Learning at Large

Situating learning in the bigger picture of action in the world

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Several years ago I wrote that: “Soon there will be essentially no distinction between mLearning and elearning” (Quinn, 2000). The point I was making then was that the issue we were facing was intermittent connectivity (that the mobile devices weren’t always connected to the network), and that when we had ubiquitous connectivity, mlearning could then be like elearning. I no longer think so; I have realized that with ubiquitous connectivity, we can move beyond what I call the ‘event’ model of learning. This is predicated on a richer model of how learning fits into our lives.

Diane Gayeski realized this before me. She mentions the proliferation of mobile information devices that are increasingly surrounding us, and instructs us that delivering information to these devices is not the concern (2002). Instead, she suggests we must be concerned with major changes beyond just the ability to put content onto PDA’s and phones, that we need to expect "discontinuities that will require a change in the fundamental approach to training, communication, collaboration, and performance support in the workplace.”

A discontinuity is not a bad thing necessarily, it just means that we cannot continue as we have, and must consider new ways of looking at things. Here I present a model that acts as just such a discontinuity, showing how our picture of learning is limited, and also provides the basis for moving beyond. This model looks at learning as part of a larger picture of meeting information needs in the process of people accomplishing goals by acting in the world. It changes our picture of learning from an ‘event’ model to a distributed model with learning layered across our life, fundamentally altering how we should think about meeting individual needs. This break provides us both with the challenge of adapting to a new way of thinking about learning, and the opportunity to provide support more closely aligned with people’s needs. Using this framework, we can see how learning has not considered the bigger picture, and that there is opportunity to consider a broader role for information technology in achieving user goals.

Informal Learning

The rise of the concept of informal learning (e.g. Conner, 2003), has suggested that we need to look at learning in a broader context. Much has been made about how much of the learning that occurs is not accomplished in formal settings. Estimates hover around 80% for the amount that is *not* accounted for by formal learning (e.g. Cross, 2003). Increasingly, Google is touted as *the* elearning tool!

At a meeting on the topic of informal learning, the question was raised as to what models from psychology might be used as insight. A useful framework comes from hermeneutic philosophy (of all places), and I’m indebted to Alexander Jarczyk (personal communication) for the following representation (see Figure 1).

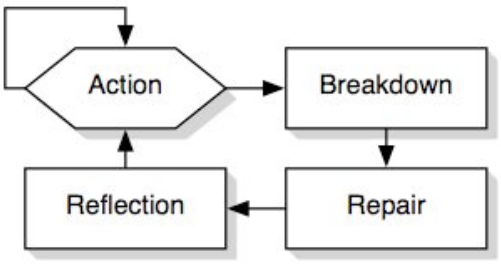

Figure 1. Action in the world.

In my interpretation of this representation, we recognize that people act in familiar ways until a breakdown occurs in a problem that we can't deal with in our automated repertoire of skills. At this point we go to a breakdown and look for answers. If we cannot find an answer 'to hand', we go into conscious problem-solving. If and when we find a solution, we archive that solution (if the overhead is less than the trouble to regenerate the solution next time it's needed), and return to action. Note that there's little obvious role for a learning 'event', unless we recognize an ongoing need which is addressed through a formal course of learning.

Extensions

Extending this model, we can see that a suite of knowledge/learning options is associated with each stage (see Figure 2). And at every step, we can consider the type of resources and technologies that might assist the individual in getting back to their task.

