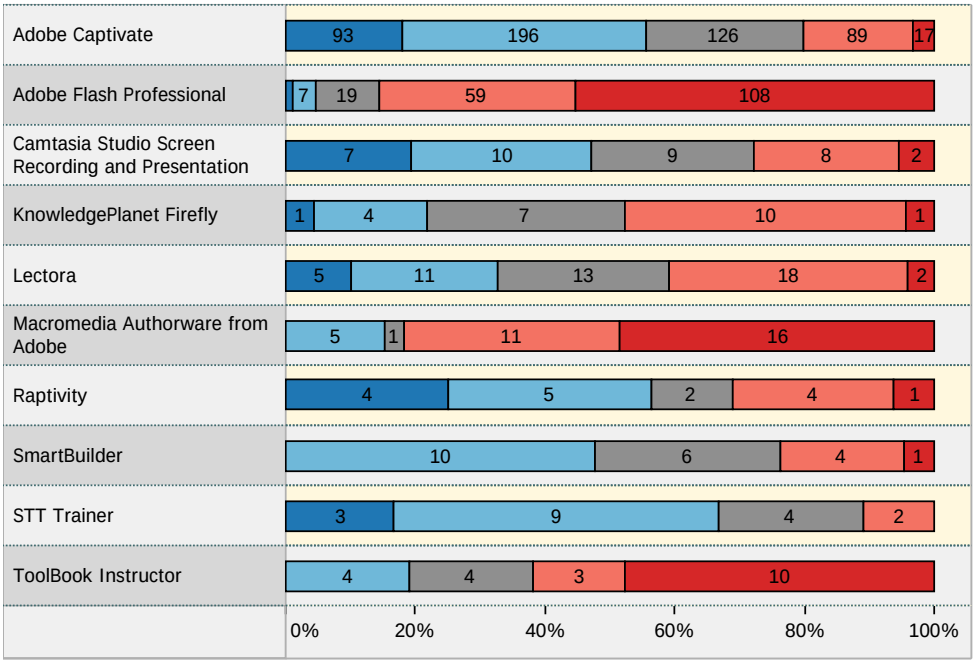
Source: The eLearning Guild Research

Figure 66 – Survey results for power and flexibility.

The top-rated product in this category is SmartBuilder, with very strong showings from Adobe Flash Professional, STT Trainer, ToolBook Instructor, Authorware, and Firefly.

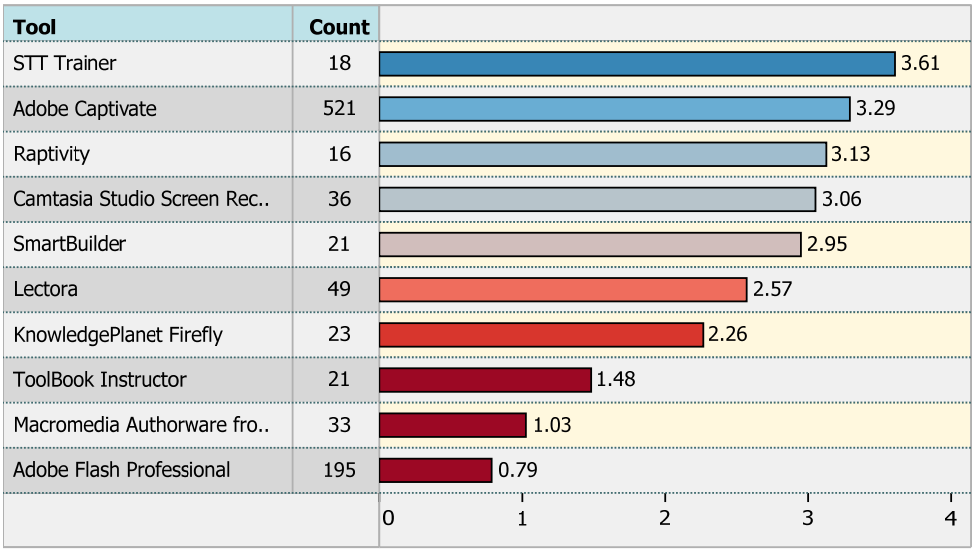
Time to Proficiency

7) How quickly do you learn to become proficient with using this tool?



Source: The eLearning Guild Research

7a) How quickly do you learn to become proficient with using this tool? -- Weighted

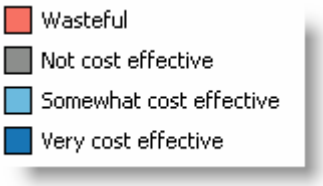


Source: The eLearning Guild Research

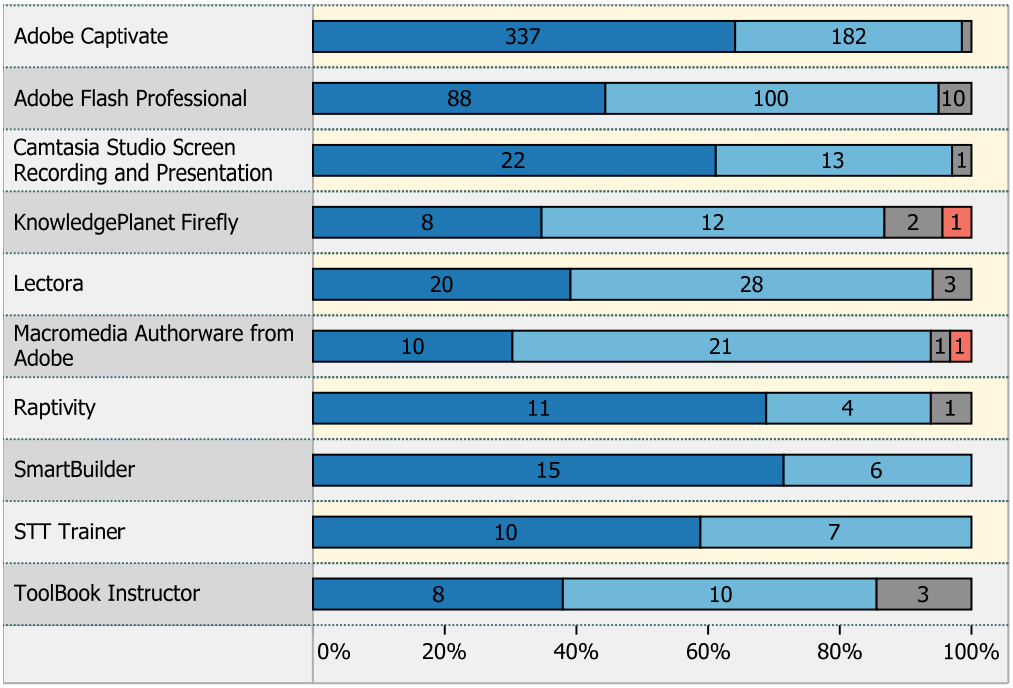
Figure 67 – Survey results for time to proficiency.

STT Trainer earns top honors here, although only 18 Guild members weighed in on this question. Adobe Captivate also makes a very strong showing.

Cost Effectiveness



9) How cost effective is this tool?



Source: The eLearning Guild Research

9a) How cost effective is this tool? -- Weighted Average

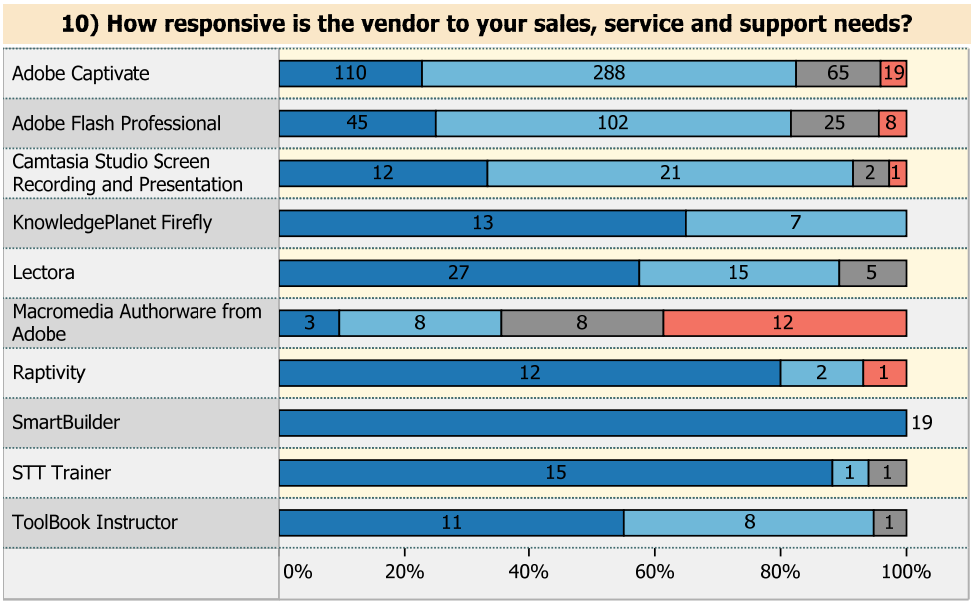
Tool	Count	
SmartBuilder	21	4.43
Adobe Captivate	526	4.25
Raptivity	16	4.25
STT Trainer	17	4.18
Camtasia Studio Screen Recording and Presentation	36	4.17
Adobe Flash Professional	198	3.79
Lectora	51	3.67
ToolBook Instructor	21	3.48
Macromedia Authorware from Adobe	33	3.45
KnowledgePlanet Firefly	23	3.39

Source: The eLearning Guild Research

Figure 68 – Survey results for cost effectiveness.

SmartBuilder's high ranking here is particularly noteworthy, given that it is a relatively expensive product ($2,500 for an annual single user license vs. $699 for Captivate, $1,045 for Raptivity, and $299 for a single license of Camtasia).

Vendor Responsiveness



Source: The eLearning Guild Research

10a) How responsive is the vendor to your sales, service and support needs? -- Weighted Average

Tool	Count	
SmartBuilder	19	5.00
STT Trainer	17	4.65
Raptivity	15	4.40
KnowledgePlanet Firefly	20	4.30
ToolBook Instructor	20	4.00
Lectora	47	3.94
Camtasia Studio Screen Rec..	36	3.47
Adobe Flash Professional	180	3.09
Adobe Captivate	482	3.07
Macromedia Authorware fro..	31	1.52

0 1 2 3 4 5

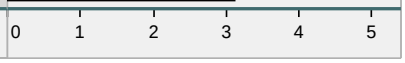
Source: The eLearning Guild Research

Figure 69 – Survey results for vendor responsiveness.

As with other product categories, the large companies – and especially large companies with many users – typically don't enjoy nearly as high vendor responsiveness ratings (responsiveness to sales, service, and support needs) as smaller companies. SuddentlySmart's SmartBuilder takes top honors, followed by Kaplan IT's STT Trainer, Harbinger's Raptivity, and mZinga's (formerly KnowledgePlanet) Firefly.

Ability to capture and edit screen object properties

Feature	Tool	Count	
Ability to capture and edit screen object properties (buttons, fields, etc)	KnowledgePlanet Firefly	23	4.57
	STT Trainer	19	4.53
	SmartBuilder	14	4.29
	Adobe Captivate	495	3.85
	Camtasia Studio Screen Recording ..	29	3.83
	ToolBook Instructor	18	3.72
	Adobe Flash Professional	117	3.59
	Lectora	34	3.53
	Macromedia Authorware from Adobe	21	3.48
	Raptivity	9	3.11

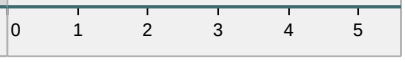


Source: The eLearning Guild Research

Figure 70 – Ratings for ability to capture and edit screen object properties.

AICC and SCORM Publishing

Feature	Tool	Count	
AICC, SCORM publishing	SmartBuilder	19	4.74
	Lectora	43	4.28
	ToolBook Instructor	20	4.20
	STT Trainer	15	4.13
	Macromedia Authorware from Adobe	24	4.13
	Adobe Captivate	398	3.81
	Raptivity	15	3.67
	KnowledgePlanet Firefly	20	3.65
	Adobe Flash Professional	147	3.52
	Camtasia Studio Screen Recording ..	25	3.28



Source: The eLearning Guild Research

Figure 71 – Ratings for AICC and SCORM publishing capabilities.

Automatic creation of navigation controls and sequencing of screens

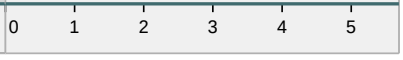
Feature	Tool	Count	
Automatic creation of navigation controls and sequencing of screens	STT Trainer	18	4.33
	KnowledgePlanet Firefly	23	4.17
	SmartBuilder	20	4.15
	Adobe Captivate	497	3.91
	Macromedia Authorware from Adobe	27	3.89
	Lectora	44	3.84
	ToolBook Instructor	21	3.67
	Camtasia Studio Screen Recording ..	31	3.65
	Raptivity	14	3.43
	Adobe Flash Professional	143	3.04

Source: The eLearning Guild Research

Figure 72 – Ratings for automatic creation of navigation controls and sequencing of screens. Adobe Flash Professional may allow you to do virtually anything you want, but the other tools will generate "frame" simulation elements and screen sequences automatically.

Creation and placement of highlighting and visual cues

Feature	Tool	Count	
Creation and placement of highlighting / visual cues	SmartBuilder	21	4.81
	STT Trainer	17	4.47
	Adobe Captivate	506	4.25
	Camtasia Studio Screen Recording ..	33	4.06
	Adobe Flash Professional	175	3.95
	Lectora	45	3.89
	Macromedia Authorware from Adobe	29	3.76
	KnowledgePlanet Firefly	21	3.71
	ToolBook Instructor	21	3.43
	Raptivity	15	3.27

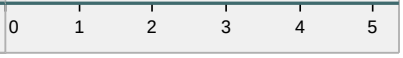


Source: The eLearning Guild Research

Figure 73 – Ratings of creation and placement of highlighting and visual cues.

Creation and placement of text bubbles and captions

Feature	Tool	Count	
Creation and placement of text bubbles / captions	SmartBuilder	21	4.52
	STT Trainer	19	4.37
	Adobe Captivate	509	4.27
	Lectora	43	4.09
	Camtasia Studio Screen Recording ..	31	4.03
	Adobe Flash Professional	174	3.80
	ToolBook Instructor	21	3.67
	KnowledgePlanet Firefly	22	3.55
	Macromedia Authorware from Adobe	30	3.50
	Raptivity	15	3.00

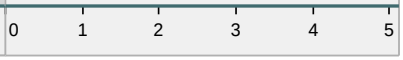


Source: The eLearning Guild Research

Figure 74 – Ratings of creation and placement of text bubbles and captions.

Customization of navigation controls

Feature	Tool	Count	
Customization of navigation controls	Macromedia Authorware from Adobe	30	4.33
	Adobe Flash Professional	181	4.31
	SmartBuilder	21	4.24
	STT Trainer	16	4.13
	ToolBook Instructor	21	3.86
	Lectora	46	3.78
	Raptivity	13	3.38
	KnowledgePlanet Firefly	20	3.30
	Adobe Captivate	483	3.21
	Camtasia Studio Screen Recording ..	30	3.13

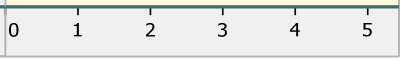


Source: The eLearning Guild Research

Figure 75 – Ratings of ability to customize navigation controls.

Embed and control avatar

Feature	Tool	Count	
Embed and control avatar	STT Trainer	5	4.60
	SmartBuilder	4	3.75
	Adobe Flash Professional	92	3.62
	ToolBook Instructor	11	3.55
	Lectora	16	3.31
	Raptivity	6	3.17
	Camtasia Studio Screen Recording ..	9	3.00
	Macromedia Authorware from Adobe	14	2.71
	Adobe Captivate	123	2.67



Source: The eLearning Guild Research

Figure 76 – Ratings of ability to embed and control an avatar. The small number of responses – four of the tools didn't even receive ten responses – indicate that this is not yet an important capability to many Guild members. As more Guild members embrace realistic simulations (and 3-D virtual worlds) we expect to see greater support for creation and control of avatars from tool vendors.

Import audio

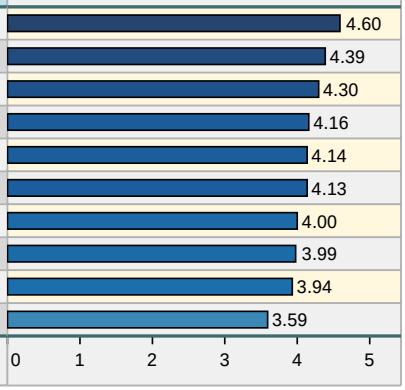
Feature	Tool	Count	
Import audio	SmartBuilder	18	4.61
	Macromedia Authorware from Adobe	26	4.19
	STT Trainer	11	4.18
	Adobe Flash Professional	181	4.15
	Camtasia Studio Screen Recording ..	33	4.06
	Adobe Captivate	458	3.97
	Lectora	44	3.89
	ToolBook Instructor	19	3.84
	Raptivity	11	3.27
	KnowledgePlanet Firefly	16	2.75

Source: The eLearning Guild Research

Figure 77 – Ratings of ability to import audio.

Import external images and screenshots

Feature	Tool	Count
Import external images and screenshots	SmartBuilder	20
	Adobe Flash Professional	185
	Macromedia Authorware from Adobe	30
	STT Trainer	19
	ToolBook Instructor	21
	Lectora	45
	Camtasia Studio Screen Recording ..	31
	Adobe Captivate	481
	Raptivity	16
	KnowledgePlanet Firefly	22

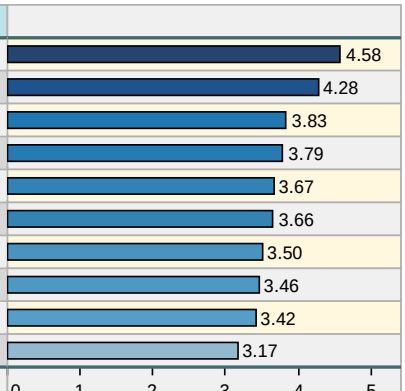


Source: The eLearning Guild Research

Figure 78 – Ratings of ability to import external images and screenshots.

Import video

Feature	Tool	Count
Import video (FLV, MPG, WMV, etc)	SmartBuilder	19
	Adobe Flash Professional	174
	ToolBook Instructor	18
	Macromedia Authorware from Adobe	28
	STT Trainer	9
	Lectora	38
	Adobe Captivate	346
	Camtasia Studio Screen Recording ..	28
	Raptivity	12
	KnowledgePlanet Firefly	6



Source: The eLearning Guild Research

Figure 79 – Ratings of ability to import video.

Integration with courseware authoring or rapid e-Learning Tools

Feature	Tool	Count	
Integration with courseware authoring or rapid eLearning tools	Raptivity	15	4.13
	SmartBuilder	17	4.12
	Adobe Flash Professional	162	3.99
	Lectora	38	3.71
	Adobe Captivate	420	3.66
	STT Trainer	11	3.64
	ToolBook Instructor	19	3.63
	Camtasia Studio Screen Recording ..	29	3.59
	KnowledgePlanet Firefly	19	3.53
	Macromedia Authorware from Adobe	22	3.32
			0 1 2 3 4

Source: The eLearning Guild Research

Figure 80 – Ratings of ability to integrate with courseware authoring or rapid e-Learning tools. Adobe's relatively low rating is surprising, given that so many courseware authoring and rapid e-Learning tool vendors have built Captivate-specific integration capabilities into their products.

Real-time evaluation and feedback

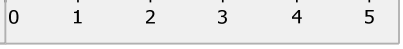
Feature	Tool	Count	
Real-time evaluation and feedback	SmartBuilder	17	4.71
	Raptivity	16	4.25
	Macromedia Authorware from Adobe	30	4.23
	ToolBook Instructor	19	4.00
	STT Trainer	17	3.94
	KnowledgePlanet Firefly	18	3.83
	Adobe Flash Professional	146	3.74
	Lectora	42	3.71
	Adobe Captivate	397	3.41
	Camtasia Studio Screen Recording ..	19	3.05
			0 1 2 3 4 5

Source: The eLearning Guild Research

Figure 81 – Ratings of ability to provide real-time evaluation and feedback. This capability is essential for highly interactive immersive learning simulations. For more information about how to create real-time assessment and feedback mechanisms, see Jim Ong's essay "Beyond Multiple Choice" in The eLearning Guild's 360° Report on Measuring Learning Success.

Rule-based branching engine

Feature	Tool	Count	
Rule-based branching engine	SmartBuilder	19	4.58
	KnowledgePlanet Firefly	16	4.25
	Macromedia Authorware from Adobe	28	4.11
	ToolBook Instructor	16	3.81
	Raptivity	11	3.45
	Adobe Flash Professional	127	3.43
	STT Trainer	13	3.31
	Lectora	37	3.19
	Adobe Captivate	387	3.12
	Camtasia Studio Screen Recording ..	19	2.84

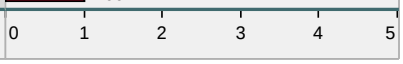


Source: The eLearning Guild Research

Figure 82 – Satisfaction with the product's rule-based branching engine. Many sophisticated learning games require this capability.

Support for mobile delivery

Feature	Tool	Count	
Support for mobile delivery	SmartBuilder	4	4.25
	Adobe Flash Professional	113	3.72
	Raptivity	9	3.44
	STT Trainer	7	3.29
	Adobe Captivate	172	2.94
	Camtasia Studio Screen Recording ..	13	2.85
	Lectora	20	2.65
	ToolBook Instructor	8	2.63
	Macromedia Authorware from Adobe	7	2.29
	KnowledgePlanet Firefly	1	1.00



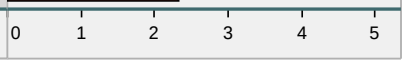
Source: The eLearning Guild Research

Figure 83 – Ratings of support for mobile delivery. The small number of responses – six of the tools didn't even get ten responses – indicate that this is not yet an important capability to many Guild members. The Guild anticipates a large up-tick in this area in the next 12 months.

Word or Printable document creation

14-33a) Features -- Weighted

Feature	Tool	Count	
Word or printable document creation	STT Trainer	19	4.53
	SmartBuilder	11	3.91
	KnowledgePlanet Firefly	16	3.50
	ToolBook Instructor	15	3.33
	Adobe Captivate	373	3.20
	Lectora	35	3.11
	Raptivity	8	3.00
	Camtasia Studio Screen Recording ..	12	2.58
	Adobe Flash Professional	113	2.43
	Macromedia Authorware from Adobe	21	2.33



Source: The eLearning Guild Research

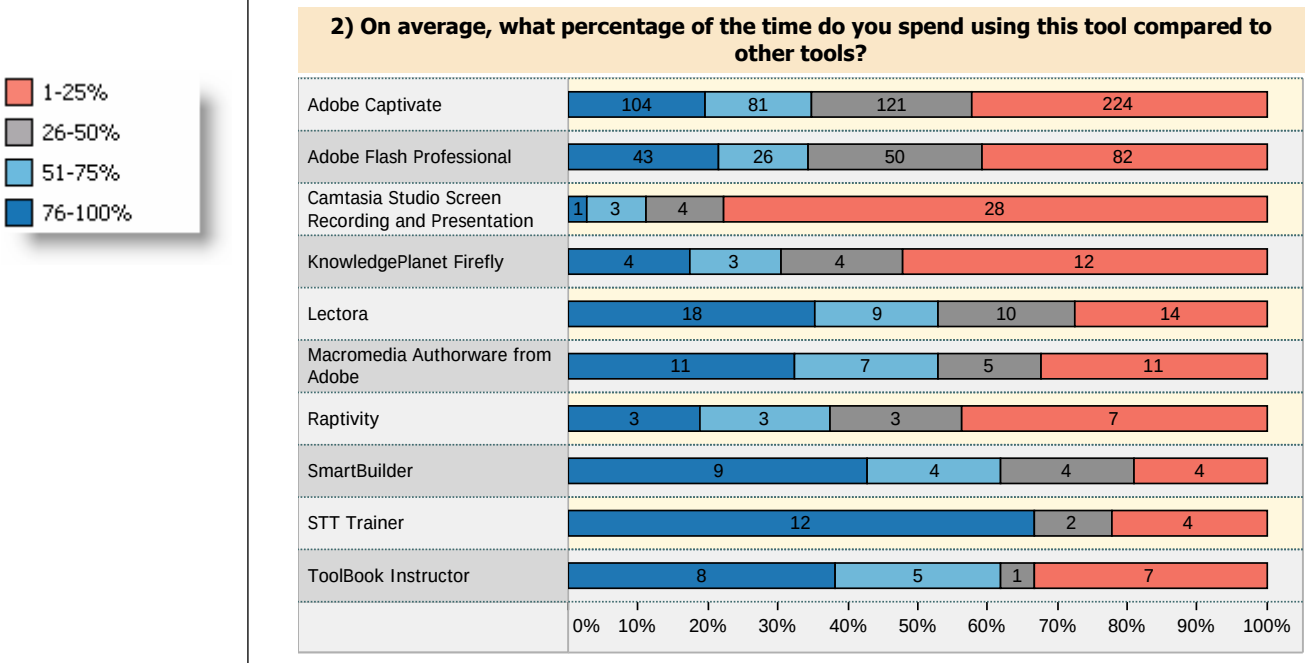
Figure 84 – Ability to create a Microsoft Word or other form of printable document. The number of responses indicates that this capability is important to Guild members. Those who need to produce both e-Learning and printed materials from a single source may also want to consider products such as ThinkingCap Studio *and* Xyleme LCMS.

Simulation Tools – Guild Member Usage and Preferences

In this section, we'll compare how often members use certain tools compared with other tools, how important the tools are, how long they've had the tool, what skills you need to use the tool, reasons for purchasing the tool, what types of players members use, and whether support for other platforms is important.

What percentage of time do you spend using this tool, compared to other tools?

In Figure 85 we see that certain tools such as SmartBuilder, STT Trainer, Lectora, and Authorware have attained "anchor status" within a member's arsenal of simulations tools; that is, over 50% of members responding indicate that they use the tool at least 50% of the time.

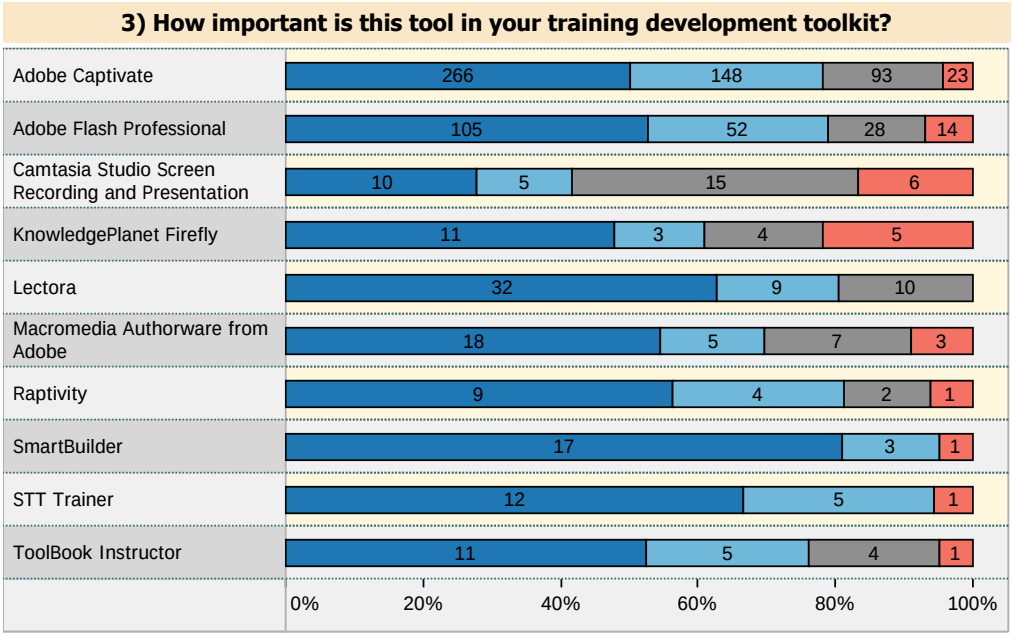


Source: The eLearning Guild Research

Figure 85 – Percentage of time spent using a particular tool.

How important is this tool in your training development toolkit?

The results shown in Figure 86 indicate that *all* of the tools enjoy very respectable ratings for their importance. SmartBuilder enjoys top honors in this category, followed closely by STT Trainer.



Source: The eLearning Guild Research

Figure 86 – Importance of particular tools.

Please indicate why you use this tool

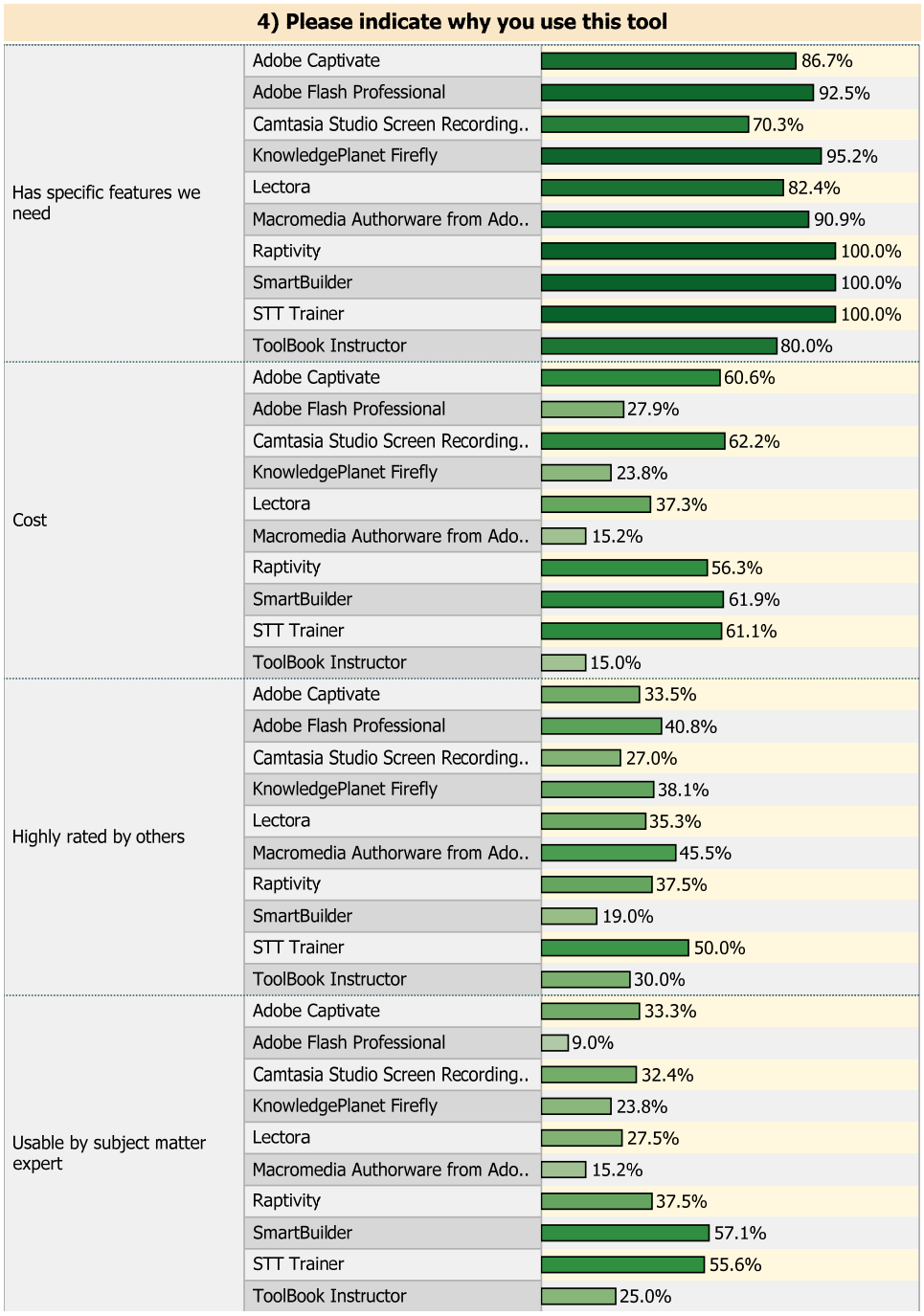
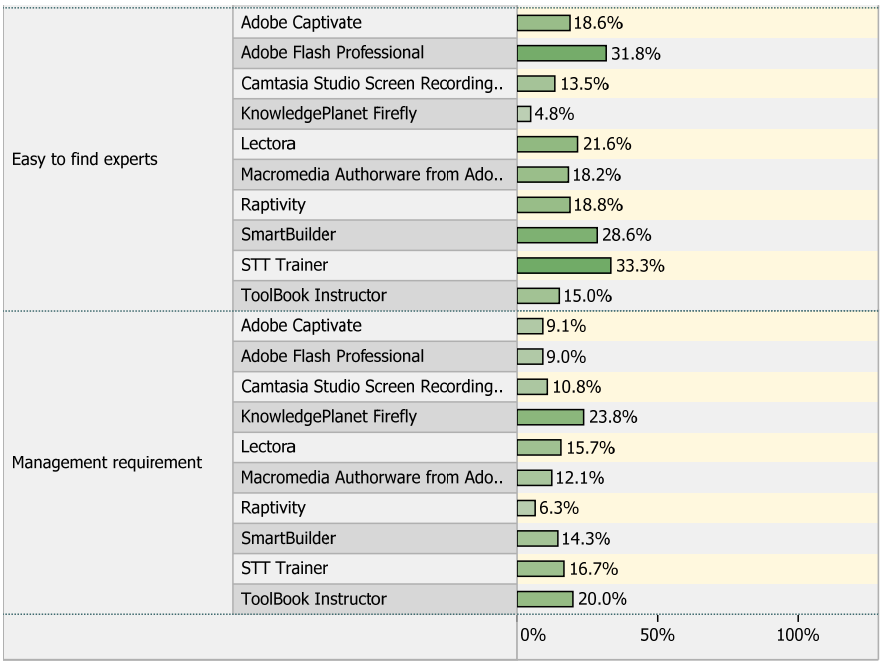


Figure 87 – Reasons why Guild members use the Simulation tools that they do (continued below).



Source: The eLearning Guild Research

Figure 88 – Continuation of reasons why Guild members use the Simulation tools that they do (continued below).

In examining the findings in Figures 87 and 88, we see certain products sitting alone in certain categories. For example, Camtasia Studio receives the lowest response under "Has specific features we need" (70.3%) but the highest response for "Cost" (62.2%). KnowledgePlanet Firefly receives the lowest response for "Easy to find experts" (4.8%) and the highest response for "Management Requirement" (23.7%)

Interesting findings include:

- Over 30% of members who use STT Trainer or Adobe Flash Professional cite "Ease of finding experts" as a reason for purchasing the tool.[15]
- 57.1% of members who use SmartBuilder indicate they use the tool because subject matter experts can use it.
- Only 9.1% of Guild members who use Captivate, and 6.3% who use Raptivity use it because it is a management requirement, indicating that members use it because they want to use it.

[15] Note that 18.6% of Captivate users citing its ease of finding experts does not mean it's difficult to find Captivate experts; it only means that 18.6% cite this as being a compelling reason for purchasing the product.

What abilities do you need to have to use this tool?

