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Stolen Moments for Learning

An Overview of Wireless e-Learning Development

Wireless e-Learning is growing in importance as part of a blended learning solution. More important than the technology is how you develop content and structure the learner's experience. The "instant learning" involved with wireless is more like performance support than training. It cannot be delivered using the same techniques as other Web-delivered learning content.

Wireless and handheld technology is reshaping many industries including e-Learning. Vendors are beginning to launch new products and services to capitalize on this important trend. Demand for these offerings is slow now, but the potential for growth is significant.

The initial service offerings have just begun to scratch the surface. Content vendors like Global Learning Systems, Global Knowledge, Learn2.com, and Isopia have all put out an impressive array of mini courses for the Palm and/or the PocketPC platform. Infrastructure vendors like Generation21, Isopia, and Docent have piloted wireless access to scheduling information, rosters, and other administrative features for training.

Fundamental shifts

These two areas — "courselets" and schedule access — characterize the majority of e-Learning offerings in the wireless space today. Both represent a logical migration to the wireless platform but lack creativity in the application of features unique to wireless. A variety of shifts in thinking and development must take place for us to truly unleash the power of wireless delivery for e-Learning.

Instructional development shifts

In order to fully capitalize on the promise of wireless for learning, a fundamental shift in learning model, style and application must occur. The shift from a training orientation to a performance support orientation is an important overall framework change.

By its nature, this shift demands new learning models that are focused on just-in-time, just-in-place paradigms. It is characterized by short learning segments that can be measured in seconds rather than hours. The information or exercises should be available instantly, and may not follow the standard format of objective definition, content delivery and assessment or practice.

Context of need defines the objective (I must complete the task before me, that is my objective in the learning exercise, or procedure review). The assessment of learning is validated in the real world through the successful completion of the task at hand.

Is it good training? Probably not. Is it good performance support? Maybe. Can you learn and perform better through this? Yes. Is this the most efficient use of the technology based on its current features and limitations? You bet!

Technical integration shifts

The technical architecture also demands rethinking in order to maximize the effectiveness of the medium. Key infrastructure concerns include the integration of wireless devices into existing environments, mapping out site plans to make sure wireless will work in a typical learner environment, device selection, possible support for multiple devices, and device management issues such as synchronization, connectivity and scalability.

User interface shifts

As if those infrastructure issues weren't enough, you must also consider the technical side of your content distribution on small devices. Not only do you have a much smaller screen size, but that size is not consistent across platforms. Neither are your color depth or text formats.

To take a first pass at this dilemma, designers should consider how much information would be on a typical screen. The jury is still out on what amount of text, graphics (if any) or combination works best. But we have worked out a rule of thumb for PDA-size devices like the Palm and PocketPC platforms. We use a 3x5 index card as the maximum amount of information that can be on a page. For smartphones, cut this card into four and you have something logical.

Learner experience shifts

Some of the most fundamental changes in my understanding came from my own

experience using wireless and handheld devices to augment my learning. Note that I intentionally use the term "augment my learning." One of the fundamental shifts in thinking involves giving up the idea that a wireless delivery system will be good for all types of learning, in all situations. Our best examples of wireless delivery of e-Learning are in conjunction with another delivery method like Web-based training modules or as performance support after a live training event.

I use my handheld devices for "stolen moments of learning" so that I can eke out a little more productivity in my day by learning while standing in line at the bank or waiting for an appointment. This is the fundamental shift we should be watching. Designing for short instances of self-directed learning will be a norm for these new devices.

A kitchen-sink design philosophy will most certainly fail because it violates the new paradigm for instant access and short sessions that is familiar to frequent handheld device users. It also stretches the technical limits of these less robust devices. The combination makes it harder to develop under the kitchen-sink philosophy.

Instead, I admire developers who accept the paradigm of the device and conform to the normal device user conventions. For instance, instead of trying to cram a course delivery system, class scheduling agent, and testing system into one large application, breaking these out into logical, separate components will help learners make better use of your tools.

Details of the instructional design model for wireless performance support

Several techniques that are well grounded in theory and research serve as guiding design principles for delivering content to handhelds. The main models for delivery of wireless learning and performance content spring from the research of Gloria Gery in Performance Support and David Jonassen in Constructivism.

Performance Support addresses the needs of individuals for information and instruction while on the job. One of the key functions of mobile computing is the ability to take applications with you to a remote place of work. The ability to access work instructions, real-time information, and other features are key components in reaching the promise of just-in-time, just-in-place, just-enough learning.

Usually, you would not send a totally untrained technician or salesperson out in the field alone. Some level of existing experience, knowledge or expertise is assumed in order for an individual to be trusted to do a job.

With this in mind, the idea of constructivism, which states that the learner should be given a good roadmap and the freedom to build their own path through the learning based on their needs, is the second guiding instructional theory. This theory will help instructional designers better understand the differences in developing for this new medium, which has very distinct audience characteristics and content types. For example, a searchable database with all of the error codes for a par-

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ticular device could be a powerful interface to find what you need, when you need it. While this may not be training, it is learning and is definitely a performance improvement function.

These two guiding design models manifest themselves throughout the development process as decisions about audience, use, content, and context are made. The following section highlights key decision points and processes for developing instruction.

Details of the instructional design process for wireless

In the tradition of blended e-Learning, most of our projects to date have treated wireless as a branch off the core development trunk for design of a full asynchronous Web-based training course. As such, the design process has been similar, but

we have noted a few distinctions worth mentioning.