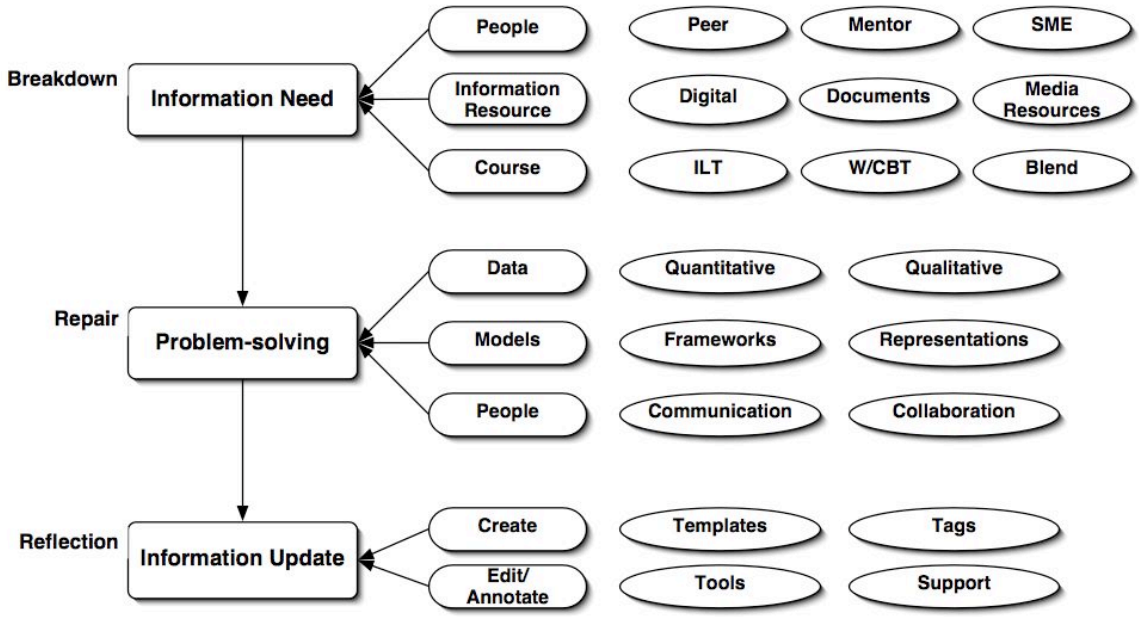

Figure 2. Extended action model.

What we see is that there is a wide variety of resources possible, but no one is looking at the picture in this comprehensive approach, so solutions tend to focus on one form or resource or, at best, one stage. We see that tied to the stage are various activities. With the breakdown stage we have an information need that we will try to solve by sourcing the answer. If we cannot find it, we need to repair the need, and go into active problem-solving. If we do solve it, we reflect and should update the information resources at the breakdown stage to prevent further problem-solving on a solved problem. Looking at each stage individually, we can identify some consequences, and then some that come from the aggregate. The first stage is the breakdown

stage (see Figure 3).

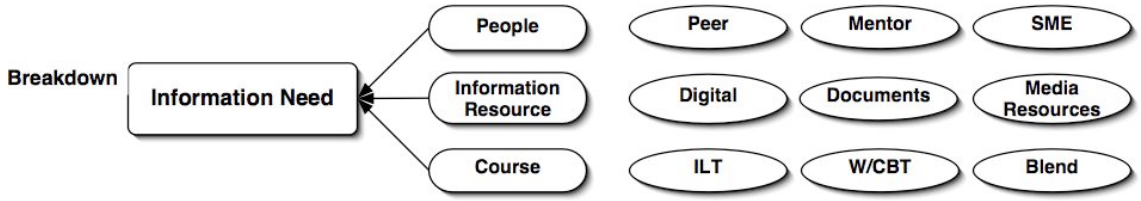

Figure 3. Breakdown stage.

At the initial breakdown, the individual is looking for the answer, rather than having to develop it anew. When we consider where they may look, we can categorize the solutions as looking for information from *people*, from an *information resource*, or from a learning resource (e.g. a *course*). They may look to people for the answer, and ask someone, in example roles such as a *peer*, either someone in the proximity (e.g. asking the person in the next cubicle) or someone who has the same role; a *mentor* such as a boss; or a Subject Matter Expert (*SME*). Here, KnowWho is more important than KnowWhat. The latter is one of the solutions that knowledge management expert identification software is designed to support. Or they may try to find the answer from an information resource, and examples can be categorized by source: whether they search a *digital* respository such as a portal or conducting a web search; whether they try and access relevant *documents* such as a policy and procedure manual, a text, or a journal article; or whether it be *media resource*s such as video or audio tapes. Some may not be able to use an information resource without some support, and need a learning resource. They may decide the importance of this knowledge is sufficient to justify the time for a full course, regardless of implementation, for example as instructor-led training (*ILT*), Web- or Computer Based Training (*W/CBT*), or a *blend* of both. Note that this latter solution is only one of the possible options, yet this is where most training departments focus their efforts!