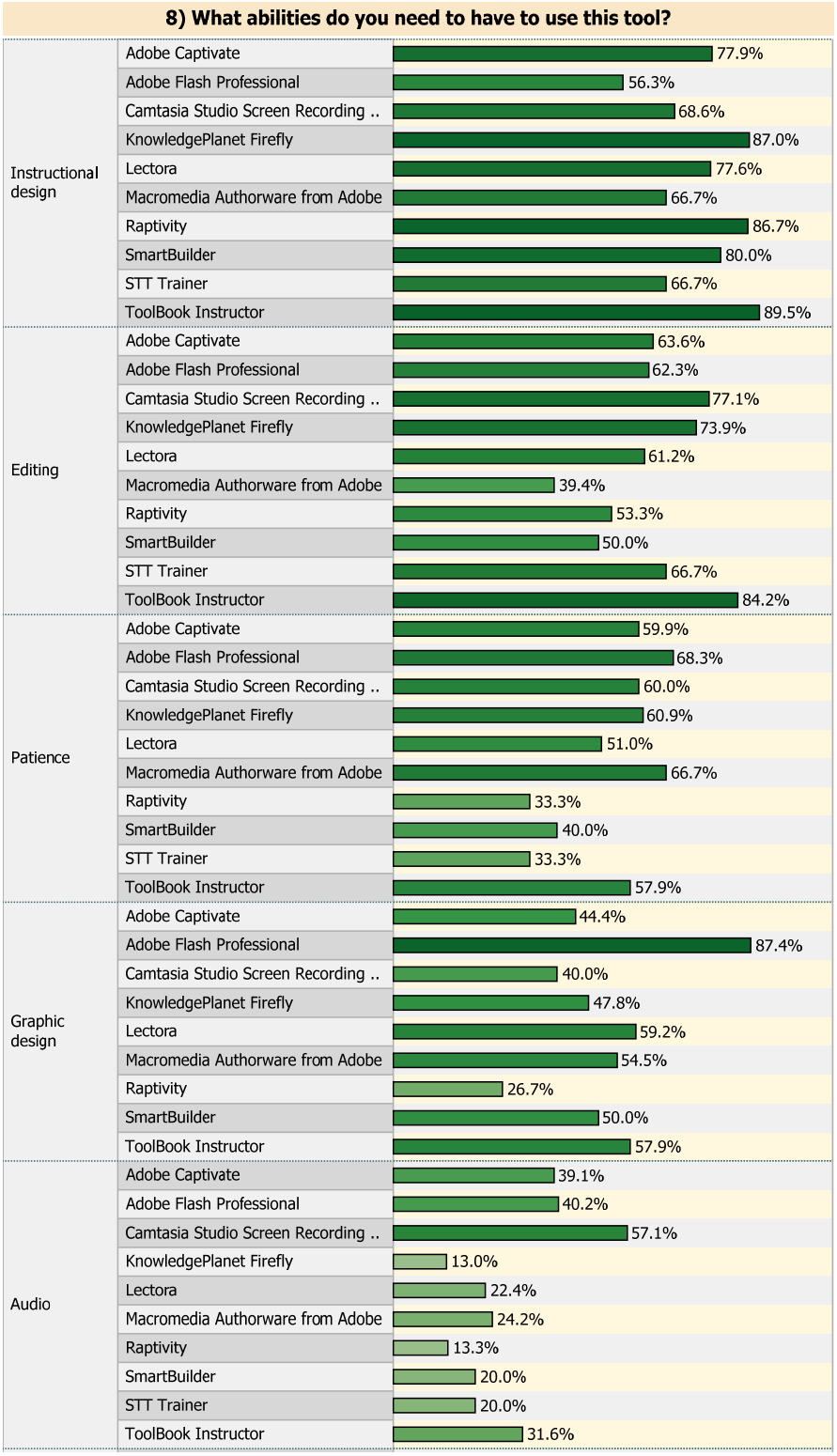
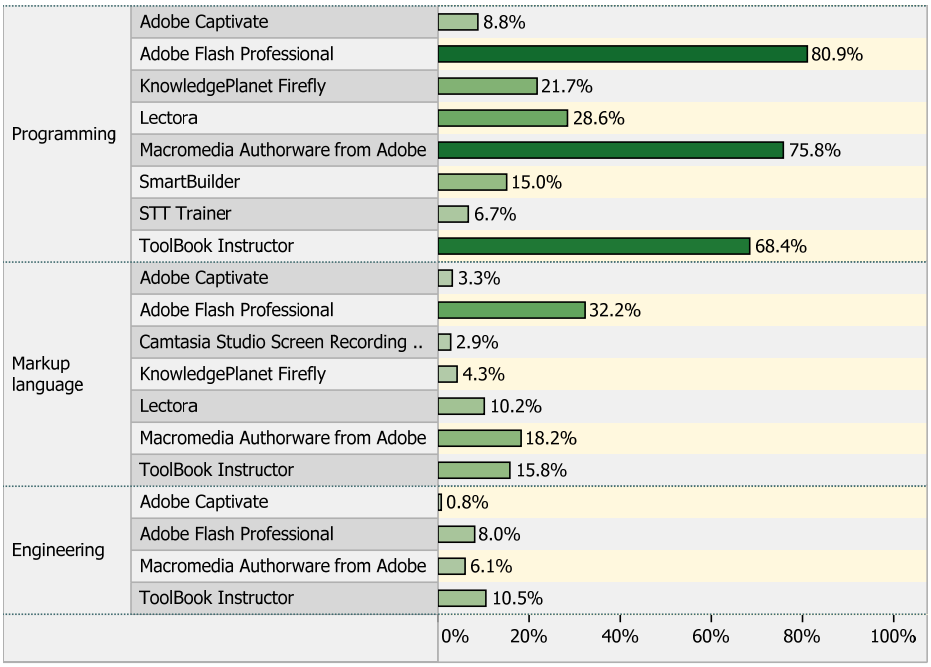


Figure 89 – Abilities you need to use a particular tool (continued below).



Source: The eLearning Guild Research

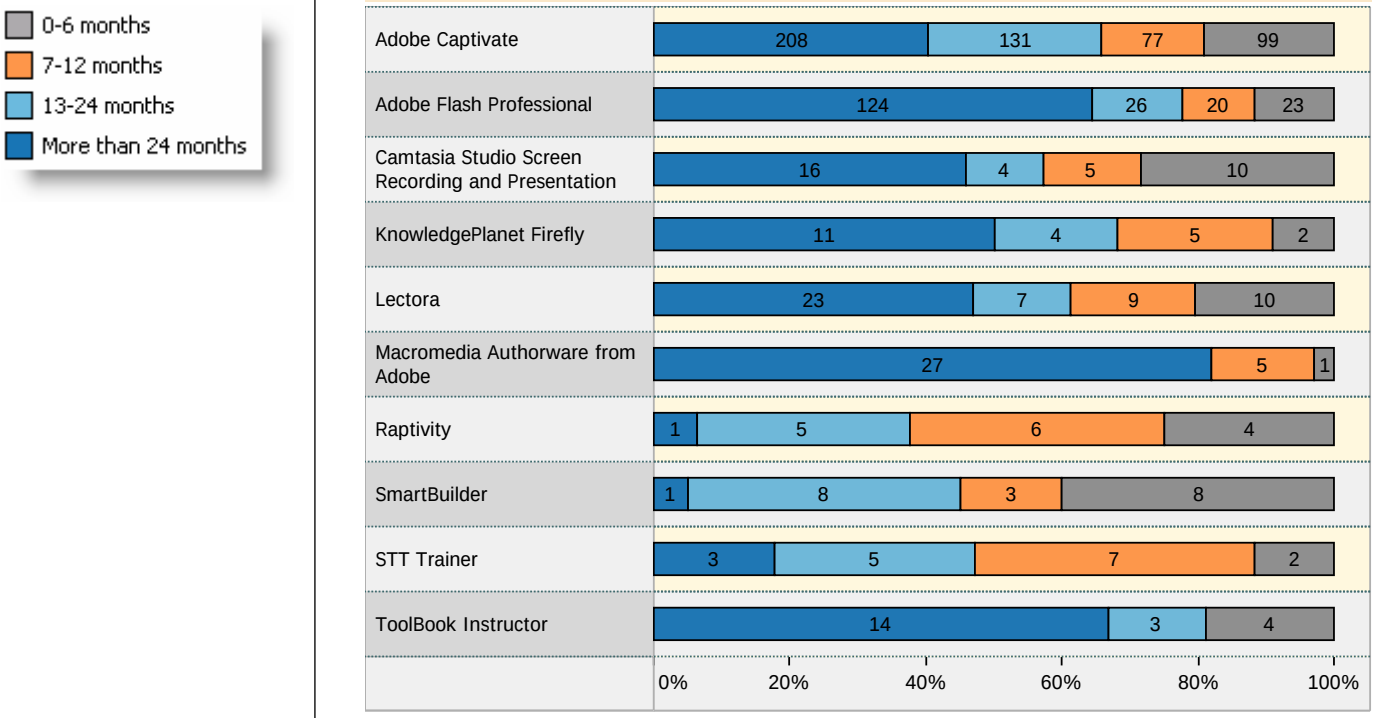
Figure 90 – Continuation of abilities you need to use a particular tool (continued, below).

As with "Please indicate why you use this tool" on page 97, most results cluster together, with some notable exceptions.

- Only 33.3% of STT Trainer and Raptivity users indicate you need patience to use their tool (vs. an average of 53% for the other tools)
- There's a huge difference between the tools that require programming skills (Adobe Flash Professional, Authorware, and ToolBook Instructor) and the ones that do not (average of 75% for the tools that require programming vs. 16% for those that don't).
- Only 56.3% of those that use Adobe Flash Professional indicate that you need instructional design skills vs. an average of 78% for the other tools combined. This is surprising in that Adobe Flash Professional, unlike many of the other tools, does not come with any forms of built-in instructional-design intelligence, so people using it must rely either on other tools,[14] or on other people.

[14] Indeed, Guild members use simulation tools in combination with other tools very frequently. See Betsy Bruce's essay "Killer Tool Combinations" in *The eLearning Guild's 360° Report on Authoring and Development Tools*.

How long have you been using this tool



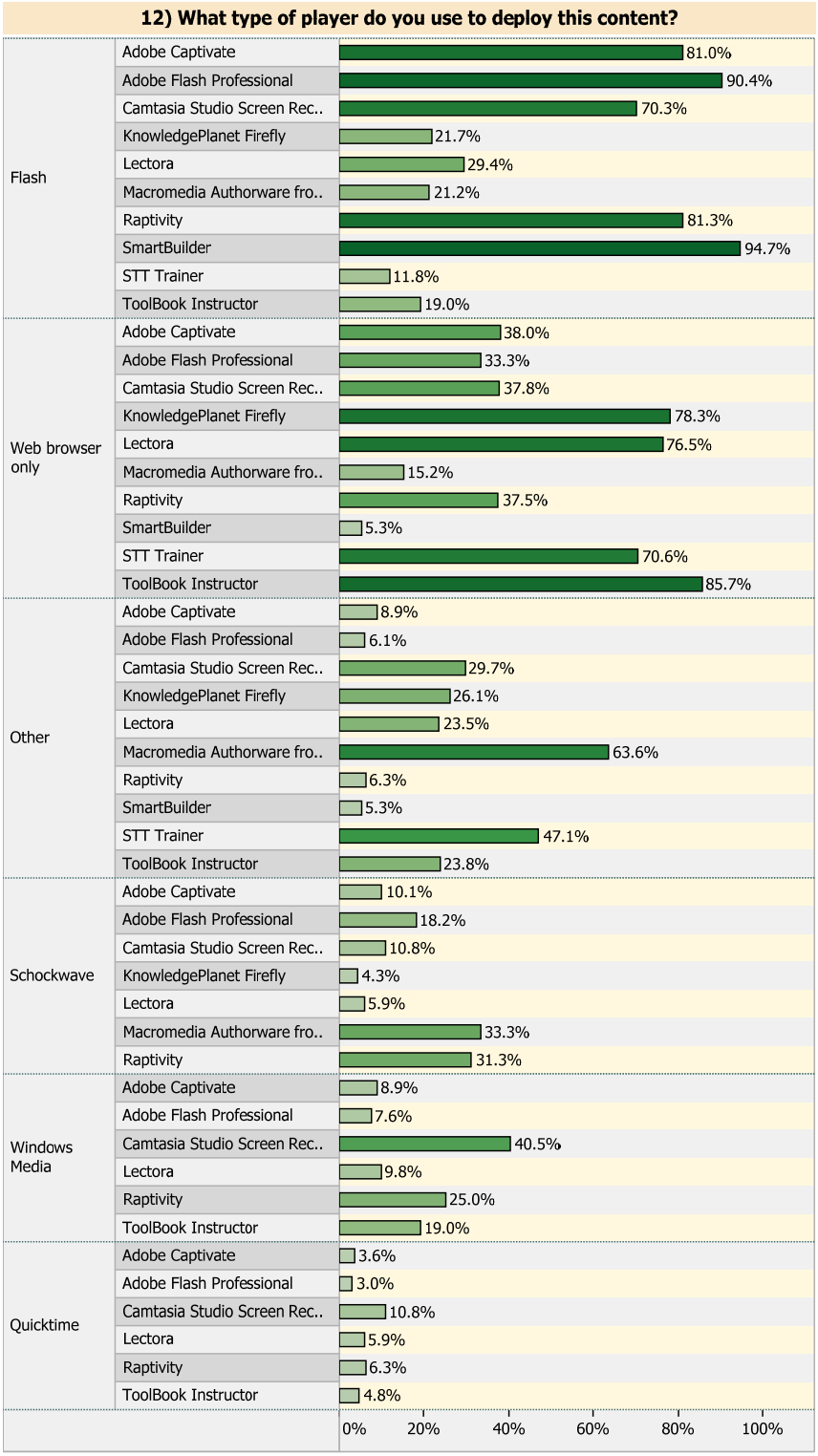
Source: The eLearning Guild Research

Figure 91 – Length of time Guild members have used a particular tool.

This chart deals with entrenchment and sales growth. Here's how to interpret the chart.

- Over 80% of Authorware users have been using the product for more than two years. This indicates that the product is solidly entrenched, but that there are no new product sales, which is not surprising given Adobe's plans to halt further development on the product.
- Close to 40% of SmartBuilder users have been using it for six or fewer months, indicating new sales, but that the product is not yet entrenched as a standard in the organizations where it is used.
- Adobe Captivate enjoys both entrenchment and new product sales, as does Lectora, KnowledgePlanet Firefly, and Camtasia Studio.

What type of player do you use to deploy this content?



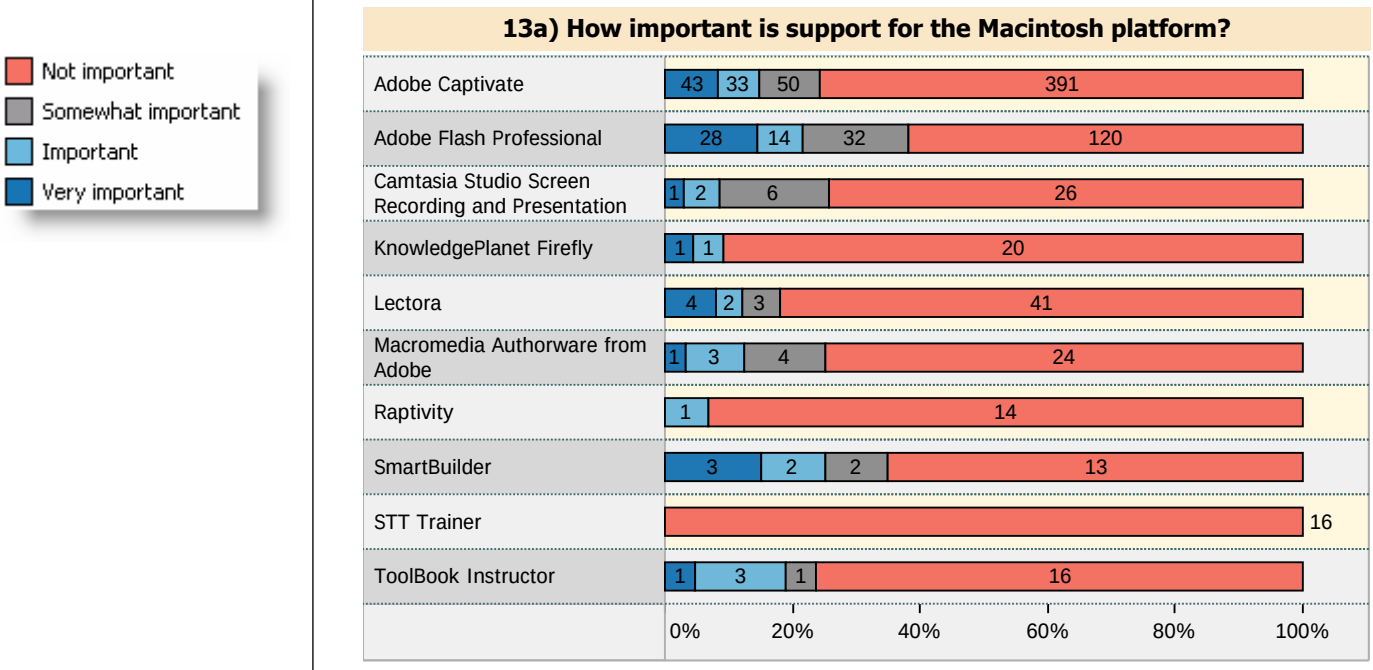
Source: The eLearning Guild Research

Figure 92 – Correlations between tools and the players used for deployment.

Again, the interesting findings are the items that stick out from the others.

- ToolBook Instructor, KnowledgePlanet Firefly, Lectora, and STT Trainer users target deployment in any browser (vs. relying on some type of plug-in.)
- SmartBuilder, Adobe Flash Professional, Raptivity, Adobe Captivate, and Camtasia Studio users rely on some form of Flash player.

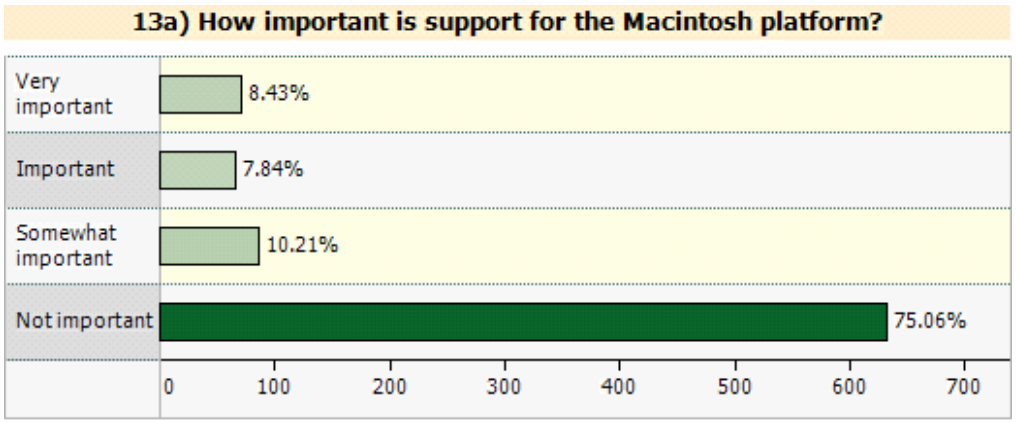
How important is support for the Macintosh platform?



Source: The eLearning Guild Research

Figure 93 – Importance of Macintosh support, broken down by tool.

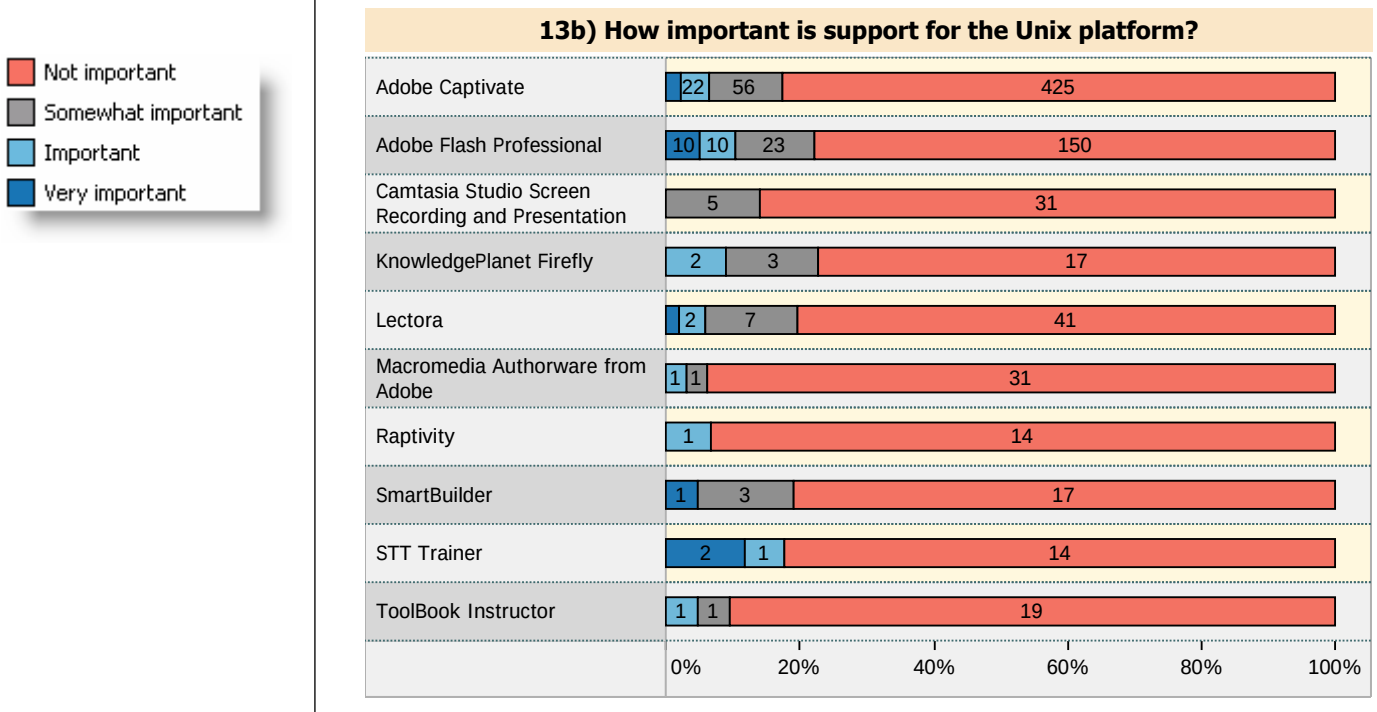
Figure 93 shows how users of particular tools rate the importance of Macintosh support. If we review Guild members' responses for all tools (not just the ten that we compare in this section), we see that over 16% indicate that Macintosh support is important or very important (Figure 94).



Source: The eLearning Guild Research

Figure 94 – Importance of Macintosh support as indicated by all members who completed the survey.

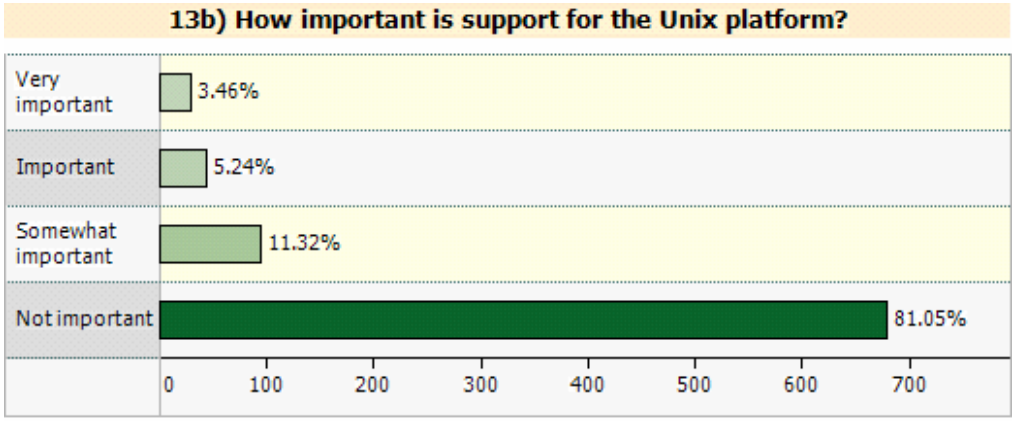
How important is support for the UNIX platform?



Source: The eLearning Guild Research

Figure 95 – Importance of UNIX support, broken down by tool.

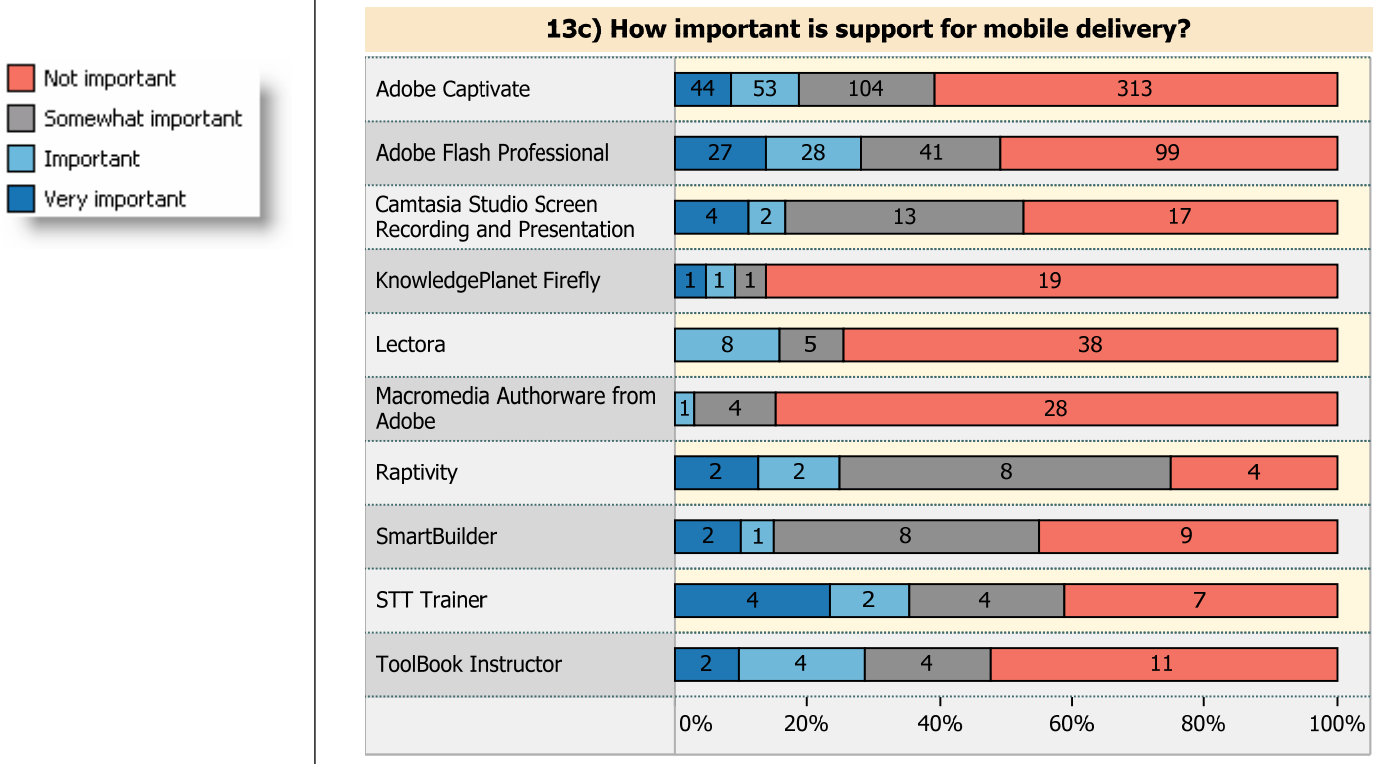
Figure 95 shows how users of particular tools rate the importance of UNIX support. If we review Guild members' responses for all tools, we see that fewer than 9% indicate that UNIX support is important or very important (Figure 96).



Source: The eLearning Guild Research

Figure 96 – Importance of Unix support as indicated by all members who completed the survey.

How important is support for mobile delivery?



Source: The eLearning Guild Research

Figure 97 – Importance of support for mobile delivery, broken down by product.

Figure 97 shows how users of particular tools rate the importance of support for mobile delivery. If we review Guild members' responses for all tools, we

see that more than 21% indicate that mobile delivery support is important or very important (Figure 98).

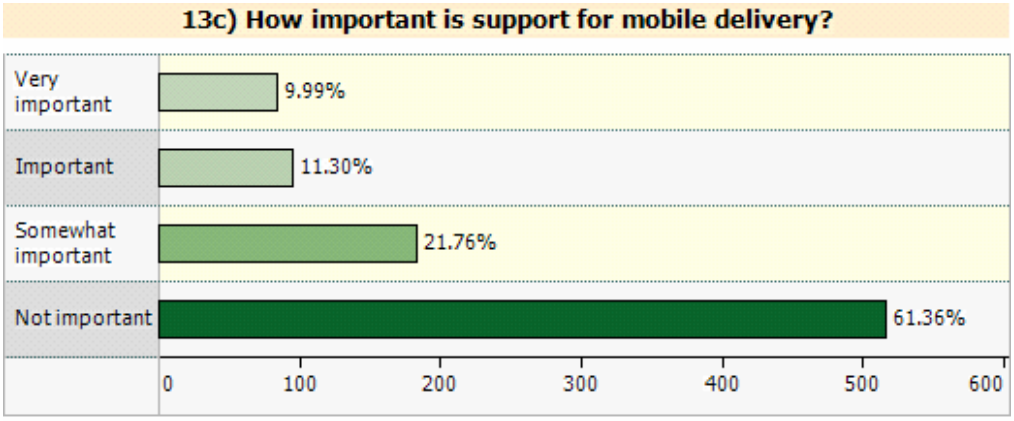


Figure 98 – Importance of support for mobile delivery as indicated by all members who completed the survey.

As indicated in the *Guild's 360° Report on Mobile Learning* published in August 2007, we predict significant growth in this area, and expect to see vendors improve their support for mobile learning initiatives (see "Support for mobile delivery" on page 93.)

Simulation Tools – Marketshare

Corporate

Tool and Product -- Multiple dimensions

Adobe Captivate	Adobe Systems, Inc.	79.71%
Adobe Flash Professional	Adobe Systems, Inc.	45.90%
Macromedia Authorware from Adobe	Adobe Systems, Inc.	10.44%
Lectora	Trivantis	10.18%
ToolBook Instructor	SumTotal Systems Inc.	5.19%
KnowledgePlanet Firefly	KnowledgePlanet	3.28%
Raptivity	Harbinger Knowledge Pr..	3.02%
OnDemand Personal Navigator	OnDemand Software	2.82%
Rapid Intake - Flashform Rapid eLea..	Rapid Intake	2.43%
OutStart SoftSim	OutStart	2.17%
Second Life	Linden Research, Inc.	1.64%

0 500 1000 1500
Number of Members

Source: The eLearning Guild Research

Company Marketshare

Adobe Systems, Inc.	93.11%
Trivantis	10.17%
SumTotal Systems Inc.	5.18%
KnowledgePlanet	3.54%
Harbinger Knowledge Products Pvt Ltd	3.02%
OnDemand Software	2.82%
Rapid Intake	2.43%
OutStart	2.17%
Linden Research, Inc.	1.64%

0 200 400 600 800 1000 1200 1400 1600
Number of Members

Source: The eLearning Guild Research

Figure 99 – Simulation Tools product and company market share results for corporations as of December 18, 2007 (based on minimum of 25 responses). 79.7% of Guild members in corporations use Captivate, and 93.1% use at least one Adobe tool for simulations.

Education and Government

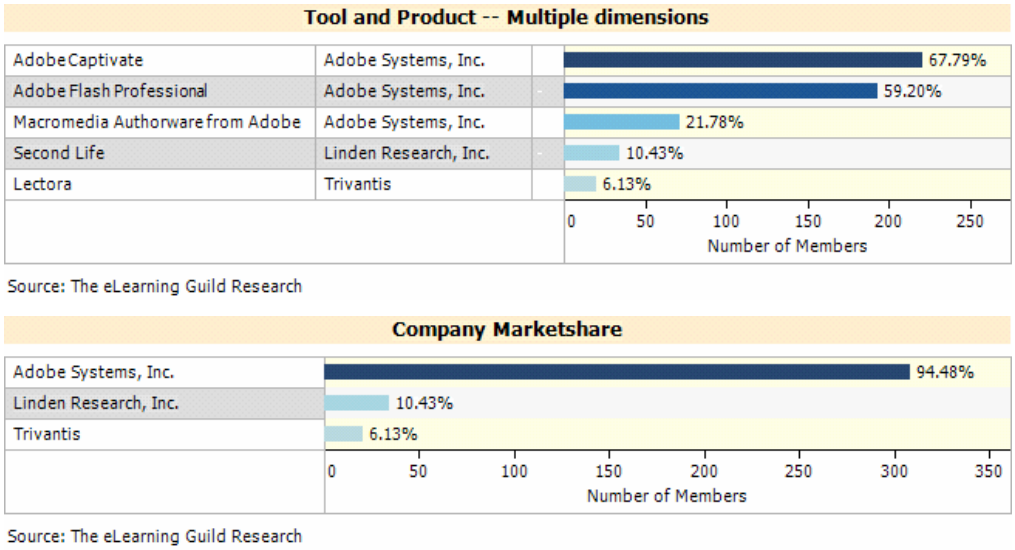


Figure 100 – Simulation Tools product and company market share results for education and government organizations as of December 18, 2007 (based on minimum of 20 responses). Notice that more than 10% are using Second Life, indicating fairly widespread adoption and/or experimentation within the education community.

Debunking Myths[15] about Serious Games

By Anne Derryberry

Anne is an analyst and advisor for serious games, online learning games, simulations, and virtual worlds. She works with learning organizations, game developers, tools developers, and analysts as a learning architect, advisor, consultant, and industry observer. She is interested in both group experience, and how groups learn in virtual environments, especially through games. She also focuses on business modeling and monetization strategies, so that learning and meaningful game play is a profitable and sustainable industry. Anne earned her Bachelor's Degree at UCLA, and her Master's Degree in Educational Technology at San Diego State University.

You can reach Anne at anne@imserious.net

[15] A few, anyway.

Overview

I like the people on Discovery Channel's *MythBusters*. They prove or disprove everyday myths through scientific demonstrations, and have a raucous good time doing so. Did you see the one where they tried to determine whether blindfolded pistol duelers could actually shoot bullets at each other that collide and fall to the ground on the dueling field?

More interesting to me than the answer they arrived at (you'll have to set your TiVo to find that out) is the number of myths that need busting. These *MythBuster* guys have a whole lab and several assistants, all for the purposes of determining whether a man could have been blown out of a window by a gust of wind only to be blown back in some floors lower; or whether hanging a disco ball from the rearview mirror inhibits speed-radar detection(!); or whether your stomach explodes if you eat a Coke-Mentos combo meal.

Watching *MythBusters* has also brought me face-to-face with myths in my own life. I had no idea how many misconceptions I've been laboring under. Not to be alarmist, but did you know that lava lamps could be lethal?

My now-heightened awareness of everyday mythology has also forced me to acknowledge some of the most persistent myths surrounding serious games[16]. And so, in homage to Jamie and Adam and their merry band, I, too, take up the *MythBuster* standard.

[16] Yes, I come down on the "serious game" side of the nomenclature debate.

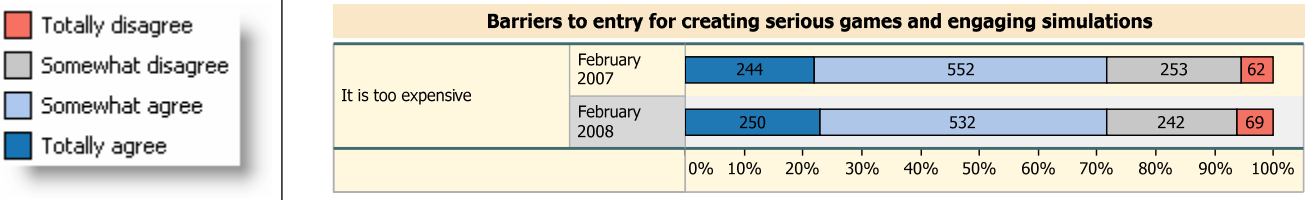
Survey Says…

Myths surrounding serious games touch many categories. Many of these are reflected in the data provided by The eLearning Guild's survey respondents.

Myth #1 – Serious games are too expensive.