In each phase of a traditional ADDIE (Analysis, Design, Development, Implementation, and Evaluation) development process, there are differences worth pointing out. One area that becomes even more important is the preliminary phase that is often overlooked in this model — Planning.

Upfront planning takes on a whole new importance when you are required to deliver learning content to different devices for different uses, in different environments or contexts. Understanding the usage can go a long way in making decisions during the other phases of development. If you know before you begin development that you might be delivering to a handheld or wireless device, you can make effective decisions that cut down on redesign time and prepare the materials for multi-format delivery in advance. This allows you to work off of the same base of content and reformat it with a minimum of expense. An example will give us the best grounding in reality for this abstract thought process.

Vodafone development example

A recent project with Vodafone called for ten Web-based training modules. Since Vodafone is the largest cellular network in the world, it made sense that they would also request that some portion of the content be deliverable over a Wireless Application Protocol (WAP) phone. Knowing that we would be asked to produce the subset of the entire course in a wireless format let us begin planning from the audience analysis phase all the way through to the implementation.

For the analysis phase, we were able to project the target audience, create several sample-use scenarios, and pilot these with both the client and several representative users to see if our assumptions were correct. The analysis also allowed us to think through some of the technical considerations facing deployment on various networks with various phone handsets and WAP devices.

We were also able to figure out that, in most cases, the audience would be looking to the WAP content as a reminder/memory aid rather than a first exposure. The WAP content would also need to serve as a teaser to encourage people to go to the Web and take the full online course if they had not already done so.

The memory aid model would be useful for sales reps that need quick access to

the features and benefits of the Vodafone network. A multiple level strategy would allow the learner to drill down deeper into the explanation of each benefit, but the information will not be nearly to the depth of the Web content found in the courses.

After we planned out the work and completed our analysis it was time to design the WAP content. The hardest part of the design process is the information design in relationship to the structure of content for such a small amount of screen real estate, and for limited bandwidth that is not best suited for large graphics or long blocks of text.

Defining levels of information and framework taxonomy for a large information space takes much longer than one would expect. One design principle that proves quite useful is the inverted pyramid model of writing used in newspaper stories. In this model the designer/writer provides a summary with all pertinent information and then goes into more detail in following paragraphs. These follow-on paragraphs can be structured as hyperlinks within the context of a WAP browser.

Care should be taken to provide an appropriate number of choices for each page. On the Web, 7±2 is used as a benchmark because of the typical maximum cognitive ability to remember discrete chunks of information. On the handheld device or phone handset, this number should be reduced to 4±2 because of the logistics of a small screen and the typical number of display lines on some of the smallest handsets. There is also the distinct possibility that your learner is processing other information, like feedback from the handset as she presses buttons to scroll through the interface.

Some of the distinctions of the learners' usage patterns can be discovered during the development of preliminary WAP content templates that allow you to pour your content into a fixed, standard structure for navigating through the information. Once the information structure is designed, you can begin populating it with learning content.

During the development phase, the key factor is writing style and following through on the content structure laid out in the design phase. For example, you'll need to write the content, or edit it for delivery on a small screen.

As a development practice, we first asked our writers to put no more content on a single screen than they could write on one quarter of a 3x5 note card. This limitation helped focus the wordsmithing and made the end format apparent throughout the development process.

We have since started using a database with a defined field length as a limiter. It is not enough to simply cut down the amount of text, the breaks in information must be logical and as close to lines of Reusable Learning Objects (RLOs) or Reusable Information Objects (RIOs) as possible.

Following a Learning Objects model will also help you reuse some of the same content, but in a different form. After the learning content is developed and placed within the taxonomy, you are ready to put the content into the WAP information

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framework from the design phase.

The implementation phase includes placing the content into the technical framework, in this case WAP's Wireless Markup Language (WML). An automated process for pouring the content into the infrastructure can greatly decrease the time involved in this step, but often proves impractical for smaller amounts of content, or complex linking structures between content chunks.

Another important part of the implementation process is testing. It is very important to post the content to a Web server that can deliver WAP content, and access it from a variety of different browsers. As in the case of Web content delivered to different browsers like Netscape Navigator and Microsoft Internet Explorer, it is very likely that you will encounter anomalies related to certain phones or WAP browsers. Part of this is because of the relative newness of the technology and the variance in the WAP browser types.

After you have thoroughly tested your learning content internally, the real test comes in rolling out the training to your intended audience. As you gather anecdotal feedback from users, it is important to evaluate these results in relationship to the overall learning program, including training in other formats and from other sources.

Evaluating wireless e-Learning is more difficult than other types of learning because of the instant, rapid learning process involved when it is done correctly. Imagine asking a learner to fill out a "smile sheet" or take a short test after every instance of looking up key information while on the job. The instrument would interfere with the results because of the increase in time and the annoyance factor of having to give input on a device that is known for its poor input capabilities.

One way to perform ongoing evaluations in a more structured fashion is through survey instruments delivered on the Web or by mail. Some organizations also conduct focus group studies to examine the usability patterns and record fixes or augmentations based on both the learning content effectiveness and the technical and interface suitability of the solution.

Conclusion

Wireless e-Learning is growing in importance as part of a blended learning solution. More important than the technology is how you develop your content and structure the learner experience.

Design with the environment, content, learner and technology in mind. Examine ways that you can creatively weave a wireless delivery strategy into your other training efforts.

Remember that the instant learning involved with wireless is more like performance support than training, and that it cannot be delivered using the same techniques as other Web delivered learning content.

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