If the answer cannot be found, individuals may then choose to go to the repair stage (see Figure 4).

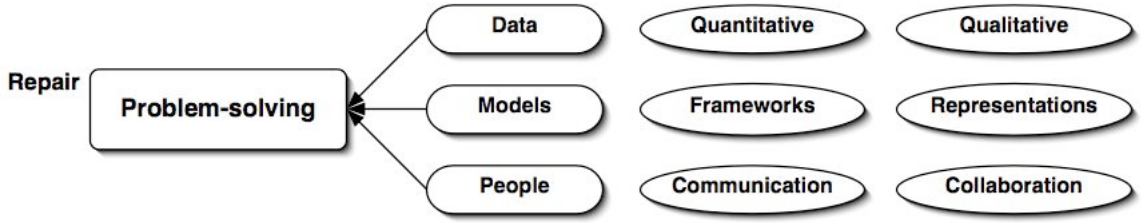

Figure 4. Repair stage.

At this stage, the individual must choose whether to abandon the task or attempt to solve the problem. If the latter, then a different set of resources make sense. To solve problems, we can categorize the components that are required into *data* about the problem, *models* to help frame the problem, and *people* who can assist. Depending on the problem, we may want *qualitative* or *quantitative* data to assist us. So, for example, data about the performance of a component, or feedback from customers, may be critical. Also, models appropriate to the domain, or if not, at least general guidance, are likely to be useful. Two ways to think about models are as conceptual *frameworks*, or task or model *representations*. For example, we might need a model of conflict resolution, or the specific techniques to remove ultrasound image artifacts. And, again, we may want people, although in this case the people we need may be different, as may be their need for commitment to what may be a long-term project. Here, we consider the support they may need, specifically *communication* and/or *collaboration*. They could be team members, stakeholders, domain experts, or a diverse mix of skills and personalities.

If they do manage to solve the problem, individuals should then go to the reflection stage (see Figure 5).

Figure 5. Reflection stage.

We want reflection to improve the process. People argue they do not have time for reflection, but besides the importance for both improvement and meta-learning (Cross & Quinn, 2002), the need to make information access more efficient can provide a Return On Investment that justifies the value.

As a specific approach to information system support for this process, we will want to *update information* resources accessed at the breakdown stage so no one else has to reproduce the problem-solving effort. Two situations can occur here: where relevant material did not exist, or did but was incomplete or wasn't framed in a way that the relevance was recognized. In the former case, we will want to *create* appropriate new content, while in the latter case, we will want to *edit* or *annotate* the existing material to add what was missing, or to frame in a way that the next time it will be recognized. One way to think about the tools they need we will need include *templates* for developing content, and appropriate retrieval mechanisms such as meta-data *tags*. When editing, we can think about separating the process into *tools* to edit the content, and *support* in revising the material to reflect the context under which the information is now seen as relevant.

Note that this is an idealized and abstract model, and that in practice people will vary in several ways. For instance, people often skip the explicit reflection stage, and one of the implications of this model is how important reflection is. Also, people may go straight to the problem-solving step since the cognitive overhead is perceived as being less than the effort to find the answer. A personal example is in using the fax software that came with my computer. It uses a model I do not comprehend, but it's easier to rediscover how to use it than to reflect and figure out the underlying model or to attempt to locate any operation instructions. Perceived cognitive overhead will affect decisions about how to address the breakdown.

One other note is that this model also has implications about how we can support people to be better at improving their own abilities in acquiring and using information resources. Among other things, it suggests how people can improve their ability to choose the appropriate information resource and to use such resources more effectively. Similar thoughts can be applied to problem-solving. Now that we've reached the situation where the half-life of information is shorter than the average working life-span, learning to learn is a key personal skill.