Truth or Fiction: FICTION

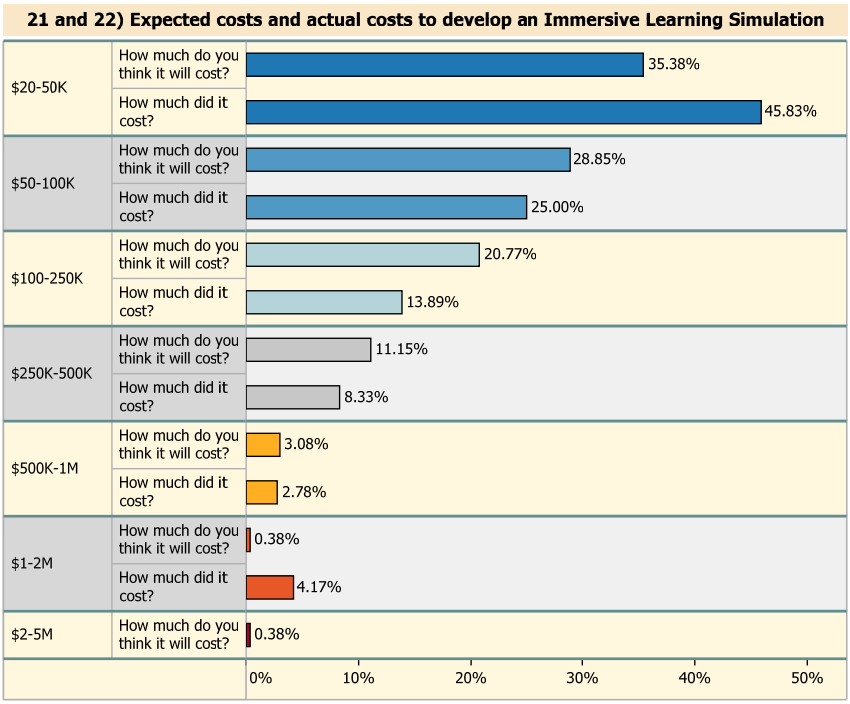
The most common myth surrounding serious games is the cost associated with their development. While survey respondents are marginally less concerned about this issue in 2008 than they were a year ago, over 70% believe that costs associated with serious games development were prohibitive.



Source: The eLearning Guild Research

Figure 101 – Over 70% of Guild members cite cost as a barrier to adoption.

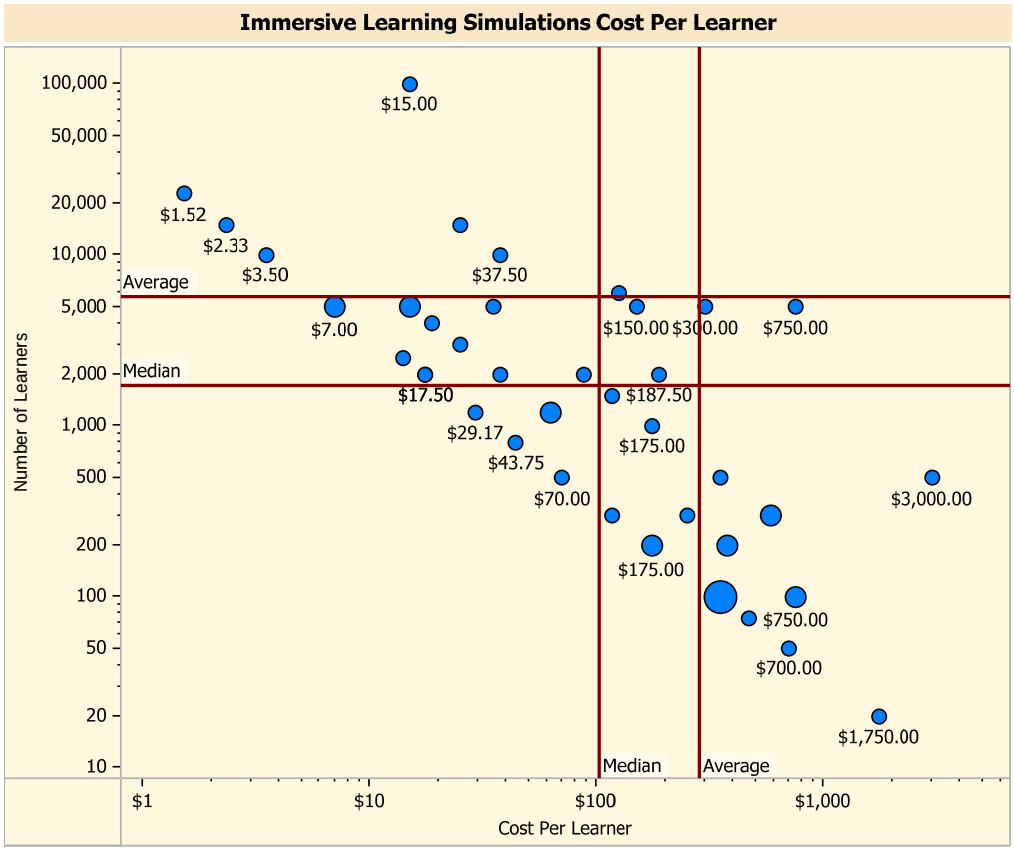
When asked to estimate the cost of a serious game development project (*n.b.*, the question gave no parameters about the game), nearly 36% projected costs over $100,000, with fully 15% of respondents anticipating a budget in excess of $250,000, as shown in Figure 102.



Source: The eLearning Guild Research

Figure 102 – Expected costs vs. actual costs.

In fact, however, for those who went ahead with their plans, the median project budget was $75,000, with nearly 45% having actual project costs running at or below $50,000. When you amortize project budgets across the target learner population, costs per learner are $102, as Figure 103 shows.



Source: The eLearning Guild Research

Figure 103 – More than 50 respondents have created immersive learning simulations, AND have provided the costs to develop these projects and the number of learners the system impacts. The median cost per learner is $87.50; the average cost is $273.88.

Bersin & Associates recently set the average cost per learner for blended learning at $240[17]. Admittedly, this is a bit like comparing a Los Angeles ranch house to a Kansas farm. But the truth is, from a generalized view, serious games and immersive learning simulations have as competitive cost-per-learner figures as any other technology-based learning program.

Indeed, some organizations, like the U.S. Department of Justice, are concluding that favorable costs, coupled with enhanced learner engagement, make games and simulations an ideal approach to workplace learning and development. Michael O'Shea, law-enforcement program manager at DOJ's Office of Justice Programs, puts it this way: "Because of the cost-effectiveness of these

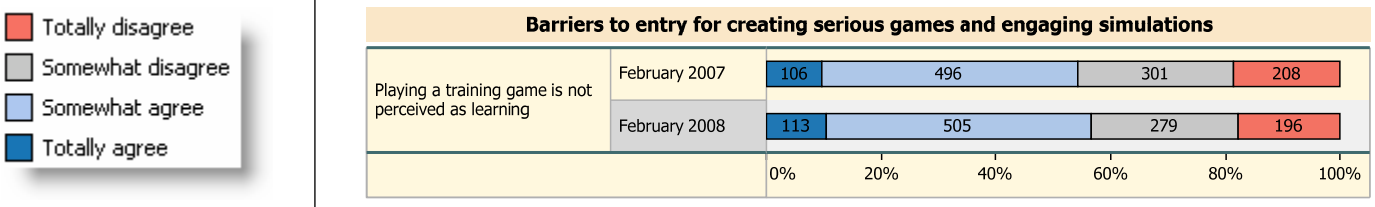
[17] http://www.bersin.com/newsletters/april_2003.asp

programs, and the ability to realistically engage users, we will see simulations applied to all areas of services provided by government."

Myth #2 – Playing games isn't learning. Work isn't for play.

Truth or Fiction: FICTION

This myth mystifies me. In addition to the body of literature that disputes this point of view, my own training, experience, and logic lead me to a clear understanding of how effective and impactful serious games and game-based learning are for adult learners. Yet, a significant (almost 60% of respondents) and expanding (approximately 1.5% increase from 2007 to 2008) group of survey respondents feel otherwise.



Source: The eLearning Guild Research

Figure 104 – Almost 60% of Guild respondents agree with the statement that a training game is not perceived as learning (although members themselves indicate an openness to adopt game-based learning. See "Barriers to Entry" on page 34.)

Have you read the case studies included in this report? Each one of the serious games or simulations described in these write-ups is a very serious learning effort with very serious goals. Some may not have any "fun" in them, but, strictly speaking, that isn't the objective of games or playing, anyway. Still in all, those who commissioned them judged these games and simulations effective and worthwhile.

There is more and more research on the effectiveness of online games as learning tools. In her 2007 review of peer-reviewed material from the previous ten years, Mary Jo Dondlinger concludes, "There is widespread consensus that games motivate players to spend time on-task, mastering the skills a game imparts… [A] number of distinct design elements, such as narrative context, rules, goals, rewards, multi-sensory cues, and interactivity, seem necessary to stimulate desired learning outcomes."[18]

[18] Dondlinger, M.J.. "Educational Video Game Design: A Review of the Literature." J. of Applied Educational Technology 4(1): 21-31, 2007.

Myth #3 – Game-based learning is not as effective as current e-Learning

Truth or Fiction: BOTH

In some ways, this myth is a more refined version of Myth #2. It acknowledges that games and simulations do offer some benefit to the learner – just not to the same degree as more formal e-Learning does.

While I challenge this myth, I can certainly sympathize with the sentiment. We have experience and history with e-Learning. We have strong documentation as to its efficacy. The jury is still out on game-based learning. Suddenly, everybody's from Missouri, the "show me" state.

Survey respondents, too, need to be persuaded, it seems, of the effectiveness of games and simulations vis-à-vis e-Learning. Eighty percent of respondents indicated agreement or strong agreement with this myth.

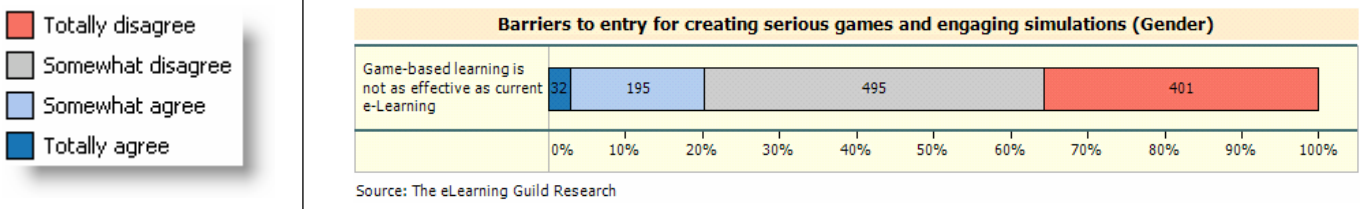
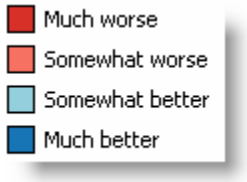
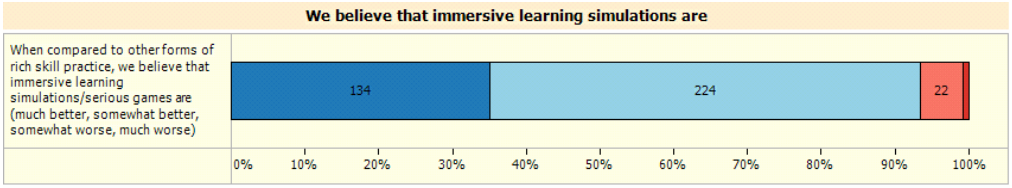


Figure 105 – 63% are "somewhat undecided" as to the effectiveness of e-Learning relative to immersive learning simulations.

It's hard to know what respondents mean by partial agreement or disagreement with an absolute statement: do they not have an absolute opinion because they haven't made up their minds, or is it because they don't make an absolute distinction? For those whose ambivalence stems from a revolt against absolutism, I share your pain. Not every audience, content domain, or environment is appropriate for game-based learning.

Still, those survey respondents who have actually created one or more serious games or sims – some 381 as of this writing – paint a different picture. No fewer than 93% of those with recent personal experience of implementing game-based learning report a belief that game-based learning can be superior to other forms of rich skill practice (see Figure 106).





Source: The eLearning Guild Research

Figure 106 – Of those respondents who have created Immersive Learning Simulations or Serious Games, over 93% consider them much or somewhat better than other forms of rich skill practice.

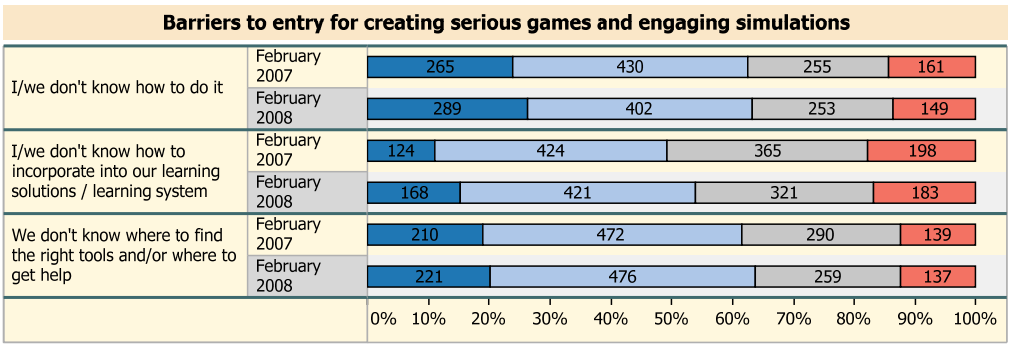
Therefore, while experience seems very much to alter one's appreciation of serious games, a note of caution seems to be in order. As with every other approach to workplace learning, you must integrate, appropriately and judiciously, games and simulations into a learning environment in order to optimize their value for learners.

Myth #4– Serious games are really complicated and difficult to develop.

Truth or Fiction: BOTH

Do you remember the first e-Learning project you were involved in? In all likelihood, you joined other members of a multidisciplinary team; instructional designers, Web developers, graphic designers, technical writers, subject matter experts, and database programmers likely had roles in your project team as well. The project worked because, together, all the players contributed their expertise to the project's success.

Yet, coming from this team orientation did not swell the confidence of survey respondents. From 50-65% of respondents were in some way stymied in their interest in serious games by their lack of confidence in their own abilities, and, seemingly, those of their colleagues.



Source: The eLearning Guild Research

Figure 107 – Many members cite lack of knowledge and know how as an impediment.

My suspicion is that respondents' trepidation is born of the sub-myth that serious games must contain certain elements, like 3-D, to be truly serious. Kevin Corti's essay in this report speaks to this point specifically by spotlighting a 2-D game (see "Demystifying Immersive Learning Simulations – Moving From the Potential to the Practical" on page 121.)

In many ways you can compare designing and developing serious games to making a movie. They can be as vast in scope, and as complicated in production values, as any high-budget Hollywood film, or as contained and unassuming as a local-access TV production. The budgets, scope, and complexities adjust accordingly, and the right project team can make a project crash and burn, land perfectly, or soar.

Learning designers have many balls to juggle. Multi-player environments and cohort learning requirements make serious game design, development, and testing quite challenging. Then there's figuring out how to make the game do meaningful assessment; and pass relevant data from within the dynamic game environment to the LMS. No wonder one's best options seem to be to freeze or go fetal.

The good news is that more and more developers, vendors, and integrators know how to play their role in the serious game environment. More case studies are appearing every day. Learning designers can easily find lifelines, just as has been true with technology and design innovations of the past.

Editor's Note: If you're not sure what to do, why not find somebody who can help you. There are a lot of fellow members, consultants, and vendors with successful implementations under their belts. The authors of this report, and last year's report, have years of experience, as do the people submitting the

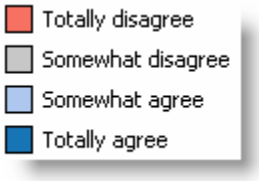
case studies. Make sure to check out the resources section on page 205 for where to find help in getting started.

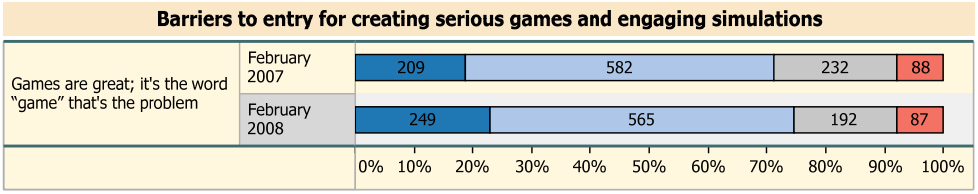
Serious games can be complicated to design and develop, and so teams make serious games. If you are a learning designer, you have an essential, albeit limited, role to play. It is not incumbent upon you to learn what everyone else knows, just be able to do your part well. Without your contribution, the learning that makes the game serious won't come through.

Myth #5 – We ought to call serious games something else.

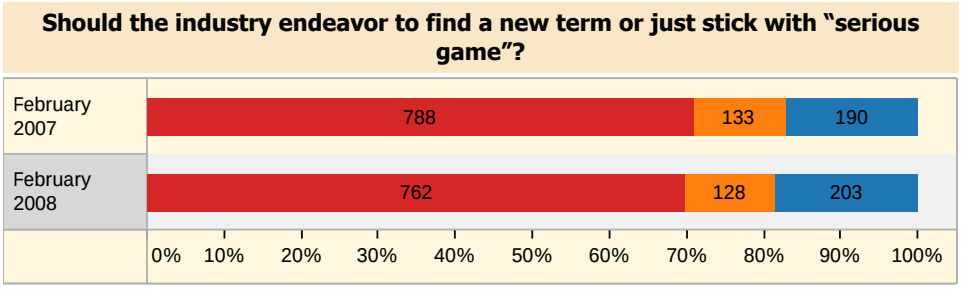
Truth or Fiction: ???????

I wasn't going to wade further into this debate, having said my piece last year[19], but there you go. The fact is that the vast majority of survey respondents – 75% – believe that the terminology is an impediment, so much so that 70% want to find a new term for this approach to learning.





Source: The eLearning Guild Research



Source: The eLearning Guild Research

Figure 108 – Guild members – or at least the organizations they work in – still have problems with the term "game."

Several expressions come to mind as I contemplate this dissatisfaction: "The horses have left the barn," and "Tilting with windmills" are the first two. Probably the one that echoes the loudest is, "The market has spoken."

Now, I recognize that survey respondents are as much The Market as anyone. Nevertheless, the question cedes the point in its very construction – "serious

[19] http://imserious.typepad.com/imserious/2007/05/rant-serious-de.html

games" *is* the term of art. If you want to call Barbie, Lola, please go right ahead. However, since her name is Barbie, that's what the rest of us are going to call her.

Editor's Note: Gee, had I known that Anne had written that screed last year… ☺ (see below). Actually, I'm personally comfortable with the term "serious game" and prefer it to "immersive learning simulations." But I recognize that A LOT of people are not comfortable at all with the term "game" (whether it be serious or not), and I appreciate having a "corporate-correct" term that will not be summarily rejected.

The Guild has spent more time this year reviewing the history of serious games, and we've uncovered useful – and entertaining – information that should help you and your organization surpass this conceptual and terminology hurdle. See "Name Game Nonsense" on page 151.

With such strength of opposition, the market may indeed change its mind and adopt a more pleasing term. We have a mythical mystery on our hands until people stop asking this question, or we stop saying "serious games."

So In Conclusion…

As with stereotypes, myths usually develop out of a lack of information and a healthy dose of fear and/or anxiety. Most myths have a hard time withstanding the scrutiny of a critical eye, as we've seen.

If you find yourself in the group of naysayers and resisters to serious games, it may be valuable to examine the myths you hold that put you in that group. It just might be that, in shining a light on some of these beliefs and misconceptions, your resistance will dissolve into enthusiasm.

Use your desk lamp, though. I was serious about the lava lamp.

Demystifying Immersive Learning Simulations – Moving From the Potential to the Practical

By Kevin Corti

Kevin is CEO of, and Chief Learning Architect at, PIXELearning, a U.K.-based specialist provider of immersive learning simulations technology, services, and products.

Kevin has worked in the learning technologies field since the mid-90s and co-founded PIXELearning in 2002. He has worked on more e-Learning and Web projects for clients than he can remember, including global private enterprises, national and regional government bodies, TV or media companies, heritage sector organizations, training and education providers, PLCs, and family-run businesses. He has a passion for innovation in learning, and is an internationally recognized "serious games" industry speaker, writer, and practitioner. He is involved with several public sector and academic initiatives aimed at fostering the growth of games and simulations for training and education, and has spoken on the subject at several dozen events in the U.K., Europe, and North America.

Prior to moving into the learning technologies space, Kevin worked in a mechanical engineering company, and obtained a degree in Disaster Management. He describes himself as a "time-constrained gamer," loathes spiders, and has a strange fascination with the number 27.

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Introduction

I have been working in the arena of complex computer-based learning games and simulations since the late 1990s. In that time, I have seen that the adoption of computer-based games, and/or simulations for learning (a.k.a. "Serious Games"), has accelerated. This is especially true in the last eighteen months, and has been particularly so in the sector that is relevant to the members of The eLearning Guild: Adult vocational training.

For avoidance of doubt, and for reasons that should become quickly apparent, this essay focuses on the nature of the applications known as Immersive Learning Simulations. It does not cover very-high fidelity, multi-million dollar "serious (computer) games." Nor does it cover simplistic "millionaire" or "smack a monkey" quizzes used increasingly in an attempt to enhance standard multiple-choice level of interactions.

Despite the marked upsurge in interest, several factors remain which contribute to preventing the wider adoption of what is potentially a wonderful addition to the blended learning solutions arsenal. This essay seeks to identify these factors, and to outline strategies for overcoming them for those of us who work on both the demand and supply side of this still nascent sector of the wider learning technologies market.

In particular, it seeks to overcome the critical issues of:

- **Terminology** (understanding what we are actually dealing with);
- **Adoption models** (understanding why and how to use simulations and games at a strategic level); and,
- **Design, development,** and **deployment** considerations.

To summarize, this essay serves as a guide for commissioners and customers to assist in making purchasing decisions, and to assist vendors in effectively pitching their service and product offerings.

What are we talking about?

What do we mean when we talk about "learning simulations," "serious games," "digital games-based learning" or any of the many other terms that are frequently bandied about? For many serious games "insiders," this is a tiresome debate, but to avoid this issue when communicating to the wider end-user audience of stakeholders would be a massive mistake. The fact is that this

space includes many different types of technology, application genres, purposes, design and development competencies, delivery modalities, support strategies, and time and budget variations. To support this statement we need only to look at a few examples.

Cisco commissioned a number of projects, one of which is the fairly well known *Binary Game* (see Figure 109 and try it for yourself). This is by nature very much a game, quite simplistic in nature, which they designed with the specific objective of enabling a large, remotely based community of learners to learn the basis behind the binary system. It was created using Flash, is browser-based, and used by learners on the Cisco Certified Network Associate (CCNA) curriculum who are studying various IT and networking subjects. This is a prime example of a frame game or "mini game."

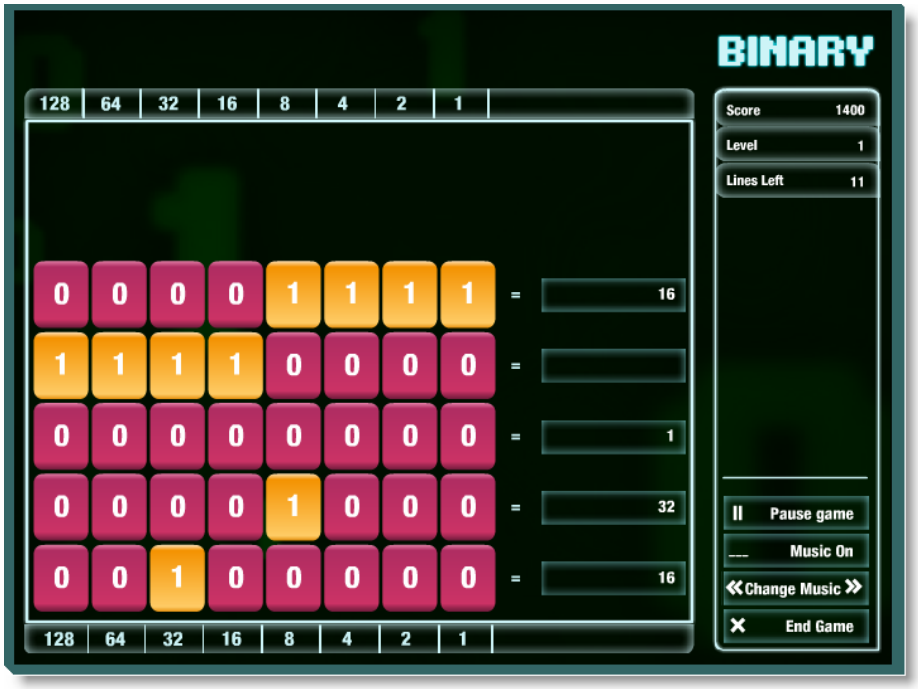

Figure 109 – Cisco Binary game.
See http://forums.cisco.com/CertCom/game/binary_game_page.htm.

Intel commissioned their *CrimeScene* game, which is a polished online multi-media-rich "whodunit" type of affair, and, to my mind, is actually an exercise in brand-building e.g. an "advergame," albeit with some supplemental learning characteristics such as, for example, problem solving (see Figure 110).

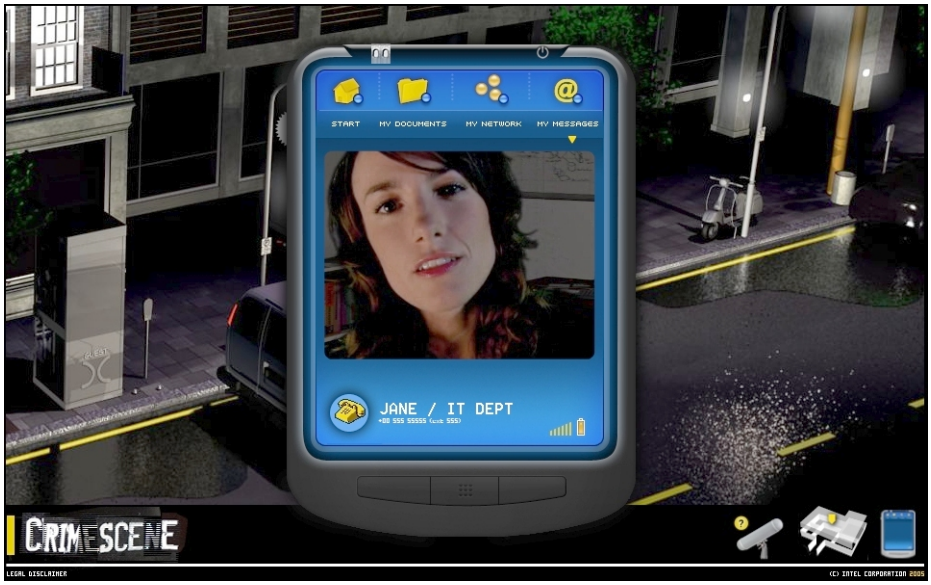

Figure 110 – Intel CrimeScene game. See http://cstech.intel.com/.

The U.S. Army created the *America's Army* series of computer games, which people very often hold up as a prime example of a "proper serious game." These were (very) big-budget projects involving big multi-skilled teams, significant development timeframes, and which used traditional entertainment game technologies and techniques. The first version of *America's Army*, which was given away for free, was primarily a (very successful) recruitment tool, although subsequent related iterations have moved steadily towards becoming *prima facie* military training tools (see Figure 111.)

Figure 111 – America's Army. See http://www.americasarmy.com/.

My company, PIXELearning, created a large-scale browser-based simulation to enhance the instructor-lead audit intern and new hire training programs for one of the "Big 4" accountancy firms in the U.S. (see Figure 112). This application closely emulates technical audit processes, as well as fosters an awareness of what it is like to actually work on a real client engagement. We designed it to closely align with the existing classroom-training curriculum, and to ensure that all learners have a commonality of learning experience. It was created using the company's *LearningBeans*® ILS platform, and is deployed using the ubiquitous Flash player. The client's internal learning evaluation and organization impact studies demonstrated a very powerful business rationale for the use of large-scale simulations.

Figure 112 – PIXELearning's Auditor game.

In the U.K., Playgen created a serious game, which, as founder Kam Mermazia explains, was: "For a management consultancy to teach innovation strategy development to CEOs of today's leading technology companies." The players learn how the innovation market works, depending on different types of businesses. They developed the application using the Virtools game engine, which uses a rich 3-D graphical approach and can be installed on Windows PCs or accessed through a browser using the Virtools plug-in (see Figure 113.)

Figure 113 – Playgen's strategy development game.

We found that by providing a small incentive to participate and record bugs, participation, and bug reporting increased by up to four times the normal rate.

During the development of the last few Windows products, the **Windows Defect Prevention Team** created several simple games to encourage Microsoft employees to find special classes of bugs during a 2-3 week period. An employee who found a bug would enter it in a SQL-based bug-tracking database using .NET-based client Bug Tracking Software. A Webpage, written in ASP.NET and AJAX, fetched the bug information from the SQL database and updated the scores of the "players" (the people reporting the bugs) every night. The employees tracked their bug game progress using the Webpage. Winners got a small reward and recognition. According to Microsoft's Ross Smith, "We found that by providing a small incentive to participate and record bugs, participation, and bug reporting, increased by up to four times the normal rate."

University For Industry (U*fi*) and Caspian Learning collaborated in the U.K. to create a work experience game to improve the employability of learners who have been out of the workplace for a considerable time period, and who have basic skills and self-esteem barriers to overcome (see Figure 114). The project utilized Caspian's proprietary *ThinkingWorlds* engine and plug-in technology to recreate 3-D office and factory work places, and to immerse the learners in contextual experiences to help demystify the work environments. According to Caspian's CEO, Chris Brannigan, "Outcomes showed increases in learner motivation and employability ratings against control groups."

Figure 114 – Caspian's employment preparation game.

Hopefully, this small sample of examples serves to illustrate that this genre of computer software applications can take many different forms and fulfill many different requirements.

That word … "game"

There is no harm in using such language when communicating with these audiences, but in order to actually attain commercial buy-in, and to drive increased adoption, we need to link the grouping term, whatever that may be for the application types, to accepted business terminology, drivers, and practices. That is to say, as an industry we must remember that we operate in the real *world, not a virtual one.*

In the context of e-Learning (and corporate training in general) the word "game" is problematic for many people and upon several levels, but semantic preconceptions aside, there is a much more fundamental problem with language which many would still associate with entertainment.

Modern corporate training is increasingly about the attainment of performance, productivity, and quality improvement (e.g. performance management) and, more often than not, for achieving this with a corresponding cost reduction. The oft-quoted benefits of "serious games" nearly always include terms such as "engage," "motivate," "captivate," and "fun." Whilst there is no doubting that many corporate training (and K-12 education) activities could benefit by being, for example, "more engaging," this type of flowery vernacular is, by nature, naturally appealing only to (some) learners and progressive instructional designers. There is no harm in using such language when communicating with these audiences, but in order to actually attain commercial buy-in, and to drive increased adoption, we need to link the grouping term, whatever that may be for the application types, to accepted business terminology, drivers, and practices. That is to say, as an industry we must remember that we operate in the *real* world, not a virtual one.

As The eLearning Guild's survey results show, the vast majority of respondents still believe there is a stigma attached to the term "game." The Guild's 2007 report sought to tackle this issue head on, and choose, based on the feedback of over 1,000 learning professionals, to plumb for the term "immersive learning simulations" or ILSs, and suggested that people use the term as a Trojan Horse in order to be able to get such applications into their organizations. Whilst ILS might not be the catchiest of terms – particularly for those tasked with marketing games and simulations for training purposes – it is clear that our industry peers consider that this more appropriately communicates how computer game and simulation design philosophies and development techniques can apply in the context of adult learning.

Having identified what an ILS is, the subsequent parts of this essay will investigate:

- The opportunities for using an ILS;
- How to go about adopting an ILS; and,
- The design, delivery, and deployment challenges involved (including the importance of learning evaluation and organizational impact assessment).

Creating customer adoption models

As with any nascent industry, there are always early adopters characterized by their willingness to embrace innovation, and by an attitude towards taking risks in return for an early competitive advantage. There have been many examples of such organizations in this space already. That said, for the wider adoption of ILS to happen, suppliers and users need to counter the confusion that abounds with coherent designs centered around learning-related requirements to ensure that all parties are "on the same page," as it were.

If a potential client fails to feel comfortable with how to go about implementing an ILS, they shall remain only a potential client.

To date, most internal learning and development teams have lacked an awareness of what is required to design, develop, and implement an effective ILS. Likewise, many on the supply side of this space, especially those whose origins are in the entertainment games and multimedia industry, lack an appreciation of what is required to create a truly effective and appropriate learning solution.

If a potential client fails to feel comfortable with how to go about implementing an ILS, they shall remain only a potential client. If an ILS vendor cannot align their technology services and product offering to a customer's specific organizational drivers, business practices, and strategic learning objectives, then no contract will be forthcoming.

This places a burden of responsibility on those of us that operate on the supply side, i.e., companies with ILS technology, content products, and design, development, or consultancy services, to do some hefty customer education and avoid the temptation to let our marketing folks take the lead in external communications. It also, however, requires customers and commissioners to invest some time and energy researching what others have done elsewhere, assess how those projects were undertaken, and learn from the successes and failures. It would not be sensible to place an order for an LCMS, a conferencing

platform, or a rapid e-Learning content creation tool without going through this process, so we should not expect ILS adoption to be any different.

Until a satisfactory cross-fertilization of knowledge, experience, and skills occurs between suppliers and customers, a significant barrier to adoption will remain. I see two key aspects to overcoming this barrier:

1. Becoming able to present the ILS solution in training and business terminology, align it to specific organizational needs, and demonstrate a well thought-through end-to-end proposal.
2. Becoming able to walk a customer through a proven end-to-end process of creating an ILS.

1) Presenting an ILS using training and business terminology

There is currently a lot of talk of, for example, "fun" and "engagement" in the ILS or Serious game space. Whilst these may be admirable learning design objectives, the sponsors and stakeholders within client organizations speak in a rather more "real world" vernacular. Obtaining their confidence (and approval) will require that an ILS product or service provider be capable of showing that their ILS can address explicit organization requirements. These could include:

- A reduction in the frequency of errors or accidents in the workplace;
- Bringing about a significant reduction in required classroom training time; and,
- Designing an ILS aligned to a particular qualification framework.

It will almost certainly mean proving that your solution addresses known end-user factors such as:

- Accessibility;
- Audience IT literacy and modalities of working;
- Being able to talk in terms of LMS integration and adherence to the client's IT environment; and,
- Being able to work with the client to create accurate cost models and ROI calculations.

No matter how fancy a vendor's marketing materials may be, nothing helps close a sale more than being able to actually show a potential customer a relevant example of an ILS, i.e. one designed for purposes that are close to their own. From personal experience, if you can show a customer an appropriate ILS and let them use it themselves, then they will see the relevance to their own situations.

2) Customer process walk through

Table 2 depicts the ILS Project Methodology that we have adopted internally at PIXELearning. The purpose of having such a process is not only so that the ILS service provider runs a "tight ship," but also so that the customer understands what needs to happen when, and where their input is necessary.

Some stages will be highly important on some projects and less so on others. Some clients will have thought through their requirements in detail and have a firm view on what they require. Other clients will look to the ILS vendor or, perhaps, a specialist ILS consultant to provide assistance at the early stages.

The project timescale will also affect the way in which such a process is applied. For example, a tight delivery timescale coupled with well-documented requirements specification will most likely mean fewer scheduled releases, as there is no need for (or time for) a series of iterative prototypes. A less defined specification, and a less-pressing deadline, may mean that it is appropriate to try things to see if they work well, assuming, of course, that the client is willing to pay for this.

1. Organizational needs assessment – understand priorities
2. Instructional needs analysis and material gathering
3. Technical needs and environment assessment
4. Technical specification written
5. Master design document created (v1.0)
6. Client approval of design works
7. Simulation logic defined and modeled in RAD tools for testing and refinement
8. Concept artwork created, and multimedia assets produced
9. Schedule of information required from client and/or 3rd parties written
10. Dialogue and/or narrative text written
11. Non-functional mock-up created for visualization and feedback
12. Early prototype developed and tested
13. Alpha version released and tested
14. Beta version released and tested
15. Full candidate release issued
16. External learning testing and QA
17. External IT testing and QA
18. Final acceptance by client
19. Learner, manager, and/or instructor support materials created
20. Creation of materials for internal communication and marketing of the ILS
21. Evaluation of learning effectiveness
22. Business impact and ROI assessment
23. Future enhancements and improvements quantified

Table 2 – PIXELearning end-to-end ILS process.

Design, development & deployment challenges

The development process is much more akin to software engineering than content creation, and all of this has the propensity to make many an e-Learning or training professional feel out of their depth.

An ILS is not a "piece" of content, but rather it is an advanced and highly interactive recreation of a situation, environment, system, or process. Development involves programming concepts and terminology such as "eventing systems," "time, location, and condition-based triggers," "character rigging," and "real-time physics." The development process is much more akin to software engineering than content creation, and all of this has the propensity to make many an e-Learning or training professional feel out of their depth. Whilst there is no better way to understand what is involved than to actually work on an ILS project, one can consider many issues before starting in order to make the process as stress-free and painless as is possible, including the following:

1. Be realistic
2. Remember the training and organizational objectives
3. Run a software development project, not a content creation project
4. The importance of ILS consultancy
5. Partnering
6. Standards compliance and tracking
7. Assessment of learning
8. Invest in technology and tools: Reuse!
9. Consider alternative business models
10. Achieving completion
11. Post-completion activities
12. Measuring (and demonstrating) organizational impact

1) Be realistic!

Creating a successful "triple A" entertainment computer game is hard work. In fact, it is *very* hard. Those who do not earn their living working in the entertainment game industry often misunderstand that facet of computer games development. It is the reason that computer games development studios employ many of the world's very best computer scientists and digital artists. It is also the reason that most console and PC games have very large development teams, big budgets, and multi-year development timescales.

ILS implementations will not necessarily need to match the cutting-edge production values and technical innovation of the latest entertainment computer games. Nonetheless, they are quite likely to require more investment, take longer, and involve more customer effort than a typical rapid e-Learning project, simply because of the more complex nature of the medium. Failure to recognize this, and, consequently the failure to budget for appropriate time, finance, and resource requirements, is likely to lead to unwelcome problems for all concerned.

If a vendor requires significant subject matter expertise in order to carry out their work, then a client should either ensure that they can provide this level of support (without causing internal disruption or loss of fee income) or allow for the additional cost of providing this externally. As a guide, the majority of ILS projects I am aware of typically fall into the $25,000 to $250,000 range.

In terms of time allocation, a good ILS vendor knows that they are employed to solve a pressing business problem that needs solving as soon as possible, and hence project durations usually fall into the three- to six-month range. Do ensure that there is appropriate time to do the job well, and include sufficient time for design, development, integration, and testing. Giving your vendor six weeks to deliver a mammoth custom-built multiplayer simulation to train thousands of employees in the latest release of your SAP-based procurement process is really not a sensible idea … no matter how strongly your CEO believes it is.

Note: If phrases such as "more investment" and "customer effort" have you a little concerned, remember this: a well-deployed ILS will likely yield a great return on investment. You want evidence? See "Do You Believe You Have Received a Good Return on Investment (ROI)?" on page 46 for ammunition.

2) Remember the training and organizational objectives

It is very easy to get carried away with shiny new toys, and, when learning-oriented simulations are not what you have worked on before, to repeatedly fall back on what you know about those great Super Nintendo, PlayStation, or Atari games you played when you were younger. Those experiences can be useful to inform your thoughts, but never for one moment forget that your primary motivation in adopting an ILS-based approach is not to entertain your audience, but rather to solve your internal or external client's business and/or learning-related problems.

Remember: Keep terms like "cool" and "fun" in the training department (or at home). It is performance improvement, productivity, and quality gains you most likely need to achieve.

3) Run a software development project, not a content creation project

Referring back for a moment to the discussion around the use of the term serious games, you can see that we used the phrase *game craft* in reference to the entertainment computer-game industry's software engineering ethos and processes. An ILS is still very much a complex software application, and, as such, the process of creating and deploying an ILS is, as with entertainment software, pretty demanding.

Companies that want to specialize in applying game and simulation techniques to learning had better develop a proven "ILS craft" pretty darn quickly if they want to thrive and grow. Likewise, commissioners need to understand that the added complexity of most (but not all) ILS projects means that, although a well-organized ILS vendor may be able to complete a project in 2 to 3 months, you cannot expect that they can operate effectively within the same timescales of a typical rapid e-Learning development cycle.

4) The importance of ILS consultancy

I think that it is fair to say that it took several years before training departments in many large corporations were able to build up sufficient internal competencies and experience around first generation e-Learning. During that interim period, there was (and there still is) a need to look to external consult-

ants to help them scope out projects, define requirements, and select and manage vendors. The same is true of ILS adoption.

You may hold the opinion that there is an overlap in the consultant's capabilities and the client's and/or the vendor's skills and experience. You may well be correct, but the one unique thing that they always offer is an independent view, one that is untainted by being too close to the project. My advice, if you have limited ILS experience yourselves, is to seek out such a consultancy and work them hard. Look at the Resource Section in this report for pointers, and consult the Guild Buyer's Guide (which, although not yet available at the time of publication, will be available later this year.)

5) Partnering

Many a learning technology vendor will greet the word "partnership," if they come across it in a RFP, with an (often-justified) cynical response on the basis that what this actually means is something along the lines of "We expect it cheap."

In the brave new world of ILS however, partnerships will perhaps become more prevalent than they have ever been before. This is because, by nature, an ILS vendor is a subject matter expert in *interactivity* above all else, and because an effective ILS delivers higher-level skills development (deep learning) rather than simplistic information delivery (shallow learning). This demands that you involve someone (or some organization) that has a command of the subject domain being tackled by implementing an ILS.

Whilst a relatively inexperienced instructional designer can usually sequence up a traditional e-Learning storybook no matter what the subject matter, it takes a truly excellent instructional designer, in partnership with a subject *expert,* to create an effective and appropriate ILS design.

My own company, PIXELearning, has partnered with Philadelphia-based Global Lead Management Consultancy to design a diversity awareness and inclusion training ILS for a major North American retail bank. The ILS, called "Makrini" – the Greek word for "remote country" – required significant ID effort from an extremely capable designer at our company, from a very experienced e-Learning designer at the banking client, and from a team of world-class diversity and inclusion consultants at Global Lead. We have all experienced situations where design teams have gotten too large to be effective, and it is right to be cautious about such ways of working; however, to undertake

them effectively, an ILS project will nearly always demand a wider mix of experience, skills, and perspectives than traditional e-Learning projects require.

The business models of large-scale ILS projects may well dictate that cost sharing is necessary, but in keeping with the adoption-related theme of this essay, it is the nature of the learning design challenge that will often dictate that ILS projects are carried out in some form of tripartite (or larger) partnership.

6) Standards compliance and tracking

The ability to integrate a solution with a SCORM- or AICC-compliant LMS or LCMS is usually a key requirement for any e-Learning solution. As such, ILS customers will most likely seek to integrate an ILS with their LMS. As a vendor you may question the reasons for this, but as this will be one of the final "ticks in a box" needed to close a sale the vendor will most likely need to be able to do this. It is, however, worth distinguishing between tracking of learners and actual assessment of learning, as they are not the same thing (see item 7) Assessment of learning.

7) Assessment of learning

An ILS, such as a complex business simulation, can potentially generate a huge amount of learner data. Even a simple simulation could create a wealth of outputs. For example, in a business simulation such as finance, you could have P&Ls, balance sheets, and cash flows; or in sales you could have units sold by product, market, and channel. In marketing, you might have allocation of budget to different promotional methods, and market share by product and territory, while in HR you could have individual and team performance, team dynamics, morale, production or operations data, and much more. The standard 4Kb allocation for saving learner data in a LMS is not capable of storing this. Likewise, no LMS provides the tools necessary to be able to effectively query this data. Therefore, unless the client's assessment strategy is simply to equate a learner's completion of a course to the required mastery of it, then it may well be necessary to create an external Web service where learner assessment data can be stored, retrieved, and analyzed.

Note: For information on how to perform meaningful real-time assessment, please see Jim Ong's Essay "Beyond Multiple Choice" in the *Guild's 360° Report on Measuring e-Learning Success* (http://www.eLearningGuild.com/360.)

8) Invest in technology and tools: Reuse!

Vendors that seek long-term competitive advantage (in any industry) will commonly seek to develop technology that can address multiple customers and markets. By amortizing the cost of this technology across multiple customer accounts, the clever vendor will be able to leverage their investment to offer more to any individual customer than if they try to tackle every project on a custom-build basis. Therein lays competitive advantage.

This approach applies not just to vendors, but also to commissioners of immersive learning simulations. Given that an ILS may be more resource- and cost-intensive than traditional e-Learning (but with bigger payback – see "When Compared to Other Forms of Rich-skill practice, We Believe that Immersive Learning Simulations or Serious Games are" on page 45) it makes little sense to reinvent the wheel each time you start a new project. My advice is to seek out a commonality of features and functionality when working with a vendor on one project, which you can leverage on other projects.

9) Consider alternative business models

In a similar vein to the partnership and investment memes, I advise commissioners and vendors to consider alternative business models when seeking to make an ILS project happen.

If you are the vendor, and your ILS project cost starts to go north of the fairly well-accepted $50,000 per hour cost of high-end e-Learning, then naturally the commissioner may start to question whether they want to progress, and inertia can set in. Learning requirements are rarely unique to a particular organization, no matter how much we may like to think so. Why not ask the commissioner if they would be receptive to some form of arrangement whereby you, the vendor, can re-purpose the product, strip out and replace any truly client-specific elements, and then productize it. As a vendor, you would thus get your costs covered by client #1 (perhaps with a small margin), and every sale after that would be nearly pure profit.

If you are on the commissioning side of the project, and you are struggling to get approval for the budget that your vendor or consultants are quoting, then why not look for other organizations with which you could share the development costs? You may even find a third party that would be interested in licensing and selling the end product, which would achieve the holy grail of turning

the traditional cost-center of training into a profit center. Now wouldn't your CEO like that?

I have been involved in several such arrangements; some that we instigated and some that the client put in place. The downside is that such negotiations can extend the sales process, complicate the design phase, and, of course, push profit back to a later date. However, as a developer, such an arrangement can quickly give you a portfolio of attractive "off the shelf" products or, at least, a white-label product that can be made specific to a new customer within a very short period.

10) Achieving completion

A mantra of many a professional soldier is "Check, check, and check again." In a similar vein, the simulation developer's mantra should be "Test, test, and test again." The early-stage technical assessment and specification should have ensured that there are no major surprises when you come to roll out the simulation, and, hopefully, iterative releases will have shown up any major issues.

As, however, we are dealing with software applications rather than content – and I labor that point deliberately – this process is not about simply looking for typos, broken links, or NEXT buttons that do not work. A typical ILS could easily contain tens of thousands of lines of programming code. As a result, there are many levels of technical testing that you need undertake. This includes ensuring that the simulation is neither too easy nor too difficult for the target audience, that you have optimized the user experience, and that it contains no dead ends from which onwards progress becomes impossible, unless, of course, that makes sense from a design viewpoint.

A simulation most likely consists of many discreet simulation elements that are interdependent, and which can affect each other under certain conditions. You should have modeled these in a test environment at the beginning of the project, but you will likely still need to test them in the final version to be sure there are no unnoticed bugs lurking that could diminish the end-user experience. This also allows you to test early-stage design concepts in the real application; i.e. in the way that learners would use it. It is amazing how often seeing it for real uncovers issues that early-stage testing does not.

11) Post-completion activities

The project ends after the client conducts their quality tests and accepts the final release – right? **Wrong!** Lose a turn and go back to the start.

An area of activity that I have seen become more frequent is assisting the client in the creation of internal marketing and communications materials.

The client may require technical support when they roll out the application to the full end-user audience. They may well need vendor support in the creation of user and instructor support documentation. An area of activity that I have seen become more frequent is assisting the client in the creation of internal marketing and communications materials. This may include simple verbiage and screen shots. Equally, it may mean the creation of promotional videos or other "surround" materials that act to raise awareness amongst, and interest from, those that the client wants to undertake the training.

12) Measuring (and demonstrating) organizational impact

Increasingly, customers are asking e-Learning vendors to assist in undertaking the evaluation of learning (e.g. Kirkpatrick levels 1 to 4) and assessment of business impact (e.g. Phillips model). The degree to which the client wants to do this, or where they require the vendor's input, will vary wildly. Nonetheless, the savvy ILS service providers, technology vendors, and consultants will understand these processes, and be able to work with the client to carry them out.

My firm, for example, recently contracted to work closely with one particular simulation client's internal measurement specialists to help them construct questionnaires and evaluation techniques, and to analyze the subsequent data. Having taken part in this process, I can testify to the fact that it is very useful, and indeed rewarding, to talk to the end-user audience that has actually used one of your simulations.

As one intern put it, after being lectured to for three years at accountancy school (and after their professor telling them that they would not actually use this stuff); "With this simulation it feels as if you are actually there on a real client engagement."

I think that this succinctly captures the point. Immersive learning simulations can allow us to move up from telling learners stuff they probably will not use, and move towards giving them personally relevant and meaningful experiences from which they can derive true value.

Note: for a complete discussion on measuring and demonstrating organizational impact, see the *Guild's 360° Report on Measuring e-Learning Success* (http://www.eLearningGuild.com/360.)

Summary

I set out to demystify issues around the adoption of immersive learning simulations. My goal was to do this for both developers and commissioners of ILSs. I do not pretend that this essay is in any way a comprehensive guide to every aspect of starting, delivering, and deploying a large-scale simulation, but I hope that even in some small way it has been of use to you the reader.

I thank you for spending your time reading this document, and I very much welcome any comments, suggestions, or criticism that you may have. This is still a nascent area of the wider learning technologies industry, but one that I, like many others, passionately believe will grow to become a commonly-accepted tool in the overall blended learning strategy of many organizations because of the step-change in personal and organizational benefits it promises.

Kevin Corti,
CEO, PIXELearning

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On the Costs of Games, and Perceptions Thereof

By Clark Quinn

Clark N. Quinn, Ph.D., is a passionate advocate for the potential of technology to facilitate learning and performance. His work has been at the cutting edge in areas such as adaptive, mobile, and performance support systems. With a particular focus on learning, he has designed and developed innovative solutions for community agencies, schools, industry, and government. The author of *Engaging Learning: Designing e-Learning Simulation Games,* Clark has led the design of award-winning online content, educational computer games, and more.

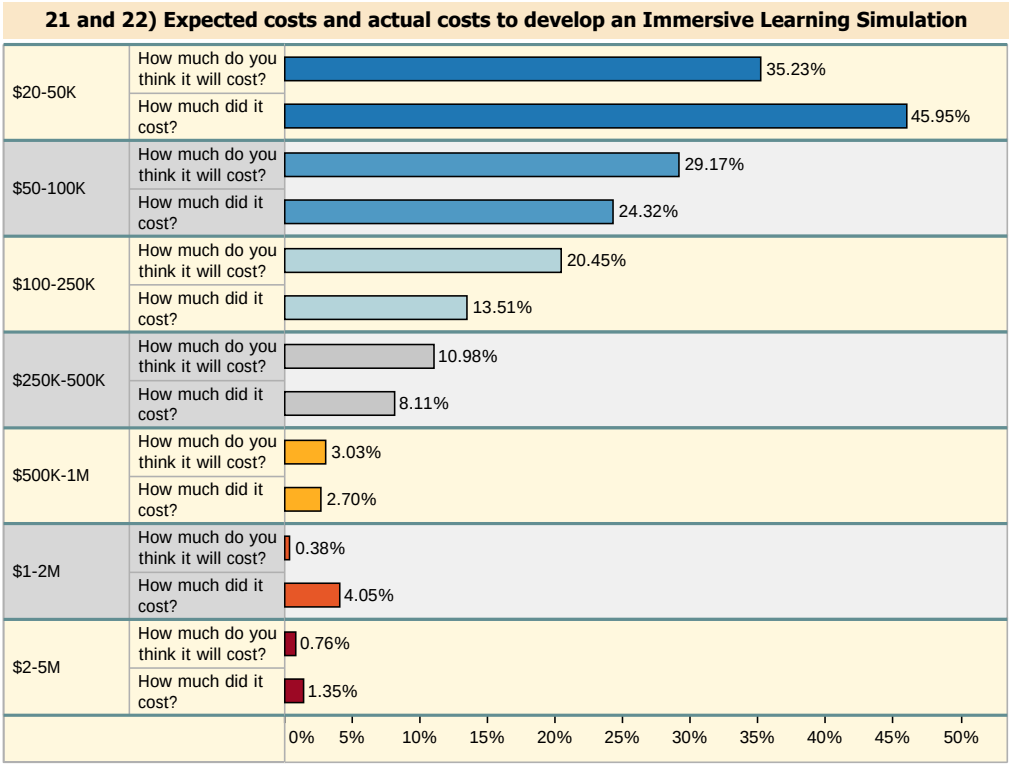
Clark delivers e-Learning strategy through Quinnovation, providing analysis of organizational learning as well as knowledge system design to Fortune 500 companies and universities in areas as diverse as medical, financial, telecommunications, information technology, and publishing. Clark previously led research and development as Director of Cognitive Systems for Knowledge Universe Interactive Studio, and held executive positions at Open Net and Access CMC, two Australian initiatives in Internet-based multimedia and education.

Also a recognized scholar, Clark has an extensive publication record and numerous invited presentations and keynotes at national and international conferences. He has held academic positions at the University of New South Wales, the University of Pittsburgh's Learning Research and Development Center, and San Diego State University's Center for Research in Mathematics and Science Education. Clark received his doctorate in applied cognitive science from the University of California, San Diego, after working for DesignWare, an early educational game software company.

You can reach Clark at clark@quinnovation.com.

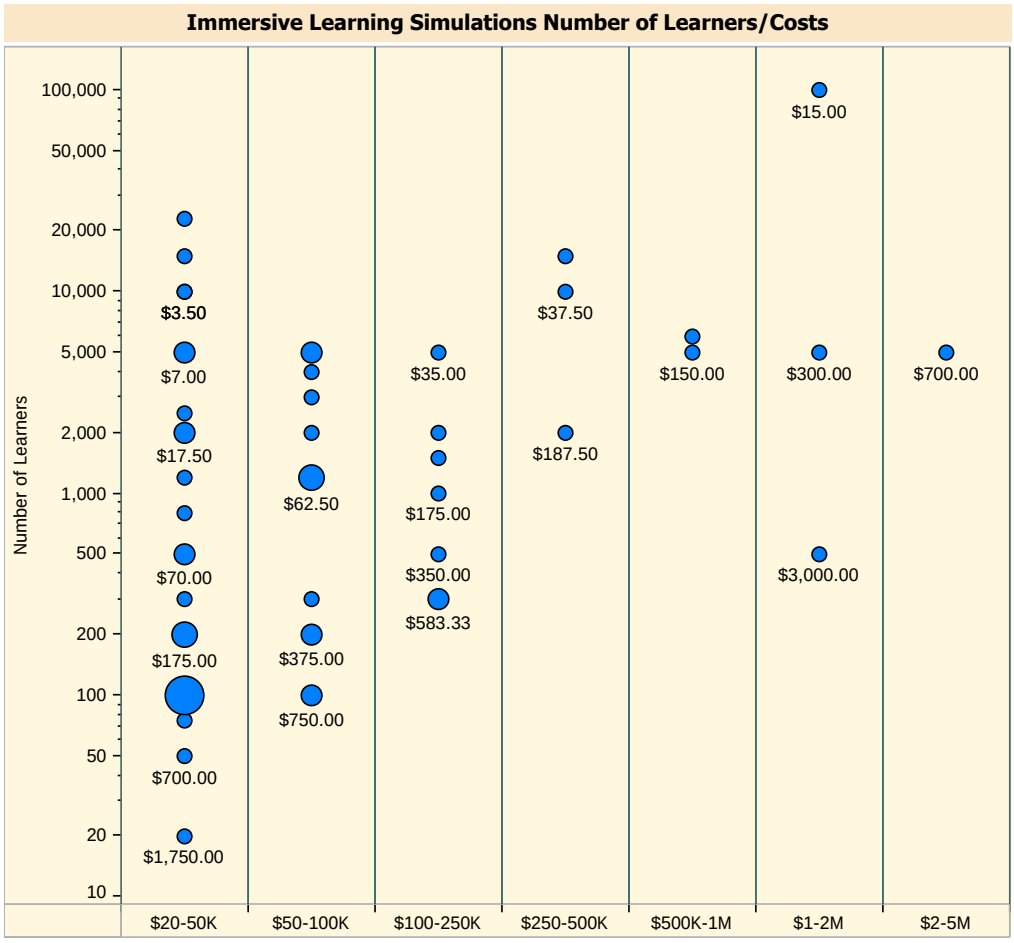
Overview

One of the persistent issues I see in the ILS or Serious game space is the issue of cost. Reliably, people fear that they are too expensive. For just this reason, we asked our respondents this time around to talk about their cost expectations. Then we asked them, if they'd completed a project, what it actually cost. We show the results in Figures 115 and 116.



Source: The eLearning Guild Research

Figure 115 – Expected vs. actual costs for ILS implementations. 264 Guild members answered the "How much do you think it would cost?" part and 74 members who have actually created an ILS answered the second part.



Source: The eLearning Guild Research

Figure 116 – Actual costs plotted against number of learners. Notice that the vast majority of projects fall into the $20-50K and $50-100K buckets, and that even the $2-5M project had a relatively modest $700 per learner cost.[20]

What you should see here is that, generally, the expectations are reliably higher than the actual cost. (Note also the range of costs indicated.) What's going on here? Several things, including what people are talking about when they say "game," and issues of scope.

Talking a good game

The serious games movement has really exploded in the past year or so. And there are good reasons; games are powerful learning practice! For the reasons

[20] The $700 per learner costs is derived by taking an average cost of $3,500,000 and dividing it by the number of learners (5,000)

you should see in the other articles, they provide challenging contexts in which to practice the critical decisions that you need your learners to be able to make. There are both a considerable amount of raised awareness, and a raised amount of discussion, with drivers for each.

In the first instance, a number of books have come out talking about the value of games for learning. This started quite a while ago with Marc Prensky's *Digital Game-Based Learning*, and continued with Clark Aldrich's *Simulations and the Future of Learning*. They continued into more mainstream markets with James Gee's *What Video Games Have to Teach Us About Learning and Literacy*, and David Williamson Shaffer's *How Computer Games Help Children Learn*. Even popular books like Stephen Johnson's *Everything Bad is Good For You* tout games as learning environments. And some landmark games have made an impact, most notably *America's Army*. So, there's quite a bit of talk.

More talk comes from some new sources. Computer game companies, struggling in a very competitive environment, are quite eager to find commissioned works, and have started exploring this market as perhaps a more stable source of revenue. These companies are familiar with the commercial market and the production requirements necessary to achieve popular sales, and consequently promote what's necessary to achieve that level of development, and rightly so. While there is some reason to be concerned about their understanding of the learning side of the equation, they certainly are the source of knowledge about how to develop to that level of scope. However, there's another overlooked level.

What's the scope?

The console game

The top level of development is a console game, running on a dedicated game platform like the XBox, Sony Playstation, or Nintendo Wii. These games have simply awesome graphics capability. To take advantage of the custom hardware for graphics, they require custom development environments. Most game studios have some investment in a library of code optimized for the platform. And to create a game on such a platform requires considerable resources, as you need teams for the complex graphics, and custom programming, etc. However, if you need the polish of a commercial game, deep engagement, and the learning (or, let's be honest, marketing) need is sufficient to justify it, this is the top of the heap. Of course, you also have to ensure your audience has the

platform, as multi-platform development is even more costly. These games, if you're going to bother at all, should have a large scope covering a wealth of skills in a rich world, with weeks of game play. They're for big tasks, major skill-shift changes, completely new areas, or if you really need the marketing. Consequently, they are top dollar to develop, easily several million dollars.

The computer game

A level below is the computer game. Here, the game is running on typical computer hardware, so the environment is more standardized. You do get quite good graphics here, but can use existing libraries of routines, or modify ("mod") available game engines. You also have far broader platform availability, as your audience likely has access to some computer. Consequently, you can make these games for a more reasonable budget with roughly the same scope, but you can also address smaller scopes, down to days. Here you're probably talking in the $500K to $2M range. You could do smaller scopes, but then even computer game development is probably overkill.

Before we go on, let me make something perfectly clear: You typically don't need commercial-quality production. You probably aren't going to try to sell your product on the open market purely for the quality of the experience. You have an additional value proposition, the learning outcome, and you probably have a built-in audience with a need (or you shouldn't be doing this!).

Before we go on, let me make something perfectly clear: You typically don't need commercial-quality production. You probably aren't going to try to sell your product on the open market purely for the quality of the experience. You have an additional value proposition, the learning outcome, and you probably have a built-in audience with a need (or you shouldn't be doing this!).

Also, I'll suggest that most situations where you want the value proposition of a full model- or simulation-driven game for replay to master a new skill set, you don't need the scope that a console game or computer game supports. When you look at most critical learning needs, there is some small number of variables and their interactions that account for most of ways in which people go wrong.

Web game or mini-game

A more modest initiative that is starting to gain traction is a game that only takes 20 minutes or so to play for one run through, and while you may play again to do better and get the nuances, it's not days and days of new play. This level of game covers, I believe, much of the important learning needs. There are plenty of skills that take more than just a branching scenario (which has at most a couple or several replays) to explore the ways in which the situation can vary, but are still small enough to be explored without developing whole

worlds. While these games can be developed as computer games, they're small enough that they can be programmed in Flash and distributed across the Web, greatly minimizing the distribution and support problems, yet achieving meaningful outcomes. I suggest that these are both useful and feasible. You can build them from maybe $50K to $250K, and on average about $100-200K from proposal to deliverable solution.

Moreover, these can meet lots of learning needs, including not only so-called "soft skills" (e.g. customer interactions) but also other important decisions such as implementing policies, understanding technology, and more.

Frame games

In the basement of our structure, we have tarted-up quiz show templates (e.g. frame games), which are just glorified drill and kill. Save them for those times when people absolutely need to have things memorized (e.g. vocabulary), but please recognize that humans are very bad at rote memorization, and see if you can't end-run it. There are scads of templates available, and don't waste money on this area which shouldn't even be worthy of mention.

In Search of ROI

At the end of the day, games of almost any scope can have a solid ROI if you take into account the number of learners, impact of the outcome, and scope accordingly. The following table may serve as a guide:

Platforms	Technology	Learning Goals	Cost
Console Games	Consoles	Complex relationships in depth	$2M-$8M
Computer Games	PCs	Multiple interacting relationships	$500K-$2M
Web Games	Flash	Several interacting relationships	$50K-$250K

I understand why organizations that develop ILS or Serious Games have a reason to suggest that such games cost in the millions of dollars, heck I'd love to have such a budget too! However, I want to suggest that you should look at your critical learning goals and think just how much practice you might need to achieve the changes you want. If it's a fair bit of variability, but not too many complex interactions, small game solutions, coupled with a fleshed-out learning program (games by themselves aren't learning solutions), are powerful practice. Don't let the hype blow you away; hang on to your learning outcomes and seriously explore the potential of games to map to your goals. Learning can, and should, be "hard fun!"

Name Game Nonsense

By Steve Wexler
The eLearning Guild

For Steve's bio, please see page 21.

Overview

In working on both this year's and last year's report, my co-authors and I spent an astoundingly large amount of time discussing terminology and, in particular, problems with the term "game." Indeed, instead of devoting all our time to discussing best practices, new techniques, cost benefits, ROI, etc., we had to expend a lot of effort just dealing with words.

As we don't want you to run into the same problem, here are two quick things you need to know.

1. You, as an e-Learning professional, need to be comfortable with the term "serious games" as a growing movement is doing great work in this area, and you need to know about it.
2. While you may get comfortable with the term, it's very likely that many people in your organizations won't be comfortable with the term any time soon. For this reason we will arm you with "corporate-friendly" terminology to help get serious games in the door (should they warrant getting in the door).

With these two points in mind, here's what we'll explore in this essay:

- Why people have trouble with the terms "game" and "serious game"
- What Guild members think about this issue
- What we can learn from the military's experience with the term
- Why you should get over your antipathy to the term
- What terminology to use in your organization

Before we get into this, let's examine why many people have an almost visceral reaction to the terms "learning game" and "serious game."

How Can Something that Involves Play be Serious?

I suspect most people associate the term "game" with "play." To many people, "play" means not working, so if you're playing a game you cannot also be "working."

Likewise, the term "fun" suggests something that is frivolous.

Business, on the other hand, is all about work, and it is, of course, not frivolous.

I am, of course, exaggerating, but it is fair to say that I would not want the surgeon operating on my cerebellum to have mastered his or her craft playing games, nor do I particularly like the idea that he or she finds drilling into my skull "fun."

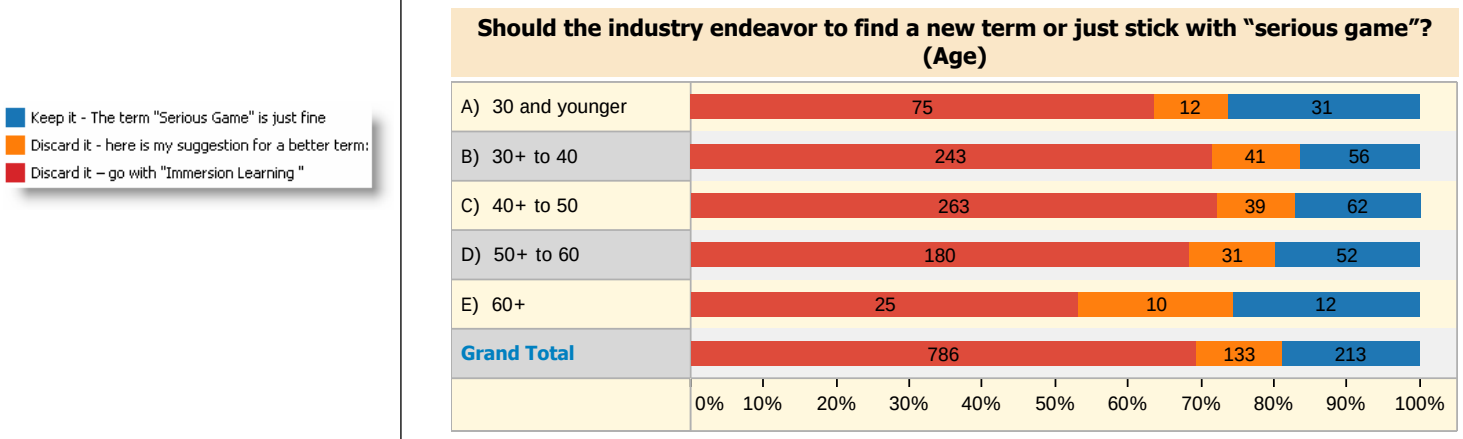
But, if I substitute "Immersive Learning Simulation" for "game" and "fully engaged" for "fun," I feel quite a bit better about the whole prospect.

Indeed, if I knew that the surgeon had practiced for countless hours, and had really mastered any and all contingencies by engaging in multiple immersive learning simulations, I would feel pretty darn good (even though he or she had in fact learned some of the craft by playing games.)

What Guild Members Think of the Term

Guild members have a resoundingly negative view of the term "Serious Game" as shown in survey results in Figures 117 through 119. Indeed, many members have commented that they cannot type the word "game" into their browsers because the corporate firewall filters it out.

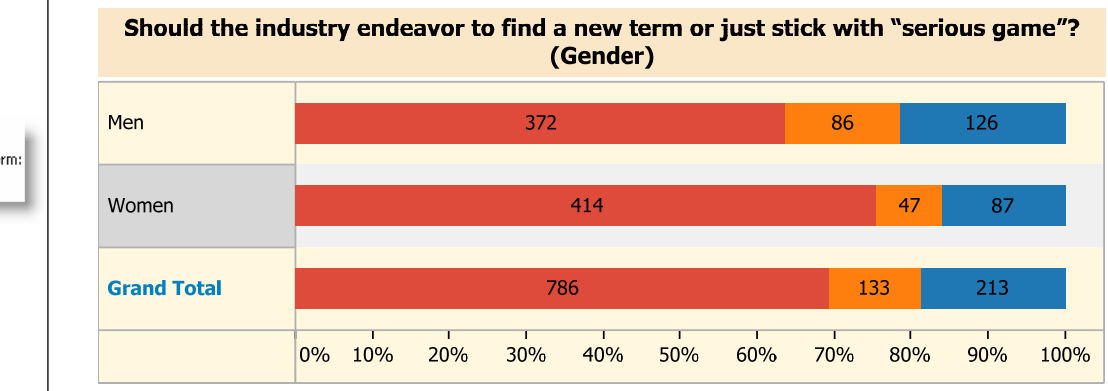
Breakdown by age



Source: The eLearning Guild Research

Figure 117 – Guild members' attraction or antipathy towards the term "serious games," broken down by age. The youngest and oldest Guild members dislike the term less than other members do.

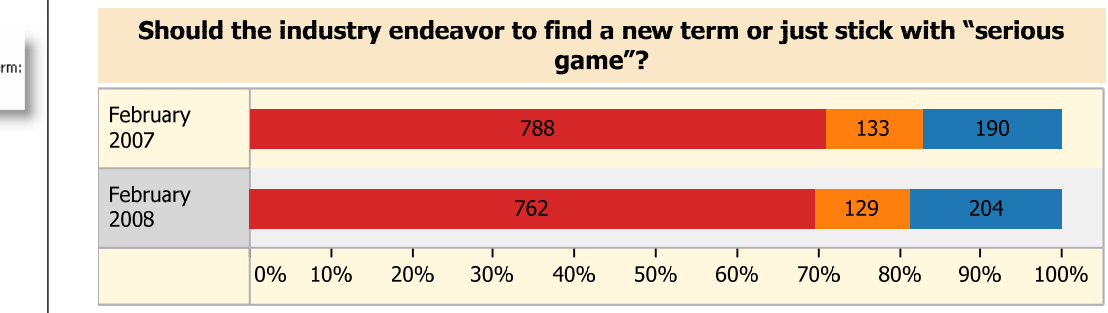
Breakdown by gender



Source: The eLearning Guild Research

Figure 118 – Attraction or antipathy towards the term "serious game" broken down by gender. Neither group cares for the term, with only 22% of men and 16% of women showing approval.

Trends



Source: The eLearning Guild Research

Figure 119 – Attraction or antipathy towards the term "serious game" comparison between this year and last year. Guild members have shown an ever-so slight willingness to embrace the term, going from 17% to 18.5%.

What we can learn from the military

The military has been dealing with the term "serious game" for at least 50 years. As Sharon Gharmani-Tabrizi recounts in her book *The Worlds of Herman Kahn: The Intuitive Science of Thermonuclear War*:[21]

> War-gaming in America was a somewhat clandestine affair. While not an official secret, gaming was acknowledged only reluctantly in the public media. It would be unseemly to advertise the fact that the nation's military was rehearsing the next war with miniatures and mar-

[21] See http://books.google.com/books?id=Ri5ho6_xorAC&output=html.

kets, stage sets and role-playing and dramas … President Eisenhower's acting secretary of state, Christian Herter, was quite willing to sponsor political-military war games at MIT in 1958, "provided that he did not have to tell Congress or the State Department he was 'playing games.'"