Implications

This model provides a framework to consider the place of formal learning in the broader panoply of human activity. This model provides a discontinuity because it shows how considering learning only addresses a small part of individual tasks, and we are well-placed to be the ones to do better.

One implication here is that supporting learning is more than just meeting course needs and that the human resources organization has justification to consider a broader role in business operations. This overall picture suggests that organizations should take a more inclusive approach to support performance, instead of compartmentalization into IT, KM, and Training groups.

- We are no longer about training, but about learning

- Organizational learning is no longer confined to the formal course

This picture also implies that learning is not localized to the course, but that at any moment in performance there is a learning opportunity. We can take a long term view of the learner, and move them along their learning goals through small instances spread across time. We no longer need to take learners away to an 'event' and then return them to the learning context.

- Learning can now be spread throughout our lives

For formal instruction, learning opportunities may be better organized through engagement in activities that drive learners to the knowledge, rather than presenting the knowledge and then testing it. Roger Schank's Goal-Based Learning (1995) plays upon this model by developing tasks that generate breakdowns as learning opportunities, and introducing information resources at the right time.

- Even when we need more concentrated instruction, it is activity-based, not knowledge-based

There has already been talk about Just-In-Time learning, where we have smaller chunks of information, and we start designing our learning to have certain resources available after the learning situations, to serve as reference and job aids. There have been further steps, to develop content in XML so that it is independent of formatting and can be displayed on different devices. These steps are indicative of the direction we need to go.

The steps beyond are to begin to recognize that the learning event, out of context, needs to be at least linked to reminders in context. A further step is to build the learning around practice opportunities in context. We need to orient our learning about meeting needs in context; at the end of the day, it's about doing, not learning.

The discussion above converges to suggest that our existing approaches are inadequate. It's no longer instructional design, nor educational technology, it is learning design, and it encompasses designing experiences, and decoupling that information to be spread over time and place.

Needed: A New Design

One thing we do not have is an instructional design model that talks about how to break up learning and successfully integrate it into the activities of day-to-day life. Our models are largely based upon separating from a work or life context, receiving learning, and then returning to context. Carroll's Minimalist Instruction is a counterpart to this approach (1990), but is focused on small tasks and not on a longer term learning goal. Situated Learning (Brown, Collins, & Duguid 1989) is another approach, but the apprenticeship model has problems in the modern workplace. A more tailored approach would be desirable, and is potentially possible through enhancements in the content design process.

Using Cognitive Apprenticeship (Collins, Brown, & Newman, 1989) as a framework has proven useful in my content development work. I have also become interested in van Merrienboer's Four Component Instructional Design (1997) as it encompasses knowledge and skill in a coherent whole for complex performance. There is more theoretical work and empirical validation to be done, but I suspect that an intersection between traditional Instructional Design (e.g. Gagne, Briggs, & Wager, 1992), and enhancements based upon cognitive research has the promise to address enhancing engagement and effectiveness, while retaining pragmatic efficiency. Additional considerations in a design model for distributed presentation in time and space would provide a basis for beginning. The framework would need to center on organizing concept and example presentations around practice opportunities existing in the learner's day-to-day activities. The answers aren't worked out, but the need is.

To get there, steps still need to be taken in creating a broadly useful scope and size for learning

objects, in ramping up the capability of devices to support rich learning, in creating a seamless wireless networking infrastructure, resolving privacy issues in learner models, and in augmenting our contextual understanding, but the barriers to progress on these issues are social, not technical. We have the capability to meet Wayne Hodgins' call for 'the right stuff': the right content, to the right person, at the right time, in the right context, on the right device, and in the right way (2001). We can do more; we can make that part of a long-term relationship with the learner, developing their capability over instances of their ongoing activity. When we tighten our learning object specifications, enrich our picture of learning support, include more models to support identifying appropriate learning content, and deliver to appropriate contexts, we will have addressed the unique opportunity that our technical sophistication has provided, and begun the path to not just improve, but optimize individual learning. Our learning will be loosed from the cages of event-based learning, and range free across our lives.

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