Similarly, the Office of the Joint Chiefs of Staff [JCS] did not publicize the establishment of its war-gaming group in 1961… The public at large remained unaware of this development until news of the Pentagon games was leaked by Milton Caniff in his nationally syndicated comic strip *Steve Canyon*, on June 9, 1963.

Figure 120 – The cartoon that spilled the beans. Steve Canyon, *June 9, 1963. Milton Caniff Collection, The Ohio State University Cartoon Research Library. Reprinted with permission of the Caniff Estate.*

> Because Steve Canyon was a gallant air force hero, Caniff was regularly briefed on service matters as possible material for his comic strip saga. Sometime in 1963, Caniff was invited to observe a Pentagon exercise, which he subsequently dramatized in his June 9th strip. The JCS was dumbfounded by the unexpected disclosure. While the comic strip did not excite national attention Lincoln Bloomfield[22] chuckled, "The embarrassment (and extensive kidding) they endured in-house caused folks in the Pentagon basement to vow never to make the mistake of allowing an uncleared round-bottomed civilian on the premises."

Gharmani-Tabrizi goes on to describe participants' reluctance to the term "game." While she writes of events from almost 50 years ago, she could be writing about Guild members' current experiences.

> Participants were reluctant to use the word "game" to describe these exercises (preferring "simulations") since game seems an unsuitable name for rehearsals of conventional, limited, or all-out nuclear war. The phrase "serious play" characterized connoted the solemnity, the expense of buying computer time and assembling gaming facilities, and the time and effort of scores of researchers who devoted months to game design and preparation.

Gharbani-Tabrizi also describes the "fun" participants experienced in these "simulations."

> Grim as war games were, they were also enormously enthralling. Lincoln Bloomfield marveled, "To someone who is not a psychological expert, it is nothing short of astonishing to see grown men abandon their families, forget their worldly obligations, and engage their personalities and intellects so completely in a simulated role."

[22] Bloomfield had been a State Department official for eleven years before moving to the MIT Center for International Studies in 1957. Beginning in 1958, he directed twelve senior-level war games.

Roger Smith is the CTO of The U.S. Army's Program Executive Office for Simulation, Training, and Instrumentation. Smith has authored a paper entitled *The Long History of Gaming for Military Training*[23] in which he offers advice on how to get organizations to adopt learning games:

- ***Use a different term.*** *The word game is not appropriate in many communities, such as medical education where people are dealing with the lives of their patients. Terms like virtual reality and microsimulation have allowed these communities to explore the technology without tripping over the terminology.*
- ***Focus on the technology, not on existing commercial applications.*** *As occurred with the military, look beyond the packaged game on the shelf and see the technologies embedded in the game. Dissect the products, and repurpose the pieces that are really valuable in your own domain.*
- ***Create prototypes close to the user.*** *The users of the tools are often much more receptive to new and effective ideas than is the bureaucracy that approves new tools and techniques. Work with the users to create prototype systems that they value, and which they will defend within their organizations.*
- ***Hook-up with the academics.*** *In many fields, there is a rich body of academic study on the effectiveness of games for training that goes back to the 1970s. Use this literature and these experts to find the most effective ways to apply game technologies.*
- ***Persistence, Patience, and Evolution.*** *Naysayers do not stay in their jobs forever. The young Captains that were creating Marine DOOM in the 1990's are the Colonels of today, and may become the Generals of tomorrow. Each generation is comfortable with a different set of technologies. Just wait for those that use games to move into positions of power.*

[23] You may find a copy of the full paper at http://www.modelbenders.com/papers/Papers.html.

Why you need to be comfortable with the term

It really isn't so much a matter of being comfortable with the term, as is it realizing that many people are doing good work under the umbrella of "serious games," and you should not overlook these things as you come across them. Skeptical? Do a Google search on "Serious Games;" check out the resources section of this report (page 205), or look up "Serious Games Summit" on the Game Developers Conference Web site. Of course, not everything you come across will resonate or be applicable to what you do, but it would be a shame to dismiss the whole movement out of hand because of its name.

What terminology to use in your organization

The Guild sticks to the same recommendation it made last year:

> *Adopt the term **Immersive Learning Simulation,** and apply it to learning systems that combine simulation, pedagogy, and "hard fun" to create a truly engaging and behavior-changing form of learning.*

Okay, perhaps change "hard fun" to "engagement." You may want to refer to the table below for some suggestions for creating a verbal "Trojan Horse" to get serious games into your organization.

If you can't use this term	Use this term
Game	Simulation[24]
Serious Game	Immersive Learning Simulation
Fun	Engagement

Table 3 – Word substitution suggestions.

Need more help in getting ILS into your organization? Guild members who have created ILSs have reported very good results. See "When Compared to Other Forms of Rich-skill practice, We Believe that Immersive Learning Simulations or Serious Games are" on page 45 and "Demystifying Immersive Learning Simulations – Moving From the Potential to the Practical" on page 121.

[24] True, these two things are not the same thing, but, as we saw previously, the military has been substituting this term for years.

Case Study – Transit Training in Immersive Virtual Reality

By David Abitbol

David is a "digital native" who holds a Bachelor's degree in Commerce from John Molson School of Business at Concordia University in Montreal, Canada. In the last few years, David has been in pursuit of the up-and-coming Intelligent Tutoring System market, and is currently the Director of Marketing at uMind.

You can reach David at dabitbol@umindsoft.com

Virtual Reality to the Rescue

How do you deal with a workforce of 7,500 people when …

1. You expect 40% to 70% to retire in the next five years
2. It takes 3 years of training for a new hire to be productive
3. Demand for your service is at an all-time high

These are some of the challenges faced by Montreal's Public Transit System. As the 15th largest corporation in Québec, and ranked 8th in the top-10 best transit systems in the world, the Sociéte de Transport de Montréal (STM) provides 364 million trips per year, or 1.3 million trips, on average, each day of the week. This accounts for 85% of all public transit trips in Québec. Today, its number one challenge is to find innovative ways of training a new breed of young, energetic workers, in a fraction of the time and cost, while maintaining top-quality training standards. Unlike a hotel desk clerk who you can train in a few days, STM positions require months, and even years, of intensive, critical training to ensure the protection of passengers, employees, and property.

Immersive Learning Simulations are quickly becoming a preferred learning medium, as they allows for flexible, risk free, realistic learning that accelerates the learners' ability to process new experiences in the workplace.

STM recently tested a pilot program that uses immersive learning simulations. Powered by A.I.-enhanced uMind technologies, this pilot resulted in an astonishing **50% reduction in training time** and a **32% increase in the overall performance** of STM employees. These same employees are now using the power of virtual reality to practice real-life, critical training scenarios such as fire, accidents, electrocution, etc., in a fully immersive 3-D subway tunnel in order to perfect safety and security protocols. As learners perform these protocols inside a given situation, a virtual tutor identifies skill-gaps and offers remediation on the fly by providing specific content to help construct the knowledge base. Figure 121 shows an example of the system.

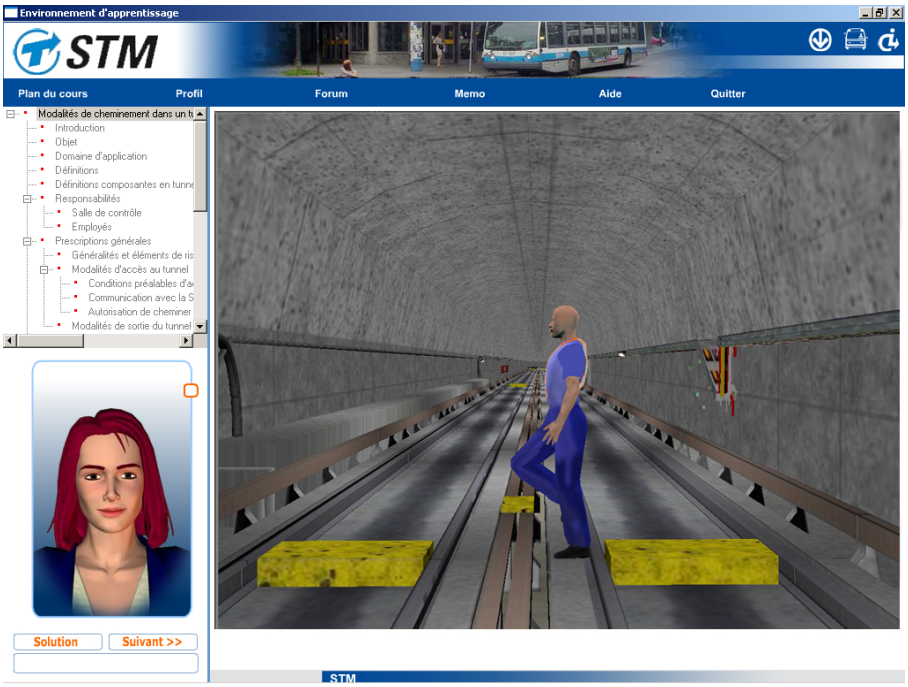


Figure 121 – Learners perform safety and security protocols in full-immersion 3-D simulations.

Our goal in this case study is to explain why STM chose Immersive Learning Simulations to meet its learning and development needs.

"Grow Your Own" Training Philosophy

Transit agencies have adopted a "grow your own" philosophy because new hires rarely possess the skills required to do their job.

In the last few years, employment rates in the transit sector have far exceeded any other sector inside a rapidly expanding transportation industry. An increasing demand level for public transport services is causing this shift. Today, there are more buses, trains, and para-transit vehicles on the roads than ever before. In fact, there were over 150,000 active vehicles providing public transportation services in 2005, representing a 30% increase over the last 10 years[25]. This increased demand has caused an acute need for skilled labor, which is nearly nonexistent as you rarely find these complex skills in new hires. Transit agencies have adopted a "grow your own" philosophy[26] because the external

[25] 2007 Public Transportation Fact Book, American Public Transportation Association, 58th Edition, May 2007

[26] *Building an apprenticeship and training system for maintenance occupations in the American transit industry*, Robert W. Glover, Lewis Clopton, Malcolm McCollum, and Xinge Wang, Emerald Group Publishing Limited, November 2007

job market possesses few candidates with the required skills. As a rule, transit agencies must shape their employees to meet their needs. To make matters worse, the transit sector is facing a retiring generation of "baby boomer" mechanics, which creates a further challenge in finding, managing, retaining, and training employees. The hard truth in the transit sector is dilution of the talent pool, and training standards are at an all time low.

Business Drivers for Adopting Immersive Learning Simulations

Here are some of the business drivers for adopting ILS.

It takes three years, on average, for a new hire to gather the competencies and skills required to be a productive worker.

Driver	Description
Growing demand for mechanics	Projections show transit employment growing 40.6% between 2000 and 2010, where an expected 88,400 job openings will be in transit maintenance.
Retirement	40% of transit workers will be eligible for retirement in the next 8 years.
Evolving Technologies	New environmentally friendly transit vehicles are calling for a new breed of electrical mechanics rarely found in the job market.
Long training cycles	It takes three years, on average, for a new hire to gather the competencies and skills required to be a productive worker.
High-risk training procedures	Transit training protocols generally involve risky procedures that are often too dangerous to reproduce in real life (for example, electric arcs).

Table 4 – Business drivers for adopting ILS

Because of these challenges, transit authorities are on the lookout for efficient training practices that can yield the best performance in the shortest timeframe. In this sense, the STM has adopted a blended approach, which combines e-Learning, immersive learning simulations using virtual reality, and on-the-job training where the learner can put to practice inside a real subway tunnel what he learned on-line.

Montreal's Transit Commission (STM)

Today, Montreal's public transit commission, The Sociéte de Transport de Montréal (STM) is one of the early adopters of Intelligent Simulation-Based Training (SBT) Systems for internal training needs. STM's vision in 2004 was to slowly work towards an innovative training medium that would reduce their training time and costs by as much as 50%, while maintaining superior performance. Recent industry trends, namely, increasing turnover rates, anticipated retirements, and the rate of change of equipment and technologies at the STM, drove this vision.

The transit industry is struggling to cope with an exponential increase in training needs for vehicle operation, maintenance, and security protocols. By its very nature, such training is both staff and resource intensive. Given the high cost associated with this critical-type training, the STM could no longer afford to ignore the benefits of Immersive Learning Simulations.

By nature, employee training at the STM revolves around hard-skill training and how-to scenarios. Hence, to effectively communicate their training in a fraction of the time and cost, the STM turned to full-immersion simulation-based training to deliver realistic, yet risk free, training practices. Let's look at the STM's training cycle evolution.

STM's winning formula: A blended training approach

Training time was reduced from 12 hours to just 6 hours, while the training costs dramatically dropped from $763 to $300 per employee

Every new employee hired by Montreal's Transit Authority must undergo the Safety and Security Program, whose objective is to achieve the highest practical level of safety and security. While the courses in this program range from radio communication to equipment handling, one of the courses focuses on maintenance of a subway tunnel. The course "Cheminement dans un tunnel" (Safe Walkthrough in a Subway Tunnel) specifically targets subway operators and maintenance personnel. Traditionally, it took two modes to deliver this training program, the first being inside the framework of a classroom via a certified instructor, while the second was inside a subway tunnel, where they expect the learner is to apply this newly acquired knowledge under the supervision of his instructor.

Using a blended learning approach, they now give this course in three distinctive phases:

PHASE 1: Theory (e-Learning inside the framework of a classroom);

PHASE 2: Immersive Learning Simulations (in the framework of a classroom); and,

PHASE 3: On-Site Training (inside a subway tunnel).

Phase 1: E-Learning Theory

The first phase of the training cycle revolves around subway protocols and maintenance. They deliver this theoretical portion on-line in a classroom setting, where an instructor is readily available to assist learners when the need occurs.

Each employee logs in, and learns at his own pace and level of difficulty. The course is adapted in real-time to each learner's existing knowledge base, skill-gaps, preferred cadence, and learning style for a personalized learning experience. The uMind system will also spontaneously add supplementary material to the initial course to increase understanding.

Instructors can monitor each student's performance in real-time from a control panel, as they take on the role of tactical interveners to help learners in distress.

Figure 122 – This interface includes a virtual tutor who assists the learner throughout his learning path.

Through this learning mode, they reduced training time from 12 hours to just 6 hours, while they reduced the number of instructors required to train each group from three to one. ROI studies concluded that training costs dramatically dropped from $763 per employee to a mere $300, while average test results increased from 62% to 92%.

Phase 2: Virtual Tunnel Maintenance

Once new hires complete the theoretical portion, the idea is to allow them to apply that knowledge in a real-life context, both to increase learning and retention, and to analyze their level of understanding. However, practicing inside a real subway tunnel is at once costly and complex:

1. Using a real tunnel for training entails taking a subway station out of operation for several hours at a time. The cost is prohibitive.
2. Training in a subway tunnel presents high risks.
3. They can train no more than two employees simultaneously.

4. They cannot simulate high-risk cases in real-life (fires, electrical problems, accidents). Simulations allow for a wider range of cases.

For these reasons, STM decided to add an Immersive Learning Simulation element to the e-Learning portion. The application specifically developed for subway operations and maintenance personnel involved the recreation of a subway tunnel, station, and garage using virtual reality and advanced AI techniques. Immersion in these dynamic and cost-effective PC-based training environments subjects subway operations and maintenance personnel to a number of real-life scenarios (live wires, electric arcs, defective rails, etc.) and, using a hands-on approach, they must perform procedures, protocols, etc. in order to work out each case.

An AI-enhanced virtual tutor consistently analyzes the user's performance, assists and guides him throughout his learning path, identifies his skill-gaps, and provides remediation by generating case after case to help him build his knowledge until he reaches a high level of performance.

In fact, the virtual tunnel is endless, and the system presents each learner with new challenges and cases based on his performance throughout the course. These intelligent and "serious gaming environments" constitute singular, next-generation teaching applications that promote autonomous, interactive, and game-like learning. They reinforce learning through the integration of advanced methodologies that promote high-level interactivity, real-time interaction, data-analysis, decision-making, case analysis, etc. to optimize learner motivation and participation. Learning through serious gaming requires active discovery, analysis, interpretation, problem solving, memory, and activities that result in the sort of extensive cognitive processing that deeply roots learning in a well-developed neural network (Foreman, 2003).

Figure 123 – A learner practicing the various safety and security protocols. For example, he notices an anomaly (live wire), and must advise subway authorities immediately.

This constructivist learning approach produces staggering results. The STM is now able to train more people at one time, and at a fraction of the cost, and allow its staff to perform hazardous or critical cases, minus the risk.

Training Phase 3: On-Site Training

The third and final phase occurs inside an actual subway tunnel. Although we mentioned earlier the dangers of a subway tunnel, they cannot omit this step from the training process. However, rather than spend 8 hours in the tunnel for training, learners now attend a 4-hour training session to apply the knowledge learned in phases 1 and 2. This efficiency also contributes to the time- and cost-savings resulting from e-Learning and simulation-based training.

Other significant costs related to training include the mobilization of equipment and facilities. You can also significantly reduce these costs through simulation-based training approaches.

Measured Results and ROI

By conducting a simple before and after study, the STM found a great influence on training time and performance throughout the course. Reports have shown that the ILS approach affected overall learning as follows:

- Phase 1 training time was reduced by 50%;
- Simulation-Based Training reduced onsite training time by 50%;
- Learning performance increased by 30%; and,
- Overall reduction of training costs by a minimum of 50%.

Before implementing e-Learning and SBT, they delivered the instructor-led portion of the course in a classroom setting that would last 12 hours, on average. Because of the complexity of the content, the course required three instructors at a time, and no more than eight learners could attend the course at once. The measured training cost per employee was $763 for this course alone. Once the STM adopted uMind's intelligent e-Learning solution that integrated simulations through virtual reality, the course deployment cost plummeted to $300 per head. That's a $463 cost saving per employee!

A more detailed analysis of the time and costs benefits shows that the direct and indirect savings add up to nearly $10 million over 10 years. This evaluation takes into account the reduced training time for employees that, once accumulated, represent thousands of workdays that they would have had to trade in for training.

Table 5 shows a recap of the measurements.

Item	Before	After	Measured Benefit
Training time in hours	12 hours	6 hours	50% less training time
Number of instructors	3 instructors	1 instructors	66% fewer instructors
Training cost per employee	$763	$300	61% in cost reductions
Average grade on course	62%	92%	48% increase in performance

Table 5 – Summary of results.

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Project Summary

Name of Project (Case Study)

Transit Training In Immersive Virtual Reality

Description

In the last few years, the STM has switched its traditional instructor-led training process to a simulation-based training platform powered by uMind's Intelligent Tutoring System. STM employees now use the power of virtual reality to navigate freely in a fully immersive 3-D subway tunnel in order to learn safety and security protocols.

Link

www.umindsoft.com/english/solutions/transport.html

Forms of training or learning used

- Intelligent e-Learning (asynchronous)
- Intelligent virtual environments
- Case-based reasoning
- Learning-by-doing
- Learning-by-consequence
- Instructor-led training

Number of learners who will use the system

200 people per year

Project Cost

$350,000

Implementation Time

Six months

Tools, Products, and Services Used

- uLearn (LMS, LCMS, Virtual Tutor)

Case Study – Using a Virtual Incident Management Training System for Transportation First Responders

By Michael Armentrout and Anne Derryberry
I'm Serious.net

Michael and Anne are serious-games consultants and advisors in the San Francisco Bay Area. You can find them at www.imserious.net.

With extensive experience in business management, financial services, marketing, and compliance, Michael's interest in serious games and online learning stems from the desire to improve and enhance corporate, governmental, and institutional performance through e-Learning techniques and innovative tools that are efficient and cost effective. He also focuses upon monetization modeling and capital formation in the serious games industry. Michael graduated from Duke University, with a Bachelor's degree in Management Science and Accounting.

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Anne is an analyst and advisor for serious games, online learning games, simulations, and virtual worlds. She works with learning organizations, game developers, tools developers, and analysts as a learning architect, advisor, consultant, and industry observer. She is interested in both group experience, and how groups learn in virtual environments, especially through games. She also focuses on business modeling and monetization strategies, so that learning and meaningful game play is a profitable and sustainable industry. Anne earned her Bachelor's Degree at UCLA, and her Master's Degree in Educational Technology at San Diego State University.

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Overview

In this case study, we examine the initial phases of adopting a 3-D virtual, multi-player game environment to effectively and efficiently train and reinforce best incident-manage-ment practices for first responders to highway traffic incidents. While still under development, the program has already shown great promise as a way to allow thousands of transportation first responders to learn, in a safe and realistic environment, how to achieve optimum results and to avoid catastrophic mistakes.

In particular, we will look at:

- The business drivers behind adopting a new learning approach;
- Why the stakeholders decided to employ a 3-D, multi-player, game environment;
- The challenges in developing the system; and,
- The initial results and plans for the next phase of the project.

Managing the Great Asphalt Way

Interstate 95 is the major highway corridor in the eastern United States. It stretches more than 1,900 miles from Maine to Florida, and passes through nearly every major east coast city. It is a vital pathway for all kinds of commerce as it passes through 15 states with a combined population exceeding 100,000,000 citizens. The average annual daily traffic in all the highly populated locations along I-95 is nearly 5 million vehicles.

Figure 124 – Incidents like this tractor-trailer spill may involve relatively benign materials, like the trash shown here, or hazardous materials such as gas or chemicals. The cleanup of such events can be both costly and time-consuming. Photo: New Jersey DOT.[27]

Consider these important facts:

- One-quarter of the traffic congestion in the U.S. is caused by non-recurring traffic incidents, including stalled vehicles, spilled loads, debris on the road, and crashes.[28]
- Traffic congestion is a costly economic threat. Americans lose 3.7 billion hours and 2.3 billion gallons of fuel every year sitting in traffic. In 2004, truck traffic idled by congestion and traffic accidents costs the industry $8 billion dollars. That cost passes on to consumers in the form of higher freight costs.[29]
- Estimates show that secondary crashes, due to congestion caused by a previous crash, represent 20 percent of all crashes.[30]

[27] Turner-Fairbanks Highway Research Center
[28] USDOT, Federal Highway Administration, Turner-Fairbanks Highway Research Center – http://www.tfhrc.gov/pubrds/04nov/03.htm
[29] Intelligent Transportation Systems, USDOT – http://www.its.dot.gov/jpodocs/repts_te/14288.htm#b2
[30] Federal Highway Administration Office of Operations Webpage, *Traffic Incident Management* – http://www.ops.fhwa.dot.gov/aboutus/one_pagers/tim.htm

- Responders to traffic incidents risk their lives to manage congestion and accidents. More than 20 percent of annual firefighter deaths occur on the roadways, as does about half of the 300 law-enforcement officers killed on duty. In the first three months of 2006, the towing and recovery industry lost five people in struck-by incidents.[31]

The I-95 Corridor Coalition

The I-95 Corridor Coalition is an alliance of transportation agencies, toll authorities, and related organizations, including law enforcement, from the State of Maine to the State of Florida, with affiliate members in Canada. The Coalition began in the early 1990's as an informal group of transportation professionals who work together to more effectively manage major highway incidents that impacted travel across jurisdictional boundaries. During the 1990's, the focus of the Coalition's program evolved from studying and testing intelligent transportation systems (ITS) technologies, to a broader perspective that embraced integrated deployments and coordinated operations.

In an effort to improve safety and performance on I-95, a Steering Committee of the I-95 Corridor Coalition set out to develop and test a Massively Multiplayer Virtual Incident Management Training System for Transportation First Responders. The Steering Committee consists of police, fire, EMT, towing recovery, and transportation officials, and includes the U.S. Department of Transportation (USDOT) and the Federal Highway Administration (FHA).

The Steering Committee set out to establish a set of "best practices" that were to be used in the development of 3-D virtual reality scenarios that would allow first-responder learners to embrace important safety and traffic management procedures. This effort would minimize prolonged traffic congestion, enhance overall traffic incident management (TIM), and improve safety for first responders and the driving public-at-large.

[31] National Traffic Incident Management Coalition – http://www.transportation.org/?siteid=41&pageid=591

Primary "best practices"

While it is readily recognized that TIM will vary from jurisdiction to jurisdiction, and that the respective agencies responsible for emergency communications, law enforcement, fire, EMS, and so on, will formulate and adopt their own methods and procedures, there are some common and effective steps that first responders can take to achieve optimal management and solutions to any particular incident. Some examples are:

- The safety of first responders is substantially enhanced when they don their reflective emergency vests as soon as they arrive at the scene;
- Placement of traffic cones and flares will help to isolate areas that must be off-limits to anyone other than first responders; and,
- An assessment of the types of responder vehicles, including appropriate size and sufficient number, is vitally important so that there is no delay in calling subsequent response vehicles to the scene.

The great promise of immersive learning simulations (ILS) is that best practices modeling is now possible in a computer-generated, 3-D, real-time, safe environment. People can test scenarios, get real-time feedback, and review and evaluate both good performance and potentially catastrophic mistakes.

The best-practices effort intends to ensure that the content of the 3-D, virtual reality scenarios teaches first responders to learn how to assess and implement the basic steps that will enhance TIM, and improve safety at the scene.

According to Chris Badger, Vice President of Marketing at Forterra Systems, "The great promise of immersive learning simulations (ILS) is that best-practices modeling is now possible in a computer-generated, 3-D, real-time, safe environment. People can test scenarios, get real-time feedback, and review and evaluate both good performance and potentially catastrophic mistakes."

Phase One – Virtual Reality Scenario Development

The I-95 Corridor Coalition appropriated $1.4 million dollars for the development of the Virtual Incident Management Training System. They chose the Center for Advanced Transportation Technology Laboratory (CATT LAB) at the University of Maryland to develop the virtual reality tools necessary to move forward with this initiative. They also selected the OLIVE (On-line Interactive Virtual Environment) platform from Forterra Systems as the foundation for their technology development.

Through the steering committee, the coalition determined what every first responder should learn to do. Their goal was to test, validate, certify, and reinforce the dissemination of best incident-management practices across the Coa-

lition region. Opinions and attitudes about what constitutes best practices vary across the wide spectrum of agencies and first-responder leaders. The steering committee maneuvered through this complicated, content development phase by receiving input from many people throughout the region, and deciding on the common themes best employed in creating an effective learning tool.

The program presents typical traffic incidents, from "fender benders" to major collisions including HAZMAT situations, and allows the participants to play out their normal roles in what is essentially a highly structured and recorded video game. In this way, traffic management personnel and incident responders can experience a wide array of realistic scenarios, analyze the impacts of their decisions, and learn appropriate responses and communication, as well as the consequences of inappropriate responses and of communication breakdowns. In essence, this learning strategy allows a real-time review of in-simulation performance and feedback to correct learning deficiencies.

Figure 2 – This is one example of an incident scenario developed by the CATT LAB for the Virtual Incident Management Training System.

The next step for the steering committee was to select the development platform that best suited their needs, at a cost level that was appropriate given the budget for the project. Several platform options were available for review, and they analyzed proposals from vendors who would provide their platforms along with additional technical support as needed. Project leadership determined

that there was a wide spectrum of technology available, and, surprisingly few similar attributes among them.

After this extensive review of computer-generated virtual environments, the steering committee selected Forterra Systems' OLIVE platform, at a cost of approximately 21% of the total budget. Also, in this selection phase, project leadership noted that the procurement process was complicated by the fact that government funding was involved, and the requirements for expenditure review and approval, prior to signing contracts, lengthened the time to make a final selection of the platform.

The team of two full-time faculty members and six undergraduate students at the CATT LAB, under the direction of principal investigator, Michael L. Pack, began the creation of an intensive training program in three-dimensional, multi-player computer gaming simulation technology. According to Mr. Pack, "OLIVE provided the greatest possibilities. It had significant first-responder content already built in, its VoIP (voice over internet protocol) was very good, and it easily handled large numbers of users at one time." In addition, OLIVE's ability to capture and record simulations for later retrieval and review made Forterra's technology especially compelling.

Phase Two – Testing with Live First Responders

Once the first set of Virtual Incident Management Training System game modules was completed, an on-site training program for first responders began. In addition to the software, they created pre-study workbooks to establish training standards and best practices. A small number of first responders were then able to experience a reinforcement of what they were to learn, using the computer-generated virtual environment as an effective reinforcement tool. By experiencing changing scenarios, the learner should be able to react and respond in appropriate ways, and understand the implications and ramifications of their responses – whether correct or flawed.

Figure 3 – First responder participating in an incident scenario

Figure 4 - Examples of how scenarios are depicted via the virtual training software.[32]

[32] CATT Laboratory, University of Maryland, College Park – Virtual Incident Management Training – http://www.cattlab.umd.edu/index.php?page=research&a=00028

Next, the project must grapple with how to expand this learning experience to encompass the thousands of first responders throughout the corridor-coalition region. One strategy calls for the use of a "rolling, 50 laptop, laboratory" where selected individuals in many locales will be able to experience this learning opportunity. This rolling lab will provide valuable information to the coalition that they will then use to formulate the next phase, including identifying appropriate funding, of this project.

Project specifications also call for the use of moderators as part of the learning design. These people are essential to the deployment, and they will provide both in-game feedback and critical technical support to first-responder learners.

In addition to evaluating the learning process, including acceptance, usability, flexibility, and effectiveness, the leaders in communities and first-responder agencies will have an opportunity to examine and evaluate this new learning technology for their first-respond-er teams. According to Karen Haas, a consultant and stakeholder in the Steering Committee, "This learning opportunity is intended to achieve two important goals for the first-responder agencies and the public they serve:

- Create efficiency in training and adoption of best practices; and,
- Foster the interest of public safety teams and leaders in resolving traffic incidents in the safest possible manner.

This involves the ongoing development of training content, with a critical overlay of standard operating procedures, which will be utilized across the coalition corridor region."

What the Future May Hold

This project commenced in mid-2006, and we expect it to continue under the current level of funding, until early- to mid-2009. If the results continue to be satisfactory, we anticipate that there will be an additional round of funding that will move the project to the next phase of implementation, which presumably will reach and serve the vast majority of the first responders along the I-95 Corridor.

In addition, we expect that this successful project would lead to adoption across the nation, and that further training scenarios would most likely include

other natural and human-caused disasters, such as plane crashes, terrorist attacks, hurricanes, earthquakes, etc.

Opportunities and Obstacles

As with any project of this nature and design, there are many opportunities and obstacles. It is no small task to convince first-responder agencies and their government and political leaders, as well as first responders themselves, of the effectiveness of this project as a learning tool.

While it's still too early to say for sure, the cost per learner will likely be well under $100.

The matter of cost is always foremost in the minds of the decision makers. It is too early to calculate the cost per learner; however, an excellent learning tool is being developed and tested for a total cost of $1.4 million dollars. While expansion will bring the total cost higher, when spread over the thousands of first responders in the 15 states of the Coalition Corridor region, the cost per learner will likely be well under $100. This seems to confirm that this virtual immersive-learning simulation will prove to be a cost-effective way to train first responders, and to achieve more efficient, safer, and less costly results at each traffic incident.

In addition, as noted by the CATT LAB team, this technology will require many agencies to upgrade their existing technology platforms to a current level of sophistication that will support this computer-generated virtual environment. While they will see this as adding to the cost per learner, upgraded technology has many positive effects on an agency, and they should evaluate the benefits of new technology as to their total impact on operations.

One of the requirements in the deployment phase calls for moderators who have the excellent credentials that are valued and respected by first responder agencies, as well as technical competence that will be vital to successful implementation of the learning strategies. Finding moderators to fill these shoes will be challenging

In Summary

Clearly, managing the nation's highways to ensure greater safety, while keeping them clear of congestion and traffic incidents, is a high priority of government, transportation departments, and first responder agencies. Furthermore, the public expects efficient and safe travel on the highways, and the unfettered movement of commerce to provide goods and services at low prices.

The I-95 Corridor Coalition recognized the need to undertake significant effort to reduce traffic problems and increase first responder safety on Interstate 95. To that end, the Coalition formed a Steering Committee that analyzed ways to improve traffic incident management by implementing a project to create learning tools that would teach best practices to the first responders across the region.

Employing computer-generated, 3-D, immersive learning simulations, the Steering Committee developed several scenarios and built them into a Virtual Incident Management Training System for Transportation First Responders. The CATT Lab at the University of Maryland, using Forterra Systems' OLIVE platform, designed and created a virtual reality training games module.

Next, they invited a small group of first responders to alpha-test the program. From the results of testing, the Steering Committee will move forward with deployment over the next six months, by using a rolling, 50-laptop, learning center that will allow a much larger sample of first responders across the region to use these immersive learning techniques. When this effort is completed, the steering committee expects to have fully spent the budget of $1.4 million.

The I-95 Corridor Coalition will have to evaluate the results of this 3-year project, and decide if they will appropriate additional funds to allow expansion of the Virtual Incident Management Training System. If they decide to move forward, all first responders in the I-95 corridor will use this system to learn the best practices deemed necessary to enhance their own safety and the safety of the traveling public, while also managing traffic incidents in the most effective and efficient manner.

Project Summary

Name of Project

Virtual-Incident Management-Training System for Transportation First Responders

Description

Traffic congestion on the Interstate 95 Corridor is costing valuable time and money, due in part to ineffective Traffic Incident Management, idle freight,

and substantial delay of the traveling public. Additionally, first responders are at great risk for injury or death when traffic incidents are mismanaged. The I-95 Corridor Coalition has developed a set of best practices that, when used, increase safety to first responders and the public-at-large, while also efficiently and effectively dealing with the incident in a manner that saves time, human and equipment resources, and money.

The Coalition has designed and developed a virtual traffic-incident management training system, using Forterra Systems' OLIVE platform, as a basis for creating computer-generated virtual learning environments for first responders. These learners will be equipped with the knowledge and judgment necessary to ensure their own safety, while correctly and efficiently managing any type of traffic incident.

Links

http://www.i95coalition.org/sp.html

http://www.cattlab.umd.edu/index.php?page=home

http://www.forterrainc.com

Forms of Training or Learning Used

~ Immersive learning simulations

~ Print-based self-study materials

Number of Learners who will use the Training

Tens of thousands of first responders in the 15-state region covered by the I-95 Corridor Coalition

Project Cost

$1,400,000

Interviews

If you want some inspiration on using games for learning, spend a little time listening to Katie Salen, and how she and her colleagues at the Institute for Play were tasked with creating a New York City public school that will use game-based techniques to tech children in games 6 through 12.

Our interview with Katie begins on page 184.

And, if you question whether learning games are appropriate for corporations, and in particular, banking and finance, listen as Alec Lamon of the Wharton School of Business explains how his institution graduates better-prepared MBAs through innovative learning games.

Our interview with Alec begins on page 195.

Interview with Katie Salen

Katie Salen is the Executive Director of the Institute of Play, and Associate Professor in the Design and Technology program, Parsons the New School for Design. Co-author of *Rules of Play*, a textbook on game design, as well as *The Game Design Reader* (MIT Press, 2004 and 2006), she recently completed an edited volume for the MacArthur series on Digital Media and Learning called *The Ecology of Games* and is serving as co-editor of *The International Journal of Learning and Media* (MIT Press). Katie just completed a stint as lead designer on Gamestar Mechanic, a game developed by Gamelab to teach young people the play and practice of game-design fundamentals. She lectures and writes extensively on game design, design education, and game culture, including authoring some of the first dispatches from the previously hidden world of machinima.

You can reach Katie Katie@instituteofplay.org.

Steve Wexler, The eLearning Guild: Katie, today I'd like to talk to you about the Game School, an alternative New York City public school aimed at grades 6 through 12, and slated to open in 2009. Can you tell me a little bit about what the Game School is, and how it's going to differ from other public schools in New York City?

Katie Salen, Institute of Play: We're developing this project among a number of organizations. One is the Institute of Play, which is a nonprofit organization that I'm running, which is an offshoot of a game development company called Gamelab. Our main partner is New Visions for Public Schools, a school reform and school development organization, the largest in New York City. We're trying to build on a lot of the learning-science research around kids' experiences in learning through a range of media; whether it's digital media, or whether it's participation in other kinds of activities outside of school, including informal learning spaces.

My background is in games and game design, and I have been doing a lot of work for the past couple of years, really beginning to try to understand ways in which kids are using games and ways in which we can connect ideas around games and learning.

The Game School is not a school where kids play games 24/7 in the classroom. Instead, the design of the curriculum tries to leverage the thinking around the way that games work as learning systems, to develop what we're calling a game-based pedagogy. This means that it's drawing on the intrinsic qualities of games and their design to engage students in a deep exploration of subject matter, with 21st century skills at the core.

We're really beginning to looks at ways in which we can support traditional literacies around numeracy, literacy, and reading comprehension, as well as supporting new kinds of thinking that we know kids really need to have in order to be successful in moving forward in the world. We're examining the idea of computational literacy (very important to math and science); the idea of collaboration; network literacy; the ability to seek out resources (which we call "intelligent resourcing"); and the ability to deal with cognitive reflection. This last item helps children understand how they're learning, and so they know how to ask for help with things that they don't know how to do.

Therefore, it's a model that looks not just at the level of the curriculum, but also looks at assessment models, because there are many studies underway about how current assessment models aren't particularly useful in capturing the real kind of learning that needs to take place.

SW: I do want to follow up with you on your assessment models, but first I want to deal with an issue Guild members are having trouble with, which is acceptance of the word "game." Many of our members are claiming that people meet just the word itself with less than open arms. When I think of the New York City school system, I think of, perhaps, a somewhat conservative bureaucracy, and I'm wondering if you had any difficulty selling this vision, given that you're using this four-letter word, "game." Can you shine some light on what you had to do gain acceptance (and funding)?

KS: That's a excellent question, and I have to say that I feel like our journey has been very surprising. The term "game" does have a lot of negative connotation publicly, and part of that has to do with the way that the media has latched on to a particular genre of games, and particular kinds of ways of talking about them. Therefore, there's been a very negative spin in the media. At the same time, teachers have long used games and play in the classroom. Maybe they haven't used digital games, but there's a long history of non-digital games in classrooms. Coming into this we expected that there to be a lot more resistance than we've actually met with, and I think what people are really beginning to understand that this is something kids are doing. They understand that there is something happening. They understand there are real problems with traditional approaches, and in connecting with kids in the 21st century.

Part of it is a generational gap. There really is a recognition that the kids today exist in a very different world of learning than the current school system supports. Therefore, there actually has been quite an openness to trying to understand what such a curriculum might look like, how teachers might begin to build on some of the activities that kids are very excited by, and, surprisingly, there's already a lot of work being done in this area in high schools and middle schools around the country. Every day, I find more examples of teachers who are doing interesting things with simulation games or real-time strategy games. Some are beginning to integrate mobile games in terms of science simulations – having kids go out of the classroom, collect data, bring it back in, analyze it, and look at it.

One of the big audiences we know we need to work with is parents, because they also often have a negative idea about games. There's a remarkable openness and willingness to ask questions about what this might mean.

We just had a book launch in Cambridge Massachusetts in December of 2007 for the McArthur Series on Digital Media and Learning. This is a new series of books examining the learning culture of kids in the digital age, which The

McArthur Foundation has put out. There was an audience of around 500, and I would say that 80 percent of that audience was teachers that had come with a real desire to understand this idea of games, this idea of digital media, this idea of 21st century literacies; and they just kept asking, "How can you help us bring this into our classroom? We really understand that it's valuable. We want to figure out how to use our expertise to begin to leverage some of the learning science research that's been going on, and some of the design research." Therefore, I feel there's been a kind of tipping point in the past year.

SW: I have a two-pronged question to follow up on some of the things we discussed earlier. I'm a product of the New York City school systems, and I had to take statewide Regents exams throughout high school. My daughters are in middle school and high school, one has already taken standard New York State Regents exams in several subjects, and the other has endured several state and federally mandated exams. I gather students who attend the Game School will have to take these same standardized exams.

KS: Yes.

SW: How are you going to prepare them for these exams? I gather you'll teach biology, algebra, languages, and so on, using new techniques. Will you prepare these students for assessments that assume a more traditional form of learning?

KS: We don't have that picture fully formed yet. We're still in development of what the specific curriculum looks like; but the thing to remember here is that it's not that we're not going to teach Algebra, or that we're not going to teach Geography or Earth Science. We are going to teach those things; it's just that the methods of teaching them will look a little bit different than it has traditionally looked.

So, for example, instead of making kids learn Algebra by working through a worksheet of algebraic problems, they may, instead, engage in a physics simulation, where they're having to move through a kind of physical space, and their movement in that space is predicated on their ability to problem solve. They have know something about underlying algebraic principles to make choices about, "Well, I have to move this number of degrees that way, and I have to add and subtract this in order to get this object to move there." There-

fore, they'll experience the mathematical principles inside of a simulation in a way that situates their learning.

Our argument is that the standard tests are simply going to be one method of assessment. We believe that if we can teach kids how to think about algebra, and if they can engage in situated algebraic study within the sort of context where it makes sense, where they have to solve a particular kind of problem, that when it comes to the test, they'll be prepared to understand the basic underlying principles. Again, it's not that they're not learning algebra. It's just that the way of learning is different – it's game-like.

We also know that we're going to have to do work with the students to prepare them for that particular kind of testing system. I think one of the challenges of schools that take on different pedagogies, is when we face students with a kind of memorization test, if they've had no practice with those kinds of tests, they may do very poorly, even though they may know the material. Thus, part of our work is how to introduce the system of how the test works into the system of learning that the kids will be experiencing, so it's not unfamiliar when they go through the test. However, it doesn't mean that we base the primary pedagogy on that particular model. Does that make sense?

SW: Yes, it does. You know, I'm dying to see what this stuff will look like. My kids' view of algebra is the same as kids from fifty years ago, which can be summed up as "When am I ever going to use this in real life?"

KS: Right, right.

SW: So, I for one – and I expect there are many Guild members – who would like to see an approach where kids are truly motivated to learn algebra; whether it be directly motivated, or through some type of "stealth" approach where to complete a game or assignment successfully the student must in fact master algebraic principles. But before we get into specifics, I want to underscore something you and I discussed earlier, and that is that you are not tasked with coming up with seven years of curricula all at the same time. Am I correct that the first year it's just sixth graders, and then sixth and seventh grade the second year, and sixth, seventh, and eighth grade in the third year, etc.?

KS: Right. We decided it was important to give the school a chance to really evolve and grow before we faced kids with the potential real problem of these standardized tests in high school, which tend to begin in the 9th grade.

We decided to start with a sixth grade class. Getting kids in the sixth grade to experience this kind of learning really gives them a shot at developing a way of thinking. Then, by the time that they get to high school, it's a very familiar way of thinking and doing, and they can be successful within a Regents' oriented atmosphere.

Therefore, we're developing curriculum for the sixth grade. We're also, at the same time, developing curriculum for the seventh grade, even though we won't have students coming in the seventh grade until 2010. The importance of that, really, is thinking about the issue of sequencing, about where a kid begins in sixth grade, and where it then leads into the seventh grade, and it's been very useful for us to begin to think about those two grades in parallel with each other. Thus, our curriculum development will be ongoing over the next couple of years, as the grades continue to roll out. For us, it's important to not design all the curriculum at once, because we don't know yet what is going to work, what is going to stick, what is viable, what the issues are that will come up. How will national assessment models potentially begin to change by, let's say, the time our students are in 9th grade. So, we want to remain open to that, and develop a system that is sustainable, and that allows us to continue to kind of modify and adjust, based on the teachers that are in the school, and based on the students. We're very interested in an ongoing assessment model that individualizes a learner's sense of where they're at, and makes that learning very visible both to parents and to teachers, so that we can really work with a differentiated instruction model to make sure that each kid is moving through that space in a way that is most appropriate for them.

SW: Katie, is there any place that people can see some of the things that you are doing? I know that there are people who are kind of clamoring for before and after examples.

KS: Sure. We constantly update our Website, www.instituteofplay.org,with status updates about our school, and it contains some of the research that we're doing. We have been starting to run pilots in schools with kids and teachers around the use of games. For instance, last semester, we worked with the Ross Global Academy, which is a New York City school. We worked with sixth and seventh graders with a mobile gaming platform that allowed them to

develop and play text-based games, all of which they played through SMS text messaging. Kids were learning kind of how to write games, and they dealt with issues around narratives and around space. These are games where kids are moving through physical spaces, receiving SMS messages at certain checkpoints along the way, and we're asking them to test their knowledge of things in each of those spaces. Thus, we have documentation of that work.

We also have documentation of a camp we ran in Minneapolis last summer with some high school kids around game design, and a number of different topics, as well as some research papers. People should check back from now on. The Website will become more and more populated with the work that we're doing.

As I mentioned earlier, there is also the McArthur Series. One of the volumes is called *The Ecology Of Games*, and it looks at this issue of games and learning. There are nine chapters in it, and several of them are case studies of using games in the classroom. So, it's worth looking at that, and it's a free PDF that people can download from the MIT Press site. If you just Google *Ecology of Games*, MIT Press Journals, it should direct you to that page.

SW: Tell me about the students who are going to be attending this school. Is it going to be like one of the New York City specialized schools, where students have to get a minimum score on a standardized test in order to attend, or are you focusing on students who do not score well on standard tests?

KS: We're looking for a truly diverse study body, and that just doesn't mean racially, economically, and ethnically, but also in terms of learning style. One thing that we have discovered in a lot of the work that we've been doing is that this model does tend to help kids who haven't been successful in a more traditional model. So, one of the great hopes for it – and I don't want to say it's a utopia – is that it does begin to provide a way of working with kids who haven't been successful in the traditional model. That doesn't discount the super-bright kids that have done well in that other system, and we really want to have a combination of those kinds of students in the school.

One big issue for us now is space. We don't have a particular location for the school yet, and part of that relates to the Department of Education school-creation process. They tend to assign space the spring before a school opens, and that makes us a bit nervous. We don't want to wait that long, because we want to locate the school within a community and begin to work with the

community; and because we're starting with sixth graders, in general, the kids will come from the surrounding community. So, part of our search for that space really has to do with this issue of the kind of students that we want to come, and trying to identify a neighborhood that has quite a diversity of different kinds of students living there.

SW: Katie, you've mentioned that you're a little nervous that you might not know until the spring beforehand where it's going to be located. Are you going to need to outfit the school with more high-tech gear than one would expect in a typical sixth grade classroom? Or is that a misconception, and a lot of the stuff is not about the technology expense, it's about the technique that you're using?

KS: I would say that's true. I often tell people that we're not designing a new High-Tech High, and that the emphasis here is not on technology, but on pedagogy. At the same time, we do want a wired school. We do want a school where kids have a one-to-one laptop program. We're also looking at mobile technology, which is what we consider everyday technology where kids already have phones, and that's not bringing any kind of new technology into the school other than they're allowed to have phones, which, in New York City, they haven't been able to have for a while.

So, yes, the infrastructure technological question is a big one for us.

SW: I'm getting a kick out of the idea of encouraging the students to do text messaging.

KS: Oh, yeah. I heard an example of a sixth grade teacher that had this incredible assignment where she would text message her students the assignment on the way to school. The assignment was they had to contact two people that they knew somewhere else in the world and ask them three questions; I'm paraphrasing here, but one of the questions was, "What was the last thing that they bought for under $10.00?" and another was what they ate for breakfast that morning. So the kids come into class, and because they have relatives from all over the world, they have, suddenly this body of data that they can then put into spreadsheets. They're now studying economics. They're discussing the concept of "under ten dollars" … they're studying how income affects what people eat.

It was incredible, because here's a technology that kids have access to. It gives them a way to quickly generate a whole body of situated data that a teacher can bring into a classroom and build on for a number of weeks. That's model really inspires us, and it fits into the idea that kids are always learning. They're dealing with real-time data in some way, and you use that learning experience then to begin to pull out the standard-based learning skills that kids need to have for testing. It's that kind of ecology of knowledge that we're really looking at, and technology is a part of that.

SW: Katie, what are your success criteria? How will you know this is working? Is it just seeing if students pass, or do better on the standardized tests? How will you know that it's working, and when will you know that it's working?

KS: We have some specific criteria. One body of criteria, of course, comes from the state, based on state standards. Kids need to know and be able to do X number of things at X level of competency. However, another of our criteria is we want kids to be engaged learners, and we want them to begin to develop skills to be life-long learners. So, one of our measures for success will be, "Are kids engaged, and are they applying this kind of posture of learning to their life more generally?"

Part of what we're trying to develop is, again, a parallel assessment model that begins to measure and capture those things. We've started to develop a set of rubrics around the core pieces of our curriculum, which is around systems-based thinking, game-based thinking, and meta-reflection. We're developing a setting of heuristics around, "Okay, what does system-based thinking look like in the context of mathematics? What does it look like in the context of the scientific method?"

You capture engagement by watching kids, by looking at whether they are seeking out work in after-school programs. Are they excited about what they're doing? It's a kind of a soft measure, and it's a measure of the culture of the school. For us that is the key here, that the success for the school is about developing a culture around learning, and whether it's there or not is actually quite visible, and that has to do with whether the teachers are feeling effective and empowered in the way that they're working with kids within this paradigm.

It also has to do with the parents becoming a kind of part of this community, too. Deep parent involvement would be, for us, a measure of success for this particular model.

SW: Well, I and other Guild members will be watching this, and looking for what happens in 2009, as well as visiting some of the resources that you mentioned. I'd like to thank you very much for your time today. I'm really looking forward to hearing more about what you're doing.

KS: I appreciate the support, and am happy to answer any questions people have about how they might get involved with what we're doing, or how we might share our work with them.

Interview with Alec Lamon

**Alfred West Jr. Learning Lab,
Wharton School of Business**

Alec Lamon is a Senior Director at Wharton Computing, the technology arm of the Wharton School of Business at the University of Pennsylvania. He runs the Al West Learning Lab, Wharton's development center and experimental laboratory to explore new approaches to learning. The Learning Lab has produced over 30 game simulations and interactive exercises to help teach a broad range of business concepts in the classroom. Prior to joining the Learning Lab, Alec worked as Systems Manager for Wharton Direct, a major distributed learning effort at Wharton's Aresty Institute. He graduated from Middlebury College with a B.A. in English and a minor in German, and he furthered his education by pursuing a Masters Program at N.Y.U. for English Literature.

You can reach Alec at lamona@wharton.upenn.edu.

Steve Wexler, The eLearning Guild: Alec, what is the AI West Learning Lab? What is it that you're doing, and what does it have to do with simulations and games?

Alec Lamon, Alfred West Jr. Learning Lab: The AI West Learning Lab is an initiative at the Wharton School to foment innovative uses of technology inside and outside the classroom, and to enrich the interaction between faculty and students. We want to enhance the student or faculty experience, not replace it. We currently have more than 30 applications that we've developed based on faculty concepts. We see our faculty as the authors who drive the process. We then work closely with them to turn their ideas into reality – or virtual reality, as it were. Sometimes that's a fairly simple homework-based model simulation. Other times it's a much more of an "immersive learning simulation" (ILS) or a "serious game."

SW: Can you give me some examples of that? I've gone to a Web site that others can go to, and have seen screen shots of some of these things and descriptions of them. Could you describe some of the things where you go beyond just the dashboard or simulation of something – where you're really getting the type of engagement that you see in a well-thought-out learning game?

AL: We have a number of examples in the learning game space. One example would be WSX, "Wharton Securities Exchange," which is a trading simulation. The simulation recreates a trading floor application, like the New York Stock Exchange, where traders buy and sell stocks based on both private and shared information. Each trader tries to combine what they know with what they see in the order-flow window, and then tries to predict what's going to happen and trade based on that prediction. A number of other universities have built actual trading floors for this sort of activity, which are expensive and often underutilized. We decided to build a "trading room in a box" – using software to turn any computer lab into a trading room where the students get immediately sucked into the world of the trading floor, trying to make the most money with the information that they have for each particular simulation run.

SW: You used the expression "sucked in" which is a wonderful way to describe engagement. I'd like you to address two issues in attaining engagement; the first is what kind of team do you need in order to put this type of thing together? The second is how do you determine whether your efforts are success-

ful? That is, how do you, and the Wharton School, know whether these initiatives were a good investment?

AL: I'll address the second part first. How do we know we're getting a good result? There are two ways. First, how often our faculty uses the software. For example, faculty members use a number of our simulations every semester in core courses, so around 400 students use them – half of all MBA students – every year. The simulations have a good reputation as being engaging and interesting, even if you're not going into investment banking or the financial sector. High usage by the faculty member is one indicator that he's pleased with the software.

Second, student engagement is palpable. If you've ever seen a real trading floor, there are lights flashing, data in multiple windows – all kinds of things are going on – and we recreated that in our software application. We even have a trading bell. The bell goes off, the trading period starts, and immediately the room goes silent and all you can hear is people clicking their trades. They don't stop until the end bell sounds. The instructor has a large display showing what's going on in the market, with additional tools and a way of calculating the results. At the end, the results pop up and you can hear collective sighs, groans, and shouts of the students. There have even been instances where people have asked if they could run one more round, even though the class is over.

SW: Very good. Is there a way that I, and other people not associated with the Wharton School can see this in action?

AL: There are Flash movies of some of these simulations at http://www.wharton.upenn.edu/learning/.

SW: You've mentioned that, at the end of a session, sometimes people say, "Can we just run one more session?" It fully engages everyone; half the students want to take this thing. Great buzz. However, is there any indication that the people going through these simulations make better traders?

AL: In the faculty author's elective investment class, the built-in exercises in our trading simulation, WSX, get progressively more complicated. The better you do with these exercises, the better grade you receive for the class. If you extrapolate that the better grade indicates the better potential trader you are,

or better potential portfolio manager, that's the closest thing we have to a benchmark for how effective this is at teaching markets and trading strategies.

The professor also uses WSX in conjunction with another application we have, OTIS, which is a portfolio management simulator. Whereas WSX is a fast paced, closed-circuit market trading game, OTIS is more like e-Trade with fake money. With OTIS, you're not thinking, "How am I going to make money in the next ten minutes?" You're thinking, "How am I going to make money in the next five months?" In his class, you have to excel at both ends of that scale. I don't think that we have hard evidence that if you're great at WSX, you're going to make money as a trader on Wall Street, but it does teach market fundamentals in a clear and engaging fashion. That can only have a positive effect on those who go on to a career in trading or investing.

SW: It sounds like WSX requires a lot of real-time assessment and feedback. Is that the case?

AL: Yes. The trading engine in WSX runs five times a second so we're at the millisecond level in terms of trying to process orders and order flow.

SW: It must have been quite a challenge to build this thing. A part of me is a little afraid to ask you about the team, the time, and the cost of it, because one of the perceptions that people have is, "Oh, these things are really expensive." You're ostensibly accurately simulating the sweat-inducing experience of the trading floor. I do want to hear what went into it, the expertise, both the knowledge of the subject, as well as what programming skills were needed.

AL: Because of the obvious complexity and size of this application, this was not an inexpensive effort, however we do have a number of applications that are just as engaging that didn't take a great deal of time or expense. However, WSX was difficult to bring to life.

SW: Oh, I'll bet, and it's probably going to take a while before you see the return on investment. Why don't you tell me a little about the teams that are needed for this, and then, maybe, tell me about an example of something where you're getting a lot of engagement and interest and it wasn't a time- and bank-buster.

AL: Sure. Well, to give you a little bit of history on how we built WSX. It took three developers about 2½ months to build. That's about 6 months of person power.

SW: What tools did you use?

AL: We built the first version in 2001, using Visual Basic 6.0 on top of SQL Server. All of the processing and storage take place in SQL server. The client simply retrieves and displays data. In researching this, we spent a day at the brokerage and trading house Goldman Sachs. They took us through their trading floors. We went on the floor of the New York Stock Exchange, and they showed us what they use and gave us permission to build a scaled-down version of their trading screens. After that day we had a real flavor of the sweat part was because we saw people in this enormous trading floor the size of a football field. It was the same day the FOMC, the Greenspan committee, was releasing their latest prognosis on whether they move the interest rates up or down. As soon as that came out in the afternoon, suddenly the room exploded with action. They were all waiting until they heard the news, and then, bam. As soon as they got information, they were yelling and clicking, and doing whatever they needed to do to try to make money for their clients based on the new information. After that, we knew what we needed to build into the software to get that kind of excitement in the classroom.

It was just a matter of coming up with the data structures, and then writing the code for the trading engine and the stored procedures that would deal effectively with order flow in a way that simulates the real-world environment. While it really wasn't that expensive it certainly wasn't easy, and it did become one of our big early successes

SW: I must tell you that three developers working two and one-half months doesn't sound bad at all; I was expecting you to say years. It strikes me that you've seen a very good return on investment.

AL: I guess the only footnote I'd add is that I'm not including the database admin support, the network support, and all of the plumbing that goes along with running this sort of application. I'm really talking about the effort from the Learning Lab team.

SW: Do any other particular examples come to mind, in which you've used immersive learning simulations, where the issue was the technique rather than the technology?

AL: There's certainly plenty of low-hanging fruit where, if you come in with a simple yet powerful game design, implementing it doesn't have to be complicated, expensive, or take a long time. The caveat is that you keep your eye on the ball, and you don't try to add unnecessary bells and whistles, which is something that we've learned the hard way. We still fall into those pitfalls. For example, we have an oil pricing game we call OPEQ: "Oil Pricing Equilibrium." It's an oligopoly game where you're in an oil producing country, and the only thing you need to do is set your output in millions of barrels for the year. When you submit that decision, it goes in the hopper with two other countries' submissions and it determines how much the price per barrel is, given the demand and the supply. It's very straightforward. However, if you layer in something like forced change, For example, in the beginning you know what your other countries are producing, and then in round three, suddenly a fourth producer comes in that's automated, which adds a whole other set of complexity to the interaction. It wasn't that hard to build. It took a little thinking, but it didn't require special tools. It was just good database design. We used Cold Fusion and JavaScript. You could use ASP, PHP, or whatever, as your Web-based programming language. It was the design of the game itself that was simple enough, yet layered enough to allow a real engagement with the students.

SW: What makes this a game more than a simulation?

AL: It's because you're trying to win. You're trying to make money. You're trying to make more money than the other countries, and at the same time you get an understanding of what happens if you try to undercut vs. cooperate with the other oil-producing countries.

SW: Very interesting. Was there any resistance to the use of the term "game" when you came on board? So many Guild members have indicated that the word is loaded with baggage, and I'm wondering if that's something that you've run into at all.

AL: We've never had any issues like that. When we started the Learning Lab, we didn't know exactly what the faculty would want. That's why we're not the "Simulation and Game Team." We're the Learning Lab, so you don't have to do

a simulation or a game. In fact, sometimes we find people don't want to submit ideas because they're not necessarily game-like. They might think they're too simple, or they don't fit what we do, but we're really trying to be as inclusive as possible. Many of the games came along initially because faculty already had these things on paper. In fact, we have two games – one's an airline pricing game named Fair Game, and the other is PowerPlay, a reverse auction between Westinghouse and General Electric – that are activities the professor had run manually with pen and paper for years, but had stopped using it because it was so difficult to run in class. We allowed him to use these games again in a very easy-to-manage fashion, and we added things you can't do with paper. Using technology, we could go around the edges of the game and fill in neat things now that it's on the Web, and we capture all the data, and then we calculate things automatically. The games were already out there, in many cases. I've never heard anyone say, "Don't use the term game."

SW: I have a question for you. It sounds like people are getting a lot out of your efforts. It reminds me of the old Jiffy-Pop popcorn tagline "As much fun to make as it is to eat!"

AL: Absolutely. There's a lot of pride on the team for what we do and what we've accomplished, and much of that boils down to the fact that we're not just writing homework assessment tools – with no offense intended to administrative software tools – but we're doing neat stuff. I think the team really gets a kick out of the fact that you write these programs, and then you go and watch the students use them and you can see them learning. In the oil-pricing game, not only is it engaging when it runs, but the really interesting part is to watch the debrief session when they're all back in classroom. People get upset. People get angry about what happened during the game. It doesn't quite get to fisticuffs, but we do see people who get very wrapped up in this simulated world.

SW: It sounds like your developers need to have special skills to develop these things, which are different from developing other applications or other e-Learning applications. Or does it just turn out, "No, if you have basic development skills, you can do this – you don't need three years of game design theory," or whatever?

AL: Yes, I would agree with that. We don't necessarily design intricate games. A lot of that comes from working with the faculty members. We have an author who has thought through what they want to do. We now have six

years of experience under our belt, so we have a lot of expertise to offer. If you have a good author to work with, this doesn't require specialized skills. It requires curiosity, energy, and the ability to learn new things quickly, because we have applications that are in Marketing, Finance, Operations, and Information Management, and so on. Moreover, the developers on the team have worked on many of those projects. You have to go from coding a portfolio management simulation to game theory to marketing strategy, and are enough of an expert in the content to know what you're doing, as well as know, obviously, the code that you need to write or the database structures that you need to create.

SW: How many colleagues do you have in the Learning Lab, and please give me an idea of what your toolbox looks like? Whom do you have on board and what would you say you're using most of the time to build this stuff?

AL: We have seven people on the team including myself. We are an Adobe ColdFusion shop with Microsoft SQL Server as a back end. We use Adobe's Flex and Flash. We started using Flash a little while ago, and then we moved into Flex when that came out. For some graphics and animations, we use Photoshop and Fireworks.

SW: Are there other things you'd like to share with us?

AL: We're looking to enhance the experience between the faculty and the students. We found the most effective simulations that we've built are usually open-ended. They don't have a definite outcome. The participants themselves generate the outcome. For example, in WSX, if you play it by yourself, you're not going to make any money because you can't sell to yourself. Once you have another person on the other side, suddenly things happen. The same is true with OPEQ. It's very simple, but the complexity comes in with the interaction among the students. Open-ended outcomes are a big part of what we found to be important.

SW: Alec, thanks so much for your time today. I look forward to checking out some of the examples at http://www.wharton.upenn.edu/learning/

AL: My pleasure, Steve.

Getting Started Check List

Setting the Stage

Get the organizational details down.

☐ Define the learning objective

Is it a significant skill set change needing deep practice, and will it seriously (and positively) impact the organization?

☐ Develop the plan

Do you have resources and time to deliver the necessary scope?

Do you have, or can you acquire the necessary skill sets (do you know what they are)?

☐ Get management support

Do you have the support to weather the attention, resistance, and excitement you'll attract?

☐ Determine success factors and risk factors

What do you need in order to succeed, and do you have sufficient of it to minimize the chance of failure?

What are the barriers, and do you have plans to minimize and control them?

☐ Determine balance between in-house and outsourced

Will you gain from the experience, regardless of outcome and outsourcing?

Design

If you don't get the design right, it doesn't matter how you implement it...

☐ Specify success metrics

What are your system performance, usability, learning outcome, and engagement metrics?

☐ Determine IT infrastructure

Web, mobile, computer, console ?

☐ Determine audience

What are their motivations and interests?

☐ Determine working relationship with SMEs

Can they focus on meaningful decisions that will affect the organization?

Can they live with a creative approach?

☐ Diversity

Do you have representation from visual, interface, audio, writing, learning, and programming design?

☐ Establish who has final say

Does the "decision maker" understand the intersection of engagement and learning, and can he or she manage diversity?

☐ Feedback loop

Do you have well-specified deliverables, and control on the cycles of input?

☐ Establish learning support

Have you organized the learning resources and established reflection?

☐ Testing

Have you used low-tech prototype testing sufficiently to feel confident in your design?

Production

...If you get the design right, there are lots of ways to implement it.

☐ Implementation capabilities

Does the coding team understand software engineering, not just programming?

☐ Quality control

Have you implemented a rigorous cycle of code, interface, learning, and engagement testing?

Implementation

Once you build it, you're not done!

☐ Tuning

Have you sampled your audience to test and refine the mechanics?

Have you allocated sufficient time for the tuning process?

☐ Evaluation

Have you ways to evaluate after implementation to validate the outcome and benefits?

☐ Change management

Have you promoted the project with the audience about how this aligns with the business goals, and are rewards aligned with the participation you desire?

Resources

By Angela van Barneveld

Angela works as a Program Manager at a global Business Intelligence and Corporate Performance Management solutions company. Her experience in the learning industry spans academic, public, and private sectors, and she is pursuing a Ph.D. in Educational Technology at Concordia University in Montreal. Angela has presented at several conferences on the topics of blended learning, mobile learning, usability, and problem-based learning, and has been a member of The eLearning Guild's Research Committee for several years.

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Web sites

e-Learning Guild Research Resources

http://www.elearningguild.com/pbuild/linkbuilder.cfm?selection=fol.28

Active Worlds

http://www.activeworlds.com/

Active Worlds allows organizations to create their own virtual 3-D worlds, and provides the hosting and technical support required to keep the 3-D world online.

Alice

www.alice.org

Not so much a tool, really, as another learning experience. Designed to teach students how to program 3-D, Alice's interface is easy to understand and use and can teach the basics of 3-D game programming.

Blender

http://www.blender.org

Blender is the free open source 3-D content creation suite, available for all major operating systems. .

Clark Aldrich's Style Guide for Serious Games and Simulations

http://clarkaldrich.blogspot.com

A Free, online reference to the subversive new media and language of Learning to Do, not just Learning to Know.

Board Games Ratings

http://www.boardgameratings.com/

An online store with game ratings and recommended lists.

Board Game Geek

http://www.boardgamegeek.com/newuser.php

Reviews, ratings, and discussion for thousands of games.

CNBC – A History of the Video Game Industry

http://www.msnbc.msn.com/id/15734058/

From *Pong* to *PacMan* to *Tetris*, a $25 billion industry has humble roots.

Checkpoint e-Learning – GBL for Employees

http://www.checkpoint-elearning.com/article/3252.html

Interview with IBM's Dr. Tony O'Driscoll on the use of games (MMORPGs) for training employees.

cxKnowledge Sharing

http://www.cxknowledge.com/Intro_SL.html

Introduce your students to Second Life: Cheryl Carter's helpful guide to what your students need to know to use Second Life.

Delta3D

http://www.delta3d.org/

An open source, fairly full-featured engine that can create rather sophisticated 3-D environments. Opens source means no up front cost, but keep in mind that you will have to "pay" to learn how to use it in terms of time, and it is open source which means that the full time development crew behind it, while hard-working and dedicated, will not be manning a 24/7 help desk.

DoD Game Developers' Community

http://www.dodgamecommunity.com/

Funded by a DoD SBIC grant, this site is intended to bring together the entire community developing games within the US military. All content except the members list is available without logging in.

Edge Perspectives – Gaming and Learning

http://edgeperspectives.typepad.com/edge_perspectives/2007/01/gaming_and_lear.html

The edge is where the action is – in terms of growth, innovation, and value creation. Companies, workgroups, and individuals that master the edge will build a more sustainable core. While our primary focus will be on business ac-

tivity, our perspectives will also be relevant to leaders of other kinds of institutions as well – educational, governmental, and social.

Educational Games Central

http://www.savie.qc.ca/carrefourjeux2/Accueil_content.html

The Educational Games Central Website allows teachers and trainers, companies, and community or non-profit organizations to develop and use educational games online using generic game shells. The Welcome page defaults to French, but is available in English and Spanish.

EDUCAUSE – Second Life abstract

http://www.educause.edu/content.asp?page_id=666&ID=SWR0552&bhcp=1

Second Life: The Educational Possibilities of a Massively Multiplayer Virtual World (MMVW): A presentation for EDUCAUSE by D.M. Antonacci and N. Modares.

EDUCAUSE – Games and Gaming

http://www.educause.edu/content.asp?page_id=645&PARENT_ID=792&bhcp=1

EDUCAUSE resource page on Games and Gaming – lists Core Content (new and popular content, primary publications, and more), Related Resources, Conference Resources, Archived Resources, and a Topic Definition.

Educause CONNECT – Richard Van Eck's Presentation on Digital Game-based Learning

http://connect.educause.edu/blog/gbayne/richardvaneckpresentation/44488

In this Podcast of the presentation "Generation G and the 21st Century," Richard Van Eck, associate professor of instructional design and technology at the University of North Dakota, discusses the theory behind the effectiveness of games in teaching and learning; what the past can teach us about if, how, and when to implement digital game-based learning; and what this will mean for colleges and universities.

e-Learning Centre – Library for GBL

http://www.e-learningcentre.co.uk/eclipse/Resources/games.htm

The e-Learning Centre is a free information resource about e-Learning. The Editor reviews each entry before placing it on the e-Learning Centre site. The link takes you to the resources for game-based learning (GBL).

e-Learning Europa – e-Learning papers

http://www.elearningeuropa.info/files/media/media10911.pdf

MGBL - Mobile Game-Based Learning: Perspectives and Usage in Learning and Career Guidance Topics (PDF).

e-Learning Guru – Games and Simulations

http://www.e-learningguru.com/knowledge_GameSim.htm

Who says e-Learning has to consist of boring page-turners? This section explores learning games from TV-style game shows to first-person shooters. It also contains white papers and articles.

e-Learning Guru – Interview with Clark Aldrich

http://www.e-learningguru.com/interviews/interview_clarkAldrich.htm

Eludamos: Journal for Computer Game Culture

http://www.eludamos.org/index.php/eludamos/issue/view/2/showToc

ELUDAMOS is an international, multi-disciplined, biannual e-Journal that publishes peer-reviewed articles that theoretically and/or empirically deal with digital games in their manifold appearances and their socio-cultural-historical contexts.

Engaging Learning

http://www.engaginglearning.com/

The site to accompany the book *Engaging Learning: Designing e-Learning Simulation Games*, by Clark Quinn. The Resources (http://www.engaginglearning.com/resources.html) page includes links to game examples that you can play online, as well as simple templates for concept documents and storyboards.

Engaging Mini-Games Find Niche in Training

http://www.simulearn.net/download/ClarkAldrich_Mini-game_article.pdf

This article by Clark Aldrich informs us that quick, interactive simulations are meeting the training needs of businesses.

Futurelabs – Games and Learning

http://www.futurelab.org.uk/download/pdfs/research/handbooks/games_and_learning.pdf

There's an increasing interest in the potential role of computer and video games to support young people's learning. Although most research has focused on out-of-school contexts, recent studies have begun to ask how games might be used, or adapted for use, in schools. This new handbook reports on some of the latest developments in the design of bespoke educational games, and asks whether and how schooling should be adapted to accommodate the use of games.

Gamasutra

http://www.gamasutra.com/

Industry Web site for professional game developers.

Game Culture

http://www.game-culture.com/

A resource for academics, developers, gamers, and all others interested in the significance of computer games. Covers gaming in general, and online gambling as a cultural phenomenon.

Game Research

http://www.game-research.com/

The art, business, and science of video games.

Game-based Learning: An xLearn Perspective

http://www.masie.com/xlearn/Game-Based_Learning.pdf

Paper by Dr. Kurt Squire for MASIE Consortium (PDF).

Game Maker (by Mark Overmars)

http://www.gamemaker.nl/

A ridiculously cheap program that is capable of creating a range of game products including scrolling shooters, platform games, puzzle games, and isometric games. One of the interesting side effects of using this, and many of the other products on this list, is that simply by using them, you absorb some of the lessons of game design. Given that some of these products cost less than $50 U.S., it may be worthwhile, even if you don't have an active project, to purchase a copy and try your hand at creating a game.

Game Show Pro

http://www.learningware.com/pages/prodServices/classroom/gsp3/?menu_request=1&menu_name=prodServices

The natural progression up from Web game shells in terms of complexity, visual quality of the output, and, of course, in price. This product also makes use of templates, but has an array of additional features beyond the Web-based game shells. One thing to keep in mind, however, is that as these products increase in price and functionality, they may not bring a similar increase in terms of training effectiveness. Design will trump graphics just about every time in creating effective game-based learning.

Games as Learning Environments

http://www.irrodl.org/index.php/irrodl/article/view/285/454

Games as Learning Environments: Research strategies and issues, Jim Bizzocchi.

(Elluminate Webinar – need free download of Elluminate software to view.)

Games2train

http://www.games2train.com/

Games2train stands out in the world of learning and training for its Game-Based Learning approach – the ability to marry the fun of playing a videogame or computer game together with all the information needed to accomplish learning or training objectives.

GamesParentsTeachers

http://www.gamesparentsteachers.com/

A parent-teacher toolkit. Contains games, resources, and more.

Greg Costikyan
http://www.costik.com/

Greg Costikyan's Website with several interesting articles.

How Games are Reshaping Business
http://hosted.mediasite.com/flash/accelerate%5Fmadison%5F20050120/

Webcast: Presented by Dr. James Paul Gee, Dr. Kurt Squire, and Constance Steinkuehler.

I'm Serious.net
http://imserious.typepad.com/

Serious thoughts about serious games.

Immersive Education
http://immersiveeducation.org/

An international collaboration of universities, colleges, research institutes, consortia, and companies that are working together to define and develop open standards, best practices, platforms, and communities of support for virtual reality and game-based learning and training systems.

Imparta Capability Building
http://www.imparta.com/

Imparta builds business-critical capabilities. They cover a wide range of skill areas, with particular focus on sales effectiveness, business acumen, and custom training solutions. They offer an integrated, "best of breed" approach that combines diagnostic tools, intensive workshops, advanced computer-based simulations, and effective reinforcement.

Leadership in a Distributed World
http://domino.research.ibm.com/comm/www_innovate.nsf/images/gio-gaming/$FILE/ibm_gio_ibv_gaming_and_leadership.pdf

In this report, read what IBM has learned about its own internal gaming community.

Learning Circuits
http://www.learningcircuits.org/

American Society for Training and Development (ASTD) resources for e-Learning.

Learningware

http://www.learningware.com/

Leading provider of software templates designed to make training more engaging, effective, and fun! Whether you need a classroom game show, an Internet-based assessment, or a classroom quiz, our mission is to give you software tools that are simple to understand, easy to use, and effective.

Learnlets – Clark Quinn's Learnings about Learnings

http://blog.learnlets.com/wp/

Game-related postings
http://blog.learnlets.com/wp/?cat=2

Ludology: VideoGame Theory

http://www.ludology.org/. An online resource for videogame researchers that has been published by Gonzalo Frasca since May, 2001.

ModelBenders

http://www.modelbenders.com/index.html

Dr. Roger Smith founded ModelBenders in 1998 to promote the application of modeling, simulation, and virtual world technologies. ModelBenders offers technical data, courses, products, and services related to creating virtual worlds.

Multiverse

http://www.multiverse.net/

The development tools for this product are still in beta, but a demo is available from the site. Multiverse plans to provide developers with an inexpensive, pre-populated, customizable tool kit, which will allow them to create Massive Multiplayer Online Games (MMOGs) faster and cheaper than ever before. One of the promises of this technology is also that an avatar (virtual alter ego) that you create in one Multiverse world will be easily transportable to any other Multiverse world.

New Media Consortium

http://www.nmc.org/sl/2006/06/12/seriously-engaging-movie/

Link that describes what the new media consortium is doing with 3-D virtual worlds. Direct link to NMC video (http://media.nmc.org/sl/video/seriously-engaging.mov).

Pixel Learning

http://www.pixelearning.com

A U.K.-based company that has a focus on applying computer game and simulation approaches within the e-Learning industry.

Quest Creator

http://www.datawaregames.com/html/qc.htm

This is another inexpensive product that allows you some limited ability to modify its characters and settings to create your own quests. While the interface is easy to understand, and the graphics simplistic by today's Xbox 360 standards, this application is another hidden gem in terms of learning for little cost about game design elements like narrative and play balancing.

Quinnovation

http://www.quinnovation.com/

Quinnovation is the vehicle through which Clark Quinn delivers innovative thinking, with a track record of pragmatic solutions covering games, mobile learning, performance support, content models, intelligent systems, and more.

Second Life

http://secondlife.com

A 3-D virtual world. Basic membership is free, and of great interest is the intellectual property agreement that says that if you build something in Second Life, it's yours to sell, give away, or distribute as you see fit. In fact, all the content in this world is user-created. Second Life's interface, while it does have a learning curve, also exposes all the tools needed to develop rich, immersive situations within the world. A great resource for the educational uses that Second Life is being put to is available here

http://www.simteach.com/wiki/index.php?title=Second_Life_Education_Wiki.

Second Life Education Research

http://www.secondlife.intellagirl.com/

Sarah "Intellagirl" Smith-Robbins' blog containing reflections on the progress of the course, and other issues related to teaching in virtual environments.

Serious Games Initiative

http://www.seriousgames.org/index2.html

Focused on uses for games in exploring management and leadership challenges facing the public sector.

Serious Games Institute

http://www.seriousgamesinstitute.co.uk/

A U.K. public-funded national centre of excellence in Serious Games, where researchers and private sector coexist and collaborate with the goal of fostering the effective and appropriate uptake of games for learning.

Serious Games: Online games for learning

http://www.adobe.com/resources/elearning/pdfs/serious_games_wp.pdf

A white paper by Anne Derryberry for Adobe Systems.

Serious Games Social Networking Group

http://seriousgames.ning.com

This site is intended as a Web portal to serious games news, resources, and companies. Its secondary goal is to enable networking between anyone with an interest in serious games.

Serious Games Source

http://seriousgamessource.com/features/feature_120806_where_its_at_1.php

Links to features article: Where It's At: An Anecdotal Look at the Stages of Games-based Learning Adoption in the e-Learning Sector.

SimSchool

http://simschool.org/

A classroom simulator for educators.

SimTeach

http://www.simteach.com/

Information and Community for Educators using MUVE (Multi-User Virtual Environments) – a Website built by educators using Second Life.

SimTeach12

http://www.simteach.com/simteach12_06.pdf

Jeremy Kemp's "best of" education in Second Life for 2006, including events, people, locations, and tools (PDF).

sloodle

http://www.sloodle.org/ Learning system for virtual environments.

Social Impact Games

http://www.socialimpactgames.com

Entertainment games with non-entertainment goals (a.k.a. Serious Games).

Summit on Educational Games

http://fas.org/gamesummit/

Full Report: Harnessing the Power of Video Games for Learning (PDF) - http://fas.org/gamesummit/Resources/Summit%20on%20Educational%20Games.pdf

Fact Sheet: National Summit in Educational Games (PDF) – http://fas.org/gamesummit/Resources/Fact%20Sheet.pdf

Task Force on Game Technology

http://www.ucalgary.ca/~jparker/TFGT/publications.html

A significant bibliography of game technology and game studies references is under construction. It's a work-in-progress, but here are several links to the relevant pages, as they exist at this moment.

The 3D Gamemaker

http://t3dgm.thegamecreators.com/

Guess what this is. It's an inexpensive, easy to use application for creating 3-D games. The price is low, but don't underestimate the power of products like this, and Game Maker, to create relatively sophisticated products at low prices.

The Thiagi Group

http://www.thiagi.com/

Improving performance playfully! We use games and activities that engage participants. We keep them interacting with each other, and with the content. We design training faster, cheaper, and better with an irreverent process that eliminates unnecessary steps that don't add value. Site includes free resources.
http://www.thiagi.com/wgs-menu.html

Thiagi, the guru of game-based learning, has available a number of shells – so named because all the developer has to do is open them up and switch out content. These games take on simple forms such as hangman and tic-tac-toe, but are a quick, inexpensive, and simple ways to create some basic game content.

Theory of Fun

http://www.theoryoffun.com/

Raph Koster's site for his "Theory of Fun" book.

Torque Game Engine

http://www.garagegames.com

This is a commercially available game engine which is, again, priced really inexpensively compared to the quality of environments it is capable of producing, and especially relative to the price that such tools brought just a few short years ago. Torque is a commercial product supported by its parent company, Garage Games. It can produce retail-grade 3-D game environments, but remember, the more graphically intense the environment, the higher that baseline better be.

Ultimate Distance Learning, The

http://www.nytimes.com/2007/01/07/education/edlife/07innovation.html?_r=2&ref=edlife&oref=slogin&oref=slogin

New York Times (electronic edition) article in Education Life section.

Virtual Worlds, Real Leaders: Online games put the future of leadership on display.

http://domino.research.ibm.com/comm/www_innovate.nsf/pages/world.gio.gaming.html

IBM's Global Innovation Outlook (GIO) has published a gaming and leadership report, studying management practices in online games – available FREE as a downloadable PDF or as hard copy.

Visual Purple

http://www.visualpurple.com/

First e-Learning company to provide world-class, decision-based simulations. Three basic product categories: (1) simulation products, (2) interactive systems emulation, and (3) decision integration, visualization, and assessment support.

Virtual U

http://www.virtual-u.org/

Virtual U fosters better understanding of management practices in American colleges and universities. It provides students, teachers, and parents the unique opportunity to step into the decision-making shoes of a university president. Players are responsible for establishing and monitoring all the major components of an institution, including everything from faculty salaries to campus parking.

West Midlands: Serious About Games

http://www.seriousaboutgames.com/home

A U.K.-based public sector, academic, and private sector collaboration aimed at fostering the best practice and industry adoption of serious games.

Win-win scenario: "Game School" aims to engage and educate

http://www.wired.com/culture/education/news/2007/07/game_school

An article about Game School, a proposed New York City public school that will use "game design and game-inspired methods" to educate sixth through 12th graders.

Woman in Games International

http://www.womeningamesinternational.org/

WIGI works to promote the inclusion and advancement of women in the global games industry.

Organizations

ASAE & The Center for Association Leadership

http://www.asaecenter.org/

Feature publication: Gaming: Let Yourself Fail Forward.

ABSEL

http://www.absel.org/

Association for Business Simulation and Experiential Learning – ABSEL is a professional association whose purpose is to develop and promote the use of experiential techniques and simulations in the field of business education and development.

DIGRA

http://www.digra.org/

Digital Games Research Association

IGDA

http://www.igda.org/

International Game Developers' Association – IGDA is a non-profit professional society committed to advancing the careers and enhancing the lives of game developers by connecting members with their peers, promoting professional development, and advocating on issues that affect the developer community.

ISAGA

http://www.isaga.info/

International Simulation and Gaming Association – The ISAGA is an international organization for scientists and practitioners developing and using simulation, gaming, and related methodologies.

JASAG

http://www.jasag.sakura.ne.jp/

Japanese Association of Simulation and Gaming (site is in Japanese)

NASAGA

http://www.nasaga.org/

North American Simulation and Gaming Association – The NASAGA is a growing network of professionals working on the design, implementation, and evaluation of games and simulations to improve learning results in all types of organizations. We believe in the value of learning gained through experience, and feel that games and simulations, appropriately designed and conducted, are an extremely useful (and underused) tool for creating this rich learning.

SAGANET

http://www.saganet.nl/

Simulation and Gaming Association – The Netherlands

SAGSET

http://www.simulations.co.uk/sagset/sagset2.htm

The Society for the Advancement of Games and Simulations in Education and Training

SSAGSg

http://www.ssagsg.org/Default.aspx

Society of Simulation and Gaming of Singapore

Conferences

Apply Serious Games 2008

London, U.K. – July 9-10, 2008
http://www.applyseriousgames.com/

Association for Business Simulation and Experiential Learning (ABSEL) 2008 National Conference

Charleston, South Carolina – March 5-7, 2008
http://www.absel.org/Conferences/Conference.html

Edutainment 2008: 3rd International Conference on E-Learning and Games

Nanjing, China – June 25-27, 2008
http://edutainment2008.eegame.cn/main.htm

Game Developers' Conference

San Fancisco, CA – February 18 - 22, 2008
http://www.gdconf.com/

IEEE International Conference (2nd) on Digital Game and Intelligent Toy Enhanced Learning (DIGITEL 2008)

Banff, Alberta – November 17 – 19, 2008
http://www.ask4research.info/digitel/2008/

International Simulation and Gaming Association (ISAGA) 2008 – 39th Annual Conference

Conference theme: GAMES: Virtual Worlds and Realities

Kaunas, Lithuania – July 7-11, 2008
http://www.isaga.info/mod/resource/view.php?id=21

Link to previous ISAGA Conferences (all the way back to 1970)
http://www.isaga.info/mod/resource/view.php?id=104

2007 New Media Consortium (NMC) Conference Proceedings

The NMC Summer Conference is a one-of-a-kind event, attracting an audience of highly skilled campus professionals who are very knowledgeable about and interested in the integration of emerging technologies into teaching, learning, and creative expression.

Indianapolis, Indiana – June 6-9, 2007
http://www.nmc.org/publications/2007-conference-proceedings

Get proceedings from previous NMC conferences
http://www.nmc.org/publications/2007-conference-proceedings

SAGSET 2008 – 38th Annual Conference

Conference theme: Teaching and Learning through Gaming and Simulation

University of Nottingham, England – July 17-18, 2008
http://www.nottingham.ac.uk/business/game2008/

Serious Games Institute (SGI) Conference 2007

http://www.seriousgamesinstitute.co.uk/media.aspx?item=90 (to access conference presentations)

http://dp-x.com/datpresenter/dpx.php?dpxuser=SGI (to access audio/video of presentations)

Books

Being Digital

Author: Nicholas Negroponte (1995)

http://www.amazon.com/Being-Digital-Nicholas-Negroponte/dp/0679762906/sr=1-1/qid=1168200770/ref=pd_bbs_1/104-0347550-2071177?ie=UTF8&s=books

Chris Crawford on Game Design

Author: Chris Crawford (2003)

http://www.amazon.com/Chris-Crawford-Game-Design/dp/0131460994/sr=8-1/qid=1168200506/ref=pd_bbs_sr_1/104-0347550-2071177?ie=UTF8&s=books

Digital Game-based Learning

Author: Mark Prensky (2000)

http://www.amazon.com/Digital-Game-Based-Learning-Marc-Prensky/dp/0071454004/sr=1-2/qid=1168200982/ref=pd_bbs_2/104-0347550-2071177?ie=UTF8&s=books

Don't Bother Me Mom – I'm Learning!

Author: Mark Prensky (2006)

http://www.amazon.com/Dont-Bother-Me-Mom-Im-Learning/dp/1557788588/sr=1-1/qid=1168200982/ref=pd_bbs_1/104-0347550-2071177?ie=UTF8&s=books

Engaging Learning: Designing e-Learning Simulation Games

Author: Clark Quinn (2005)

http://www.amazon.com/exec/obidos/tg/detail/-/0787975222/qid=1109287746/sr=1-5/ref=sr_1_5/?v=glance&tag2=httpwwwotteco-20

Got Game: How the Gamer Generation is Reshaping Business Forever

Authors: John C Beck & Mitchell Wade (2004)

http://www.amazon.com/Got-Game-Generation-Reshaping-Business/dp/1578519497/sr=1-1/qid=1168351965/ref=pd_bbs_sr_1/104-0347550-2071177?ie=UTF8&s=books

Growing Up Digital: The Rise of the Net Generation

Author: Don Tapscott (1998)

http://www.amazon.com/Growing-Up-Digital-Rise-Generation/dp/0071347984/sr=1-1/qid=1168201201/ref=pd_bbs_sr_1/104-0347550-2071177?ie=UTF8&s=books

How Computer Games Help Children Learn

Authors: David Williamson Shaffer (2006)

http://www.amazon.com/Computer-Games-Help-Children-Learn/dp/1403975051/sr=8-6/qid=1168202351/ref=pd_bbs_sr_6/104-0347550-2071177?ie=UTF8&s=books

Learning by Doing: A Comprehensive Guide to Simulations, Computer Games, and Pedagogy in e-Learning and Other Educational Experiences

Author: Clark Aldrich (2005)

http://www.amazon.com/s/ref=nb_ss_b/002-8574347-1262420?url=search-alias%3Dstripbooks&field-keywords=clark+aldrich&Go.x=11&Go.y=9

The Nurnberg Funnel: Designing Minimalist Instruction for Practical Computer Skills

Author: John M. Carroll (1990)

http://www.amazon.com/Nurnberg-Funnel-Instruction-Communication-Information/dp/0262031639/sr=8-1/qid=1168630903/ref=sr_1_1/104-0347550-2071177?ie=UTF8&s=books

Theory of Fun for Game Design

Author: Raph Koster (2004)

http://www.amazon.com/Theory-Fun-Game-Design/dp/1932111972/sr=1-1/qid=1168200300/ref=pd_bbs_sr_1/104-0347550-2071177?ie=UTF8&s=books

What Video Games have to Teach Us about Learning and Literacy

Author: James Paul Gee (2005)

http://www.amazon.com/Video-Games-Teach-Learning-Literacy/dp/1403965382/sr=8-1/qid=1168202351/ref=pd_bbs_sr_1/104-0347550-2071177?ie=UTF8&s=books

Worlds of Herman Kahn: The Intuitive Science of Thermonuclear War

Author: Sharon Ghamari-Tabrizi

http://www.chapters.indigo.ca/books/Worlds-Herman-Kahn-Intuitive-Science-Sharon-Ghamari-Tabrizi/9780674017146-item.html

Examples

Business Game, The

http://www.thebusiness-game.com/

The Business Game is an engaging games-based learning product that puts the learner into a realistic business scenario where they develop and market a new product.

CO2FX

http://www.globalwarminginteractive.com/index.htm

A Web-based multi-user educational game which explores the relationship of global warming to economic, political, and science policy decisions; the game is driven by a systems dynamics model, and is presented in a user-friendly interface intended for a high school user.

Caspian Learning Demo

http://www.elearningguild.net/Examples/Caspian_Demo.wmv.

This is a Windows media clip showing some examples of immersive learning systems from U.K. company, Caspian Learning.

Cisco's Binary Game

http://forums.cisco.com/CertCom/game/binary_game_page.htm

Clark Aldrich's Blogspot

http://clarkaldrich.blogspot.com/search/label/Examples

A collection of links to real examples of simulations. Clark particularly recommends: Tips on Tap; September 12; Flex Your Power Challenge; Selling Simulation

Crime Scene Game – Intel
http://cstech.intel.com/

Crompco Gas Station
http://www.elearningguild.net/Examples/Crompco_Demo.wmv

A walkthrough of Crompco's Second Life virtual gas station.

ENG104 in Second Life
http://eng104sl.intellagirl.com/

The class site containing student writing and assignment sheets.

ENLIGHT: Capitalism II
http://www.enlight.com/capitalism2/

Create and control the business empire of your dreams. This in-depth strategy game covers almost every aspect of business that one could encounter in the real world. You can download the game (53MB).

Experimental Gameplay Project
http://www.experimentalgameplay.com/

Initially starting out as a class project at Carnegie Mellon University to rapidly prototype as many new forms of game play as possible, this site now encourages anyone with a brilliant game idea to prototype it and place it on the site where they can receive feedback, exposure, and possibly more. Play games, access articles.

Games That Work
http://gamesthatwork.com/

Play sample games.

Games2Train
http://www.games2train.com/

Serious training in a game environment – Go ahead and try different formats of games to see how you do! Options include Video Games, Multiplayer Games, Certification Games, Quiz Shows, Flash Games, and Phone Games.

GamesParentsTeachers

http://www.gamesparentsteachers.com/modules.php?op=modload&name=Gameslist&file=index

Index of games.

Getty Games

http://www.getty.edu/gettygames/

Art-based children's games from the J. Paul Getty Trust.

Kongregate

http://www.kongregate.com/

This site seeks to create the leading online hub for players and game developers to meet up, play games, and operate together as a community. Kongregate's site serves as a unique way for users to play great Web-based games alongside friends. Anyone can add their own games to Kongregate's library in a process that's fast and simple.

Invisible City Productions

http://www.invisible-city.com/

Features a selection of innovative tabletop game designs.

Learning Mate ILS

http://www.elearningguild.net/Examples/LearningMateDemo.mov.

Clark Quinn provides a walkthrough of an ILS that teaches drug use in controlling pain.

Power Politics III

https://registration.kelloggcreek.com/pp3/Teachers/default.asp

The free "Educational Version" of Power Politics III is available to any educator who wishes to use the simulation as a teaching aid in his/her classroom.

Project Management Simulation

http://www2.dot.ca.gov/hq/cpsd/PM_sim/

In this simulation, you play a new project manager for planet Terraforming. You'll get a stack of projects, and an interface to review data and communicate with team members and stakeholders. Your job is to try to get those deliverables executed on time, and maintain good relations all around.

Quest

http://www.quinnovation.com/quest/

Designed to help kids learn to live independently; originally programmed in HyperCard and subsequently ported to the Web. While using older technology (CGI), it's playable, and still features the original design.

Sun Microsystems – Dawn of the Shadow Specters

http://learning.sun.com/sls/staff/display/NEWHIRE/Play

New hire training at Sun Microsystems

The Thiagi Group

Web-game shells – http://www.thiagi.com/web-game-shells.html

Training games – http://www.thiagi.com/games.html

Training puzzles – http://www.thiagi.com/puzzles.html

Virtual Leader

http://www.elearningguild.net/Examples/VirtualLeaderExample.wmv.

This is a Windows media clip of Simulearn's award-winning leadership immersive learning system.

WFP FoodForce – The Game

http://www.food-force.com/index.php/game/

The game: A major crisis has developed in the Indian Ocean, on the island of Sheylan. We're sending in a new team to step up the World Food Program's presence there, and help feed millions of hungry people.

YouTube - Jeremy Kemp

http://youtube.com/profile?user=jeremykemp

Jeremy Kemp's collection of Second Life Educational videos.

Glossary of Terms

AI

Artificial Intelligence. A set of code or algorithms designed to simulate the actions of an intelligent being – such as a human or an animal.

Action games

Games focusing on speed and physical drama, and which set high demands on the player's reflexes and coordination skills.

Adventure games

Games focusing on puzzle solving within a narrative framework. They will typically demand strict, logical thought.

Avatar

Graphical representation of the user in an online forum, especially in role-playing games.

CVE

Collaborative Virtual Environment. Can range from a multiplayer game like *World of Warcraft* where players can work together to defeat a common enemy, to a site like Wikipedia, where users can work collaboratively to achieve a common goal.

Edutainment

Combination of the terms "education" and "entertainment." A label for games with a pronounced educational ambition.

Engagement metrics

Quantitative outcomes that specify the quality of the engagement (e.g., "over 80% prefer this over regular e-Learning," or "average a higher rating than

previous courses." The designer creates the targets, and learners test against them until they achieve the targets. These are inherently subjective (which is natural for engagement).

FPS

First-person Shooter. A perspective in a game where the player is seeing the game from the first-person point of view (that is, the computer screen is looking into the room as if through the players eyes), and typically, the player's task is shooting at something that is attacking.

Far Transfer

Learning applied to real-life situations that are somewhat, to greatly, different from the learning context, yet are appropriate applications of the skill or knowledge. For example, you learned some negotiation skills for dealing with clients, and you use those same skills and processes in a different context, like bargaining the price for a new TV set or, negotiating allowance with your kids.

Flow

Describes the flow state as the feeling of optimal experience. We feel flow when we feel in control of our own fate, and have a sense of exhilaration and enjoyment.

Frame games

Games where the structure is independent of the content (e.g., *Jeopardy*, *Hangman*). Typically used for rote memorization.

Game

An interactive experience, where the interaction has been play-balanced to achieve optimal playability. In learning terms, it is a tuned scenario that creates a game-level experience.

Game levels

Most games are designed with levels, each with its own setting, obstacles, and "boss" at the end (tough monster / challenge). These are natural breaks in the

storyline, and overcoming the challenges at one level will progress the player to the next level.

Game mechanics

In the simplest terms, this refers to the set of rules which determine how a player interacts with the game – not how you play the game (the Rules) – but how the player actually moves the action along. An example from any number of typical board games might be "roll the dice and move forward the number of spaces indicated." It seems simple, but if the game mechanics are too extreme or too simplistic (relative to the game), then the player could lose interest and stop playing. Other examples of game mechanics include: drawing a card to determine a random event, comparing attack and defense values of opposing pieces to determine a combat outcome, comparing a die roll to a skill value to determine success or failure of an action, or Mario jumping on top of an opponent to knock it out.

Immersive Learning Simulation (ILS)

Also known as a Serious Game. An optimized blend of simulation, game element, and pedagogy that leads to the student being motivated by, and immersed into, the purpose and goals of a learning interaction. Serious games use meaningful contextualization, and optimized experience, to successfully integrate the engagement of well-designed games with serious learning goals.

Alternative definition: a simulation game with learning objectives as a major design constraint. Resources, decisions, and rewards of the game are analogous to the content process. Usually used with simulations, and are the most effective way for players to try out different strategies and learn effective decision-making.

Interactivity

A term used in many fields, but typically as a measure of user influence. The higher the degree of interactivity, the more influence the user has on the form and course of a media product. The two main types of interactivity include real-time and turn-based (see *Strategy games – real-time* and *Strategy games – turn-based* in this Glossary).

Interface

The graphical or textual form of interaction between user and software. Through the interface, the user may give commands to the software, which are then translated into instructions that the computer can interpret.

Learning metrics

Learning metrics are specific learner performance targets we set, and then design our learning to achieve (e.g. "A learner will be able to successfully complete a purchasing transaction without manager help 80% of the time). We then test against these targets, collecting data until we meet the objectives.

Ludology

The study of games, particularly computer games. Ludology is most often defined as the study of game structure (or game play) as opposed to the study of games as narratives, or games as a visual medium.

Mini-game

An activity, or wrapper, used to add fun and excitement to classroom or e-Learning training. Examples include game show elements (*Jeopardy*, *Wheel of Fortune*), puzzle elements (*Sudoku, Boggle, Jumbles*), and memory elements (*Concentration*) – also called a Frame Game.

Alternative (and rather different) definition: A simulation game with a limited scope, taking around 10-20 minutes to play, but still employing the sound pedagogical foundation of a well designed ILS.

MMORPG

Massively Multiplayer Online Role-Playing Game is a type, or genre, of game where the player takes the part of a character. It involves a persistent world (virtual work keeps going 24/7), possibly featuring thousands of players in the same world.

A game type where several (typically several thousand) players act simultaneously in the same server-based world. Users normally pay a monthly fee, and connect by their Internet account.

MUVE

Multi-User Virtual Environment, also called a virtual world.

Pedagogical scaffolding

Support, initially provided during learning practice, which is gradually removed until the learner is performing the full target task. Scaffolding could include hints, simplified versions of problems, partially completed problems, etc.

Play balancing

This is the design process of making sure that any game is neither too easy nor too hard; easy concept to grasp, often very hard result to achieve; a part of the tuning process. For example, if someone wanted you to play a wrestling game by wrestling Hulk Hogan, you would probably conclude that you would not want to play that game because of the obvious imbalance in skill and power – it would be far too hard. On the other hand, the same game probably wouldn't be very interesting for Hulk Hogan either, for exactly the same reasons. A well-balanced game is one that keeps ultimate victory within reach of the player, but makes them work (and learn) to achieve it.

Playability

Synonymous with overall game quality; specifically, it is a measure of how compelling and engaging the game is, how interesting and challenging the decisions are, and what kind of suspense and tension are created in the game.

PVE

Player versus environment. Refers to game combat where a human player is engaged in combat with computer-controlled opponents.

PVP

Player versus player. Refers to combat involving two human players, as opposed to a human player versus a computer-controlled opponent.

Replayability

The quality of a game that makes you want to play it multiple times. Replayability usually comes from a game design, or opponent, that reacts intelligently (or at least appears to) and changes its conditions in unpredictable ways. For example, *Chess* has high replayability, while a specific *crossword puzzle* or a *simple branching game* has low replayability.

Scenario

A simulation where the initial state has been set, and a goal (or goals) are provided for the player. Examples include determining when to open flood gates if an area has already experienced heavy rains (water and levee), how to find a file (Windows XP tutorial), how to make a withdrawal from an account (ATM), and how to administer an epidural for somebody with chronic back pain (human nervous system). Sometimes also considered to be a game level.

Scenario – branching

Students make decisions in a setting while trying to achieve a goal, and different consequences lead to different decisions. The decisions affect the evolution of the story, ultimately terminating in either successful or unsuccessful outcomes. **Advantages**: more reality through consequences depending on decisions; relatively inexpensive to implement. **Disadvantages**: fixed consequences, so limited replay; and ability to track the consequences becomes problematic beyond a certain number of paths.

Scenario – mini/one-page scenario

A single decision, cast with a setting and a situation providing a meaningful reason to make the decision, and with specific feedback providing the consequences to the decision. Essentially, a multiple-choice question with the choices phrased as alternative responses to the situation. **Advantages**: more meaningful questions; and ability to cover many contexts. **Disadvantages**: lack of continuity.

Scenario – linear

Several decision in the same setting, with each situation having consequences, but some story element creates the net same results so that no matter what

choice you make, you face the same next decision. **Advantages**: simple to implement, ensures every learner faces same questions (which can be important decisions), and some story continuity. **Disadvantages**: lack of meaningful different decision consequences.

Scenario – rule/engine-driven

Like branching scenarios, the consequences and subsequent decisions vary, but can have probabilistic rather than pre-determined outcomes (e.g. when you approach the VP about the problem, 80% of the time you get a disgruntled VP). **Advantages**: almost unlimited replay; and are easier to scale. **Disadvantages**: more complex to model.

Serious game

Also known as an Immersive Learning Simulation (ILS). An optimized blend of simulation, game element, and pedagogy that leads to the student being motivated by, and immersed into, the purpose and goals of a learning interaction. Serious Games use meaningful contextualization, and optimized experience, to successfully integrate the engagement of well-designed games with serious learning goals.

Alternative definition: A simulation game with learning objectives as a major design constraint. Resources, decisions, and rewards of the game are analogous to the content process. Usually used with simulations, and are the most effective way for players to try out different strategies and learn effective decision-making.

Simulation

A model to describe a situation, event, program, or phenomenon. An interactive simulation allows people to manipulate variables that change the state of the model. Putting the simulation into a particular state, and asking the player/learner to get it into a goal state turns it into a scenario (and tuning that experience turns it into a game). Examples include water/levee interactions, computer networks, a virtual automated teller machine, and a model of the human nervous system.

Simulation games

Games built on a simulation model. Another way to think of them is as scenarios that have been play-balanced, or tuned, until the experience is compelling as well as educationally effective. They often can include all the complexity of the full model, and require comprehending complex interactions, but learners can develop that understanding at an appropriate rate, or it may mask the full complexity for learning purposes.

Strategy games

Games focusing on the ability to deal with dynamic priorities, typically in a context of resource shortage. Strategy games may be divided into real-time strategy games and turn-based strategy games.

Strategy games – Real-time

Strategy games in which the action is played out continuously without breaks, as opposed to turn-based strategy games. That is, the computer does not stop and wait for the user to input before continuing (e.g. *driving* or *basketball*).

Strategy games – Turn-based

Strategy games divided into "turns" as known from board games (and as opposed to real-time strategy games). Typically, the player moves all units, whereafter the next player moves all his units, and so on. That is, the computer stops and waits for user input (e.g. *Chess*).

Tabletop simulation

A board game that attempts to simulate a real-life process, like warfare (such as *Axis and Allies* or *Squad Leader*).

Virtual world

A simulation of a world that supports multiple players interacting, and typically emphasizes 2.5-D immersion (the appearance of 3-D immersion through a screen). Such worlds are not ILS; though the experience can be immersive, they typically do not have specific learning objectives (putting some in helps them become MMORPGS). Adding initial states and goal states aligned to a learning objective would turn them into an ILS.

Appendix A – Respondent Demographics

Simulations, Games, and Immersive Learning Survey

As of this writing 1,133 Guild members have completed this survey, broken down as follows.

Company size

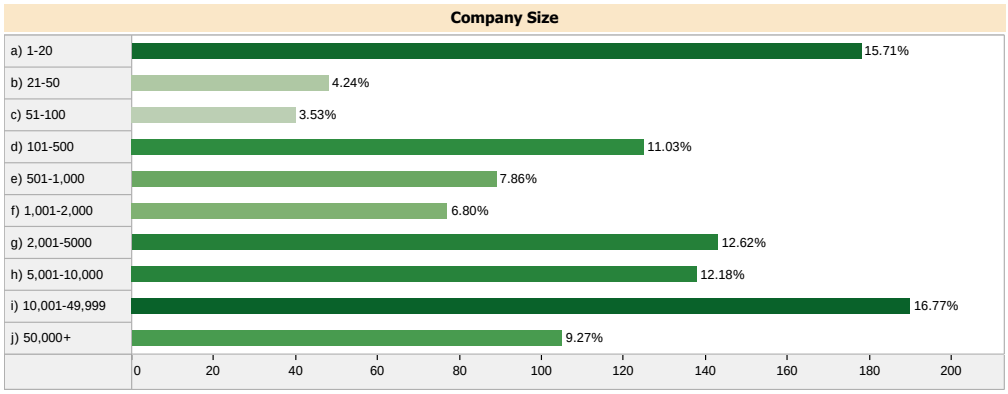


Figure 125 – Survey responses broken down by company size.

Region

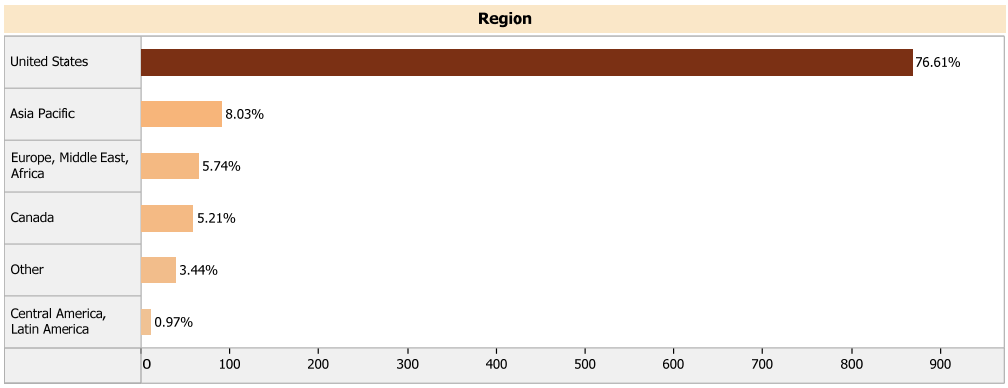


Figure 126 – Survey responses broken down by Region.

Industry

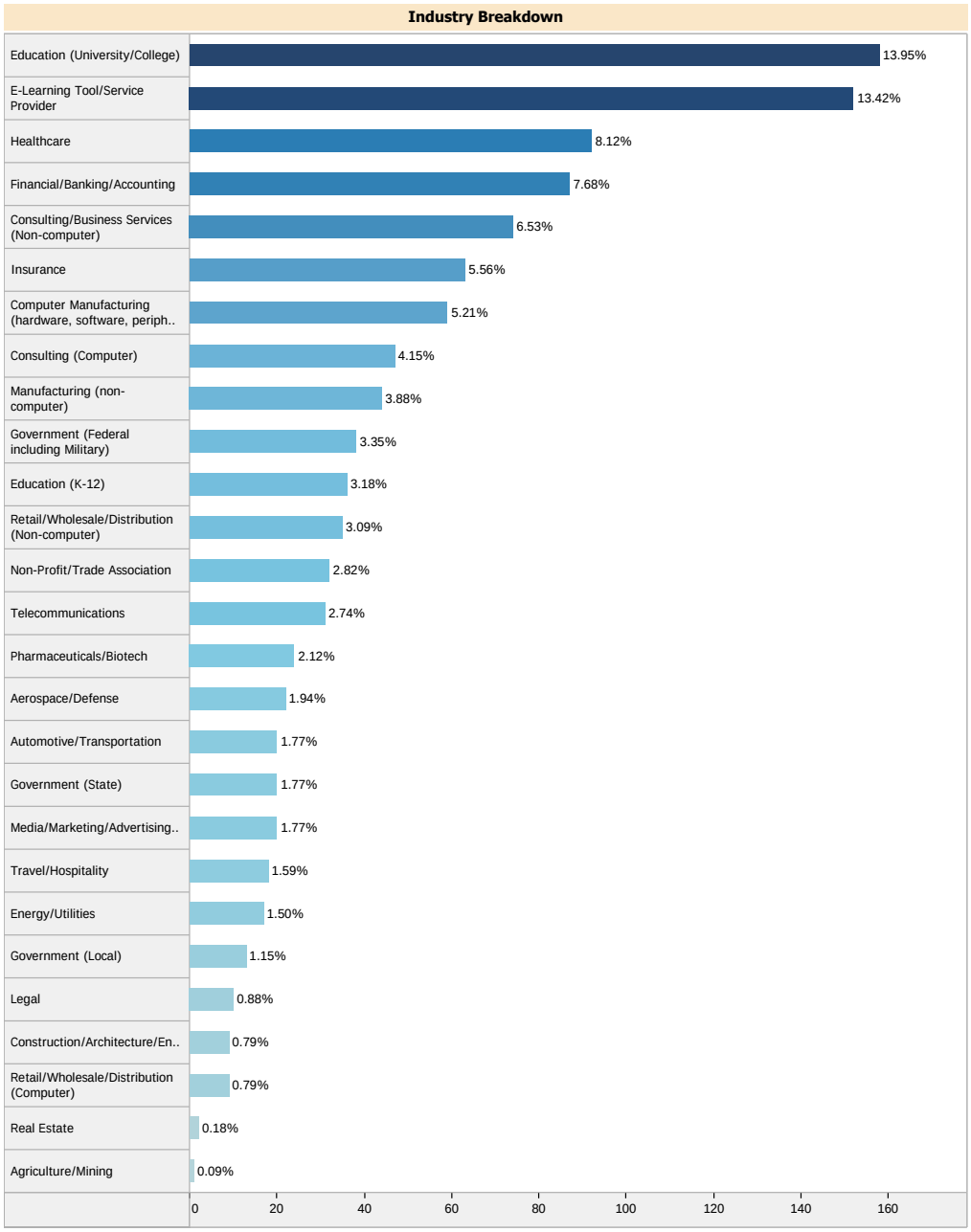


Figure 127 – Survey responses broken down by Industry.

Job Level

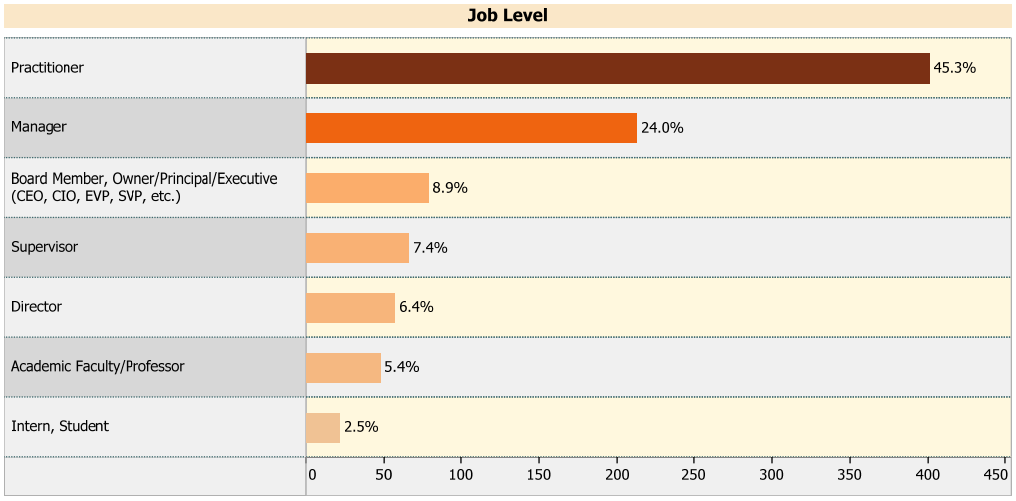


Figure 128 – Survey responses broken down by Job Level.

Simulation Tools Survey

As of this writing 883 Guild members have completed this survey, broken down as follows.

Company size

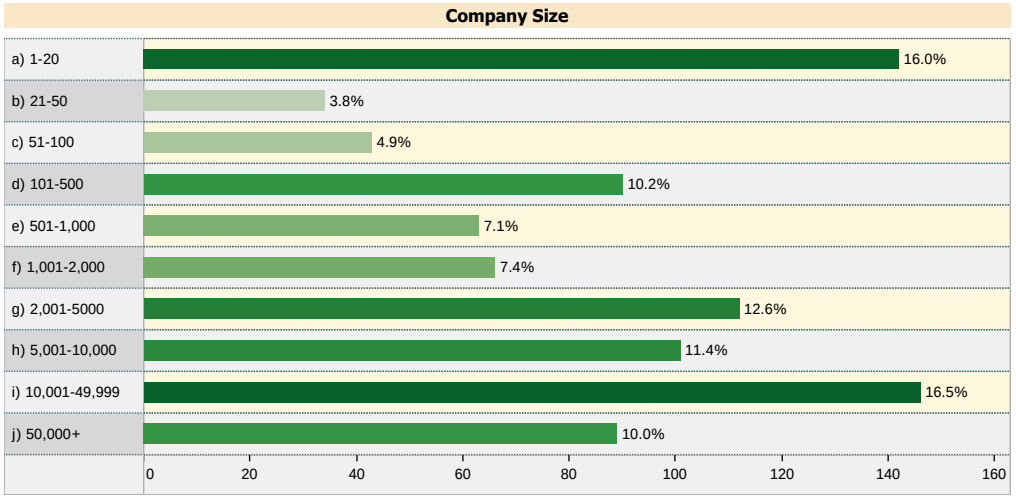


Figure 129 – Survey responses broken down by company size.

Industry

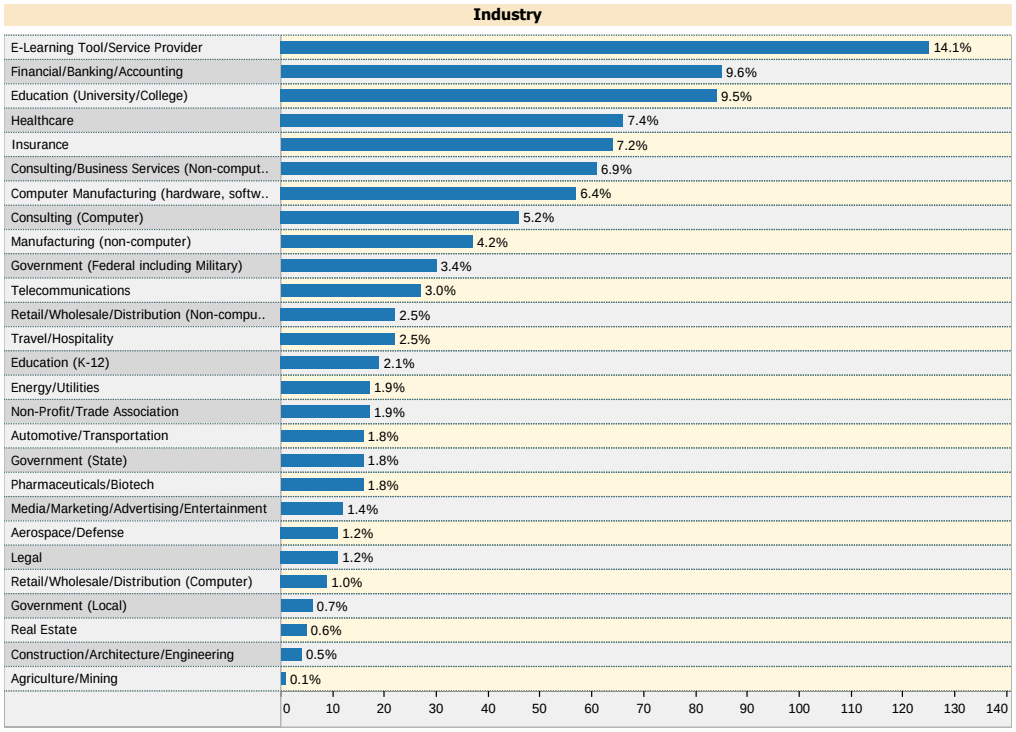


Figure 130 – Survey responses broken down by Industry.

Region

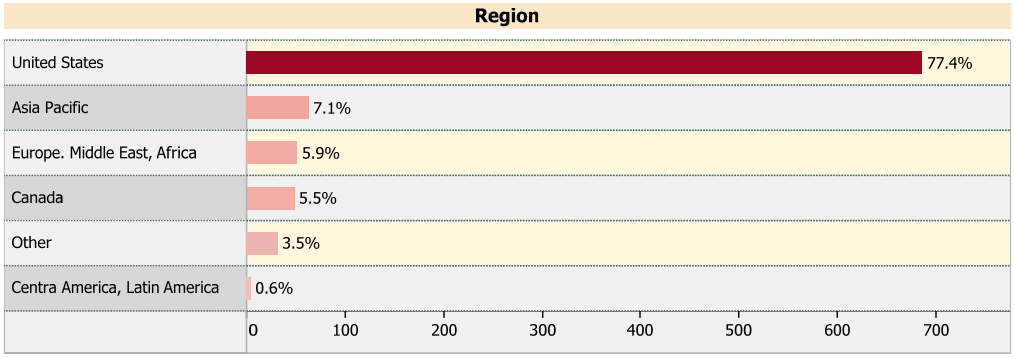


Figure 131 – Survey responses broken down by Region.

Job Level

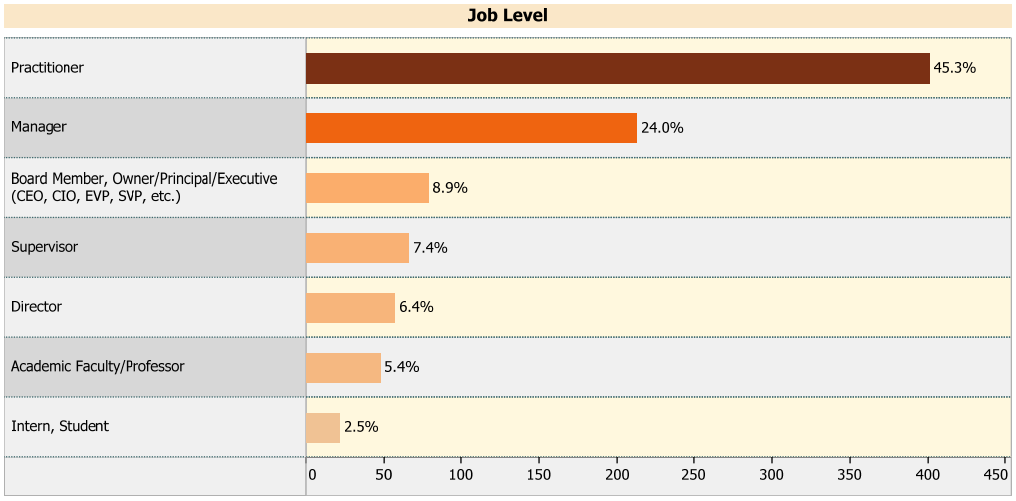
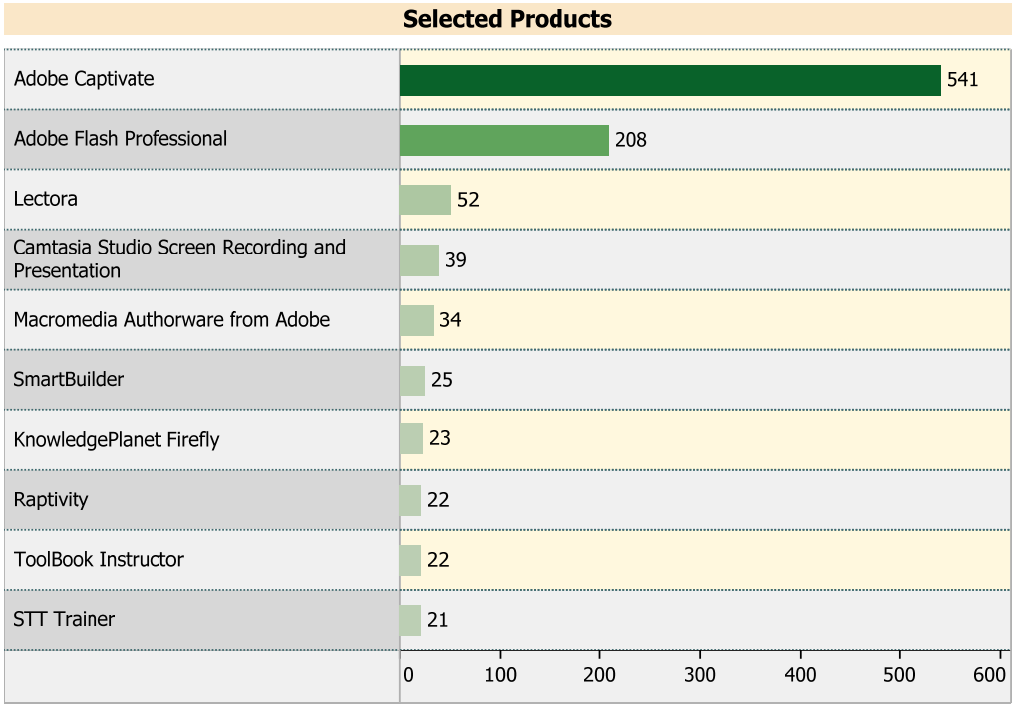


Figure 132 – Survey responses broken down by Job Level.

Simulation Tool Responses

Number of Members



Source: The eLearning Guild Research

Figure 133 – Number of responses for selected Simulation tools, with a minimum of 20 members responding.

Number of Organizations

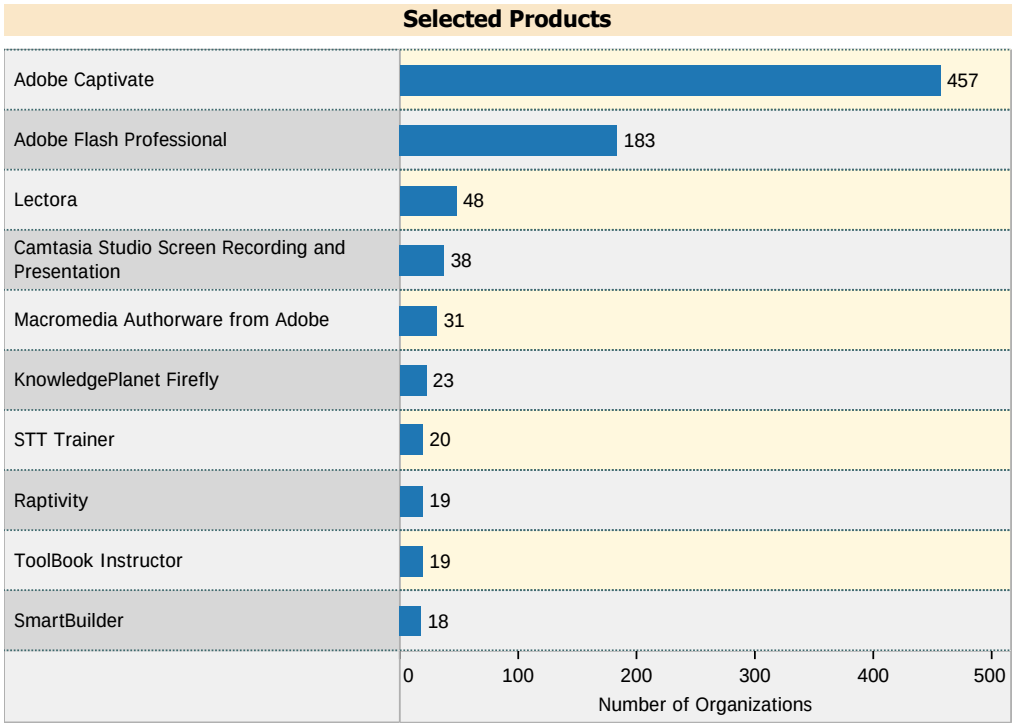


Figure 134 – Number of organizations represented by the members responding in Figure 133, above.

Appendix B – Using Direct Data Access

What You Will Need to Get Started

Before you can use the Guild Direct Data Access (DDA) portfolios, you will need to have three things in place.

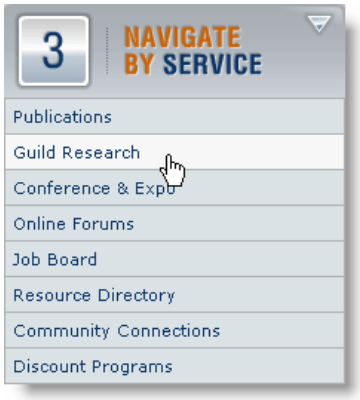
1. You must be a member of The eLearning Guild (you can join as a free associate).
2. You must have rights to the particular portfolio you want to view. Several portfolios are free to all Guild members (such as the Salary and Compensation DDA and Tools Marketshare DDA), but you must purchase 360° Report DDAs separately.
3. You must prepare your computer by installing the Citrix plug-in or thin-client viewer that will enable you to interact with the data.

Note: Instructions for installing the plug-in and thin-client are available from the DDA launch page that we describe below.

Accessing a Direct Data Access Portfolio

For this example we will access the Guild's Rapid Development Tools Comparables model DDA portfolio.

1. Go to www.elearningguild.com and log in.
2. Click **Navigate By Service** (at the top right of the screen) and choose **Guild Research** as shown below.

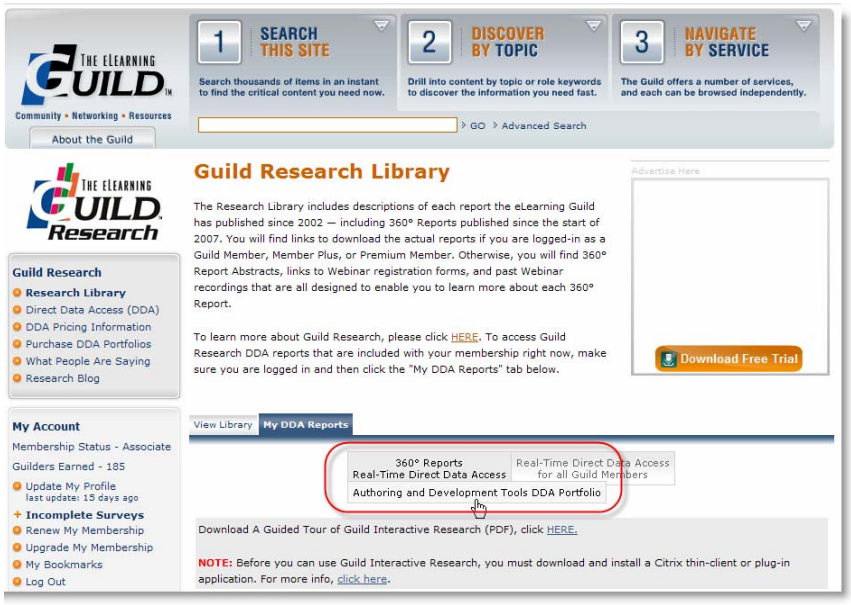


3. From the menu along the left side, click **Research Library**, as shown below.

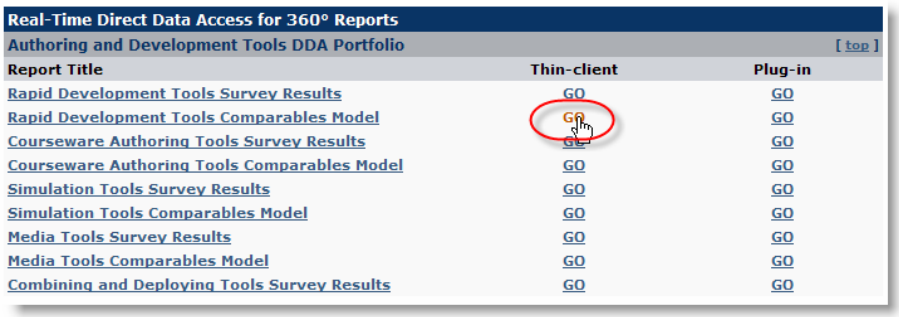
4. Click **My DDA Reports**, as shown below.

The MY DDA Reports page will appear.

5. Click 360° Reports Real-Time Direct Data Access, and then the report you want to view (in this case **Authoring and Development Tools DDA Portfolio**) as shown below.



6. Select the portfolio the particular view/results you want to examine, in this case the **Rapid Development Tools Comparables** model, as shown below.



The Direct Data Access portfolio will load, as shown below.

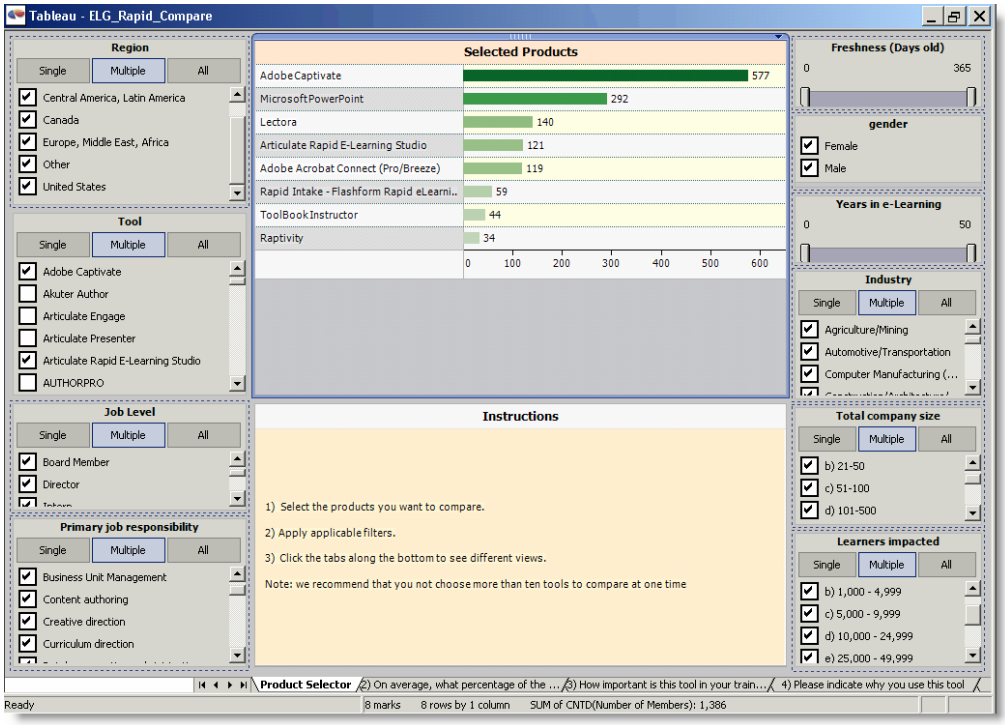


Figure 135 – The Rapid e-Learning Development Tools Comparables Model. Here we can both select which products to compare, apply filters, and see results.

Applying Filters

By default when you load a DDA every option is “on” except under the Tools filter, where most items are not selected (comparing more than ten tools at a time can be unwieldy). Let’s see how we can add a tool to include in our comparison.

Check Box Filters

Suppose you want to add Camtasia Studio to the list of products you are comparing. You can do this easily by selecting the product using the Tool filter check boxes, as shown below.

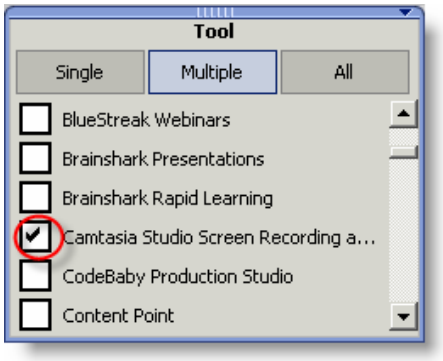


Figure 136 – Applying a check box filter.

The list of selected products will then change, as shown in Figure 137.

When you first add an additional tool, it may take a while for the view to update.

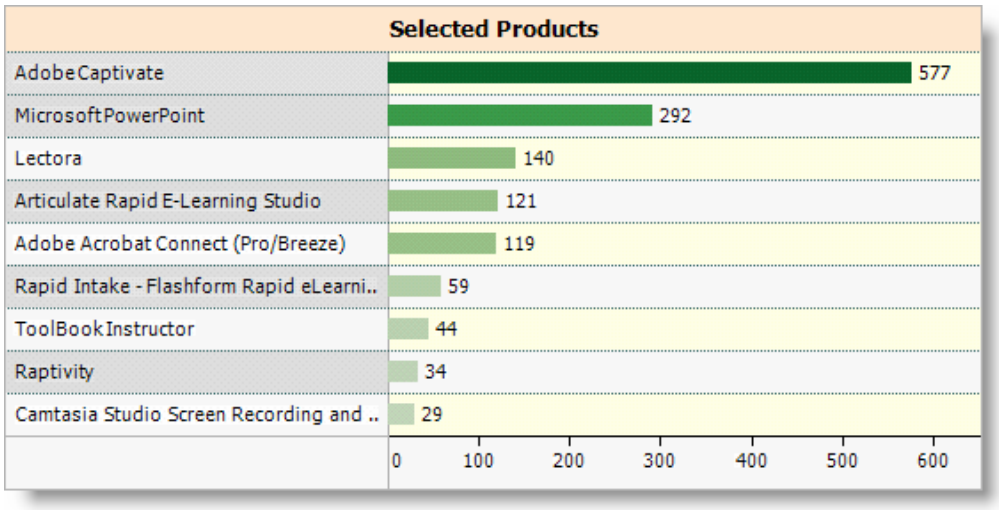


Figure 137 – Results of changing the Tool filter settings.

Accessing Different Views

Each report contains many different views (where each view typically corresponds to a question in the survey). You access different views by clicking the tabs along the bottom of the report.

Figure 138 – Access different views by clicking the tabs along the bottom.

Viewing Details and Copying Images

If you hover the cursor over a bar you will see details about the underlying information, as shown below.

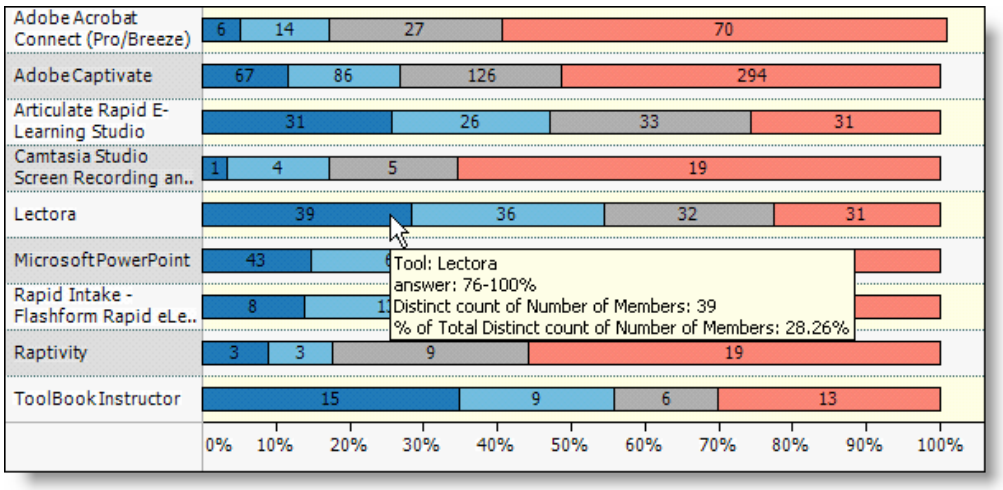


Figure 139 – Hovering the cursor over a bar displays details.

You can also copy an image by right clicking and choosing Copy Image from the pop-up menu.

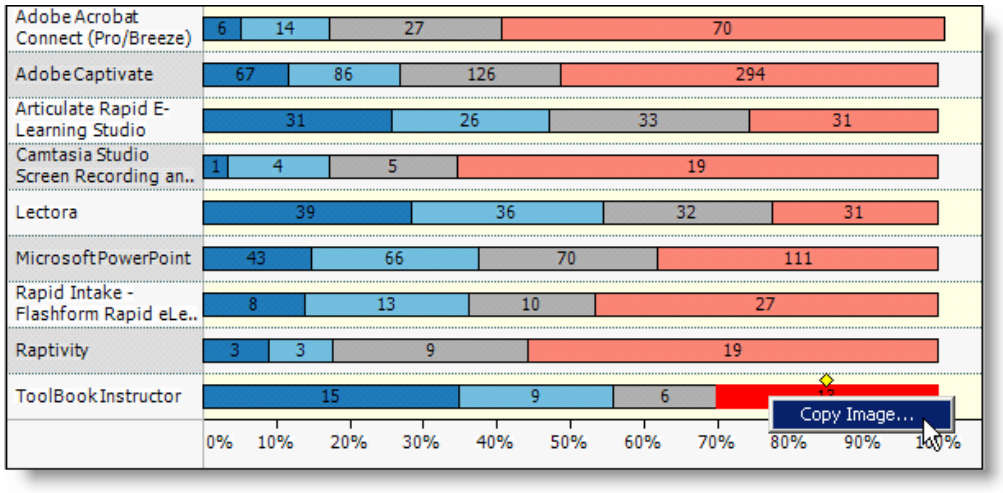


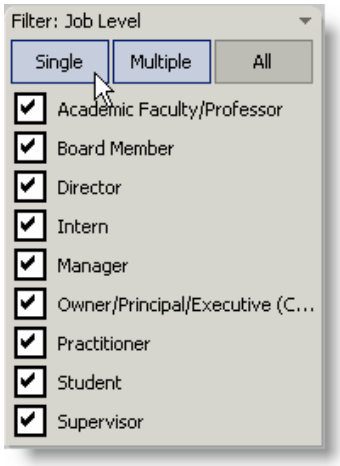
Figure 140 – Copy images for inclusion in reports by right clicking a graph and selecting Copy Image from the pop-up menu.[33]

[33] Note: Members may copy up to four images from a report, and may request permission to include more images. Vendors may not copy images for promotional purposes without first receiving written permission from the Guild.

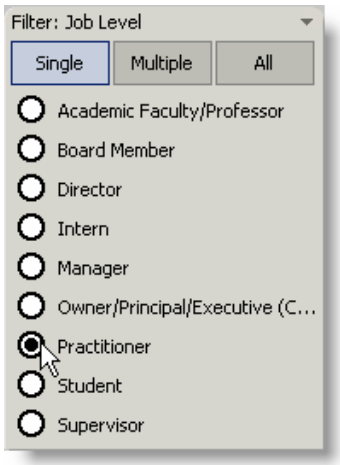
Radio Button Filters

We can filter the results further using the "Single" button. For example, suppose we just want to see survey results from Practitioners, we can do this easily by doing the following.

1. Click the **Single** button on the **Job Level** filter.



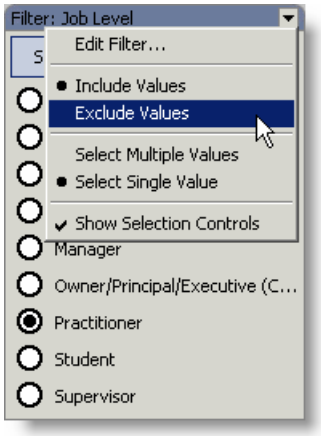
2. Click the **Practitioner** radio button.



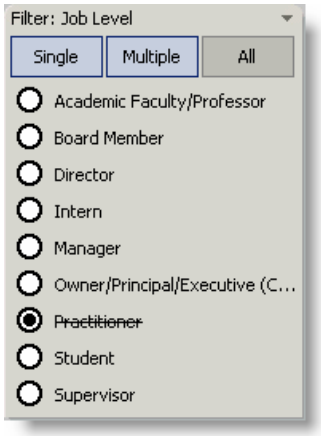
Using the Exclude Values Filter

Suppose you now want to see responses from Guild members at all job levels *except* Practitioner. While you could click the Multiple button and apply multiple check boxes, you can also use the Exclude Values feature, as shown below.

- Click the small down arrow in the upper right corner of the Job Level filter and select **Exclude Values** from the pop-up menu.



The filter box display changes, as shown below.

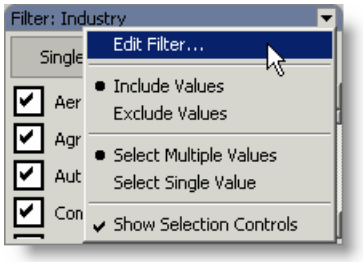


Changing Multiple Filter Settings

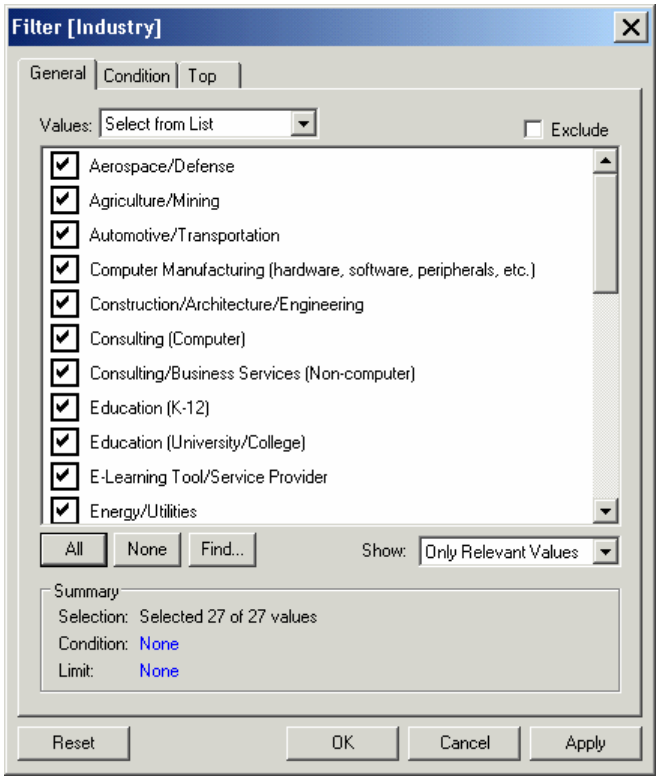
You will notice that whenever you apply a filter, the view recalculates to display the information based on your new setting. This automatic recalculation can be tedious if you have to turn on or off many options. You can instead use the Filter dialog box to change many options without waiting for a recalculation between mouse clicks.

For this next example let's see how to filter results so that we only see responses from the Financial, Healthcare, Insurance, and Pharmaceutical industries.

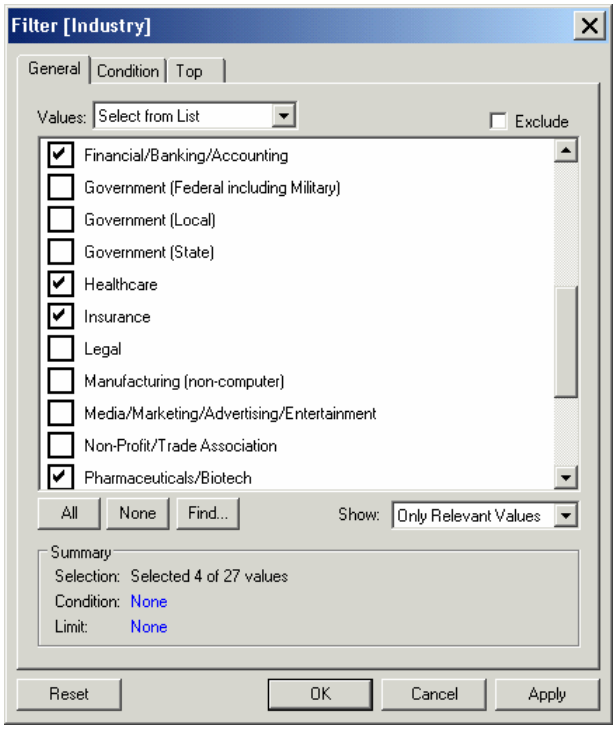
1. Click the small down arrow in the upper right corner of the Job Level filter and select **Edit Filter** from the pop-up menu.



The Filter dialog box will appear, as shown below.



2. Click **None** to clear all the selections.
3. Select the industries you want to include, as shown below.



4. Click **OK**.