

Making connections between e-learning and natural learning

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Apprenticeship · Natural learning · Social learning

Key words

The results of e-learning can be radically improved when it is consistent with the way that people learn naturally. My goal, here, is to explore those links with an emphasis on social learning. I then want to show a few ways of adding value to e-learning through personal processes and the use of publicly available and inexpensive networking tools.

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1 How people learn naturally

In the thirty thousand years prior to the Renaissance and the Industrial Revolution – for hunter gatherers, farmers, crafts people, and others – the way of learning and teaching was simple. Loosely speaking, all groups used some type of apprenticeship. Management guru Peter Senge once wrote that people who did not know hung around with people who did know. Of course, there is more than that. But the question is: Why does the apprenticeship model work so well?

The answer is that the apprenticeship model, particularly when used well, engages all of the capacities of the human brain and mind synergistically. The different processes of learning support each other.

A human being is a living system, and learning sustains life

The central fact is that learning is a biological process that is essential to keep us alive. Learning is an even more fundamental survival response than fight or flight. We were not born with the capacity to learn in order to get a job, earn money, or found a mega-corporation. These are all things we can do because we can learn, and because they may be ways that help us thrive and stay alive. But learning itself is much more basic. Learning is what makes it possible to both consciously and unconsciously adapt and adjust to a changing world.

The central notion is that each person is an integrated living system (FUSTER 2003/DAMASIO 2005). That means that body, brain, heart, and mind are all involved in learning. Our approach (my partner and I), therefore, has been to synthesize research across many disciplines, ranging from neuroscience to

cognitive psychology, for the purpose of eliciting a set of useful and accurate principles of learning with profound practical implications (CAINE/CAINE 1994, 2001).

2 Brain/mind principles of natural learning

Here is a very simple introduction to how people learn naturally.

1. All learning is physiological

Principle 1 All real world learning is grounded in two processes:

- First, it changes the way that people come to see and interpret things, situations and themselves – i. e. how and what they perceive. So people develop different ways to »read« the world. Infants are doing this all the time. But so is anyone who immigrates to a new country, or becomes highly skilled in some profession such as interior design or neuroscience or politics.
- Second, and this happens in parallel, people also develop new ways of acting. They acquire new and additional skills. One way to observe this development is to follow the path of someone mastering a sport – say beginning with kicking a football in a park and going on to becoming a star in a major league team.

People are always testing and either confirming or changing the ways in which they perceive and act, based on feedback from the actions that are or are not taken. That is the essence of the perception-action cycle (FUSTER 2003). It is a natural capacity with which all of us are endowed and by means of which all of us interact with our world (CAINE/CAINE 2001). So science is now explaining what every day life has confirmed over centuries. Natural learning is not just an intellectual process.

2. The brain/mind is social

Principle 2 We are all born to learn by interacting with other people. The social situations in which people find themselves »shape« the way in which ideas and concepts are absorbed and understood. Scientists call this situated cognition (LAVE/WENGER 1991). The social nature of learning is now known to have biological roots in the form of »mirror neurons« (RIZOLATTI 2008). These are neurons in the brains of observers that respond in the same way as neurons in the brains of actors. That is why all of us are potentially hard wired for empathy. It is one reason why learning through imitation and modeling are so effective. And it helps to explain the importance of leader involvement and the way that leaders conduct themselves. People respond at a visceral level to the actions and persona of leaders.

Research is also confirming the immense importance of informal learning. All of us simply »pick up« much of what we come to know about our culture and our profession. CLAXTON (2000) calls this »learning by osmosis«. The National Research Council in the United States, functioning under the auspices of the National Academy of Science, now devotes significant resources to the study of informal learning (see e. g. Learning Science in Informal Environ-

ments, <http://www.nap.edu/catalog/12190.html>). One of the most useful tools that has been developed to capitalize on the social nature of learning is the community of practice (WENGER 2002). In essence, we can become more competent by improving the ways in which we learn from each other, both formally and informally. Social learning is effective, in part, because it also capitalizes on many other aspects of the ways in which people learn naturally, including the search for meaning.

3. The search for meaning is innate

Every individual has a drive to understand how his or her world works, sometimes called the explanatory drive (GOPNIK et al. 1999). In practice this means that everyone tends to filter input, organize information and experience, and ask questions according to what they are interested in and care about. Note, for instance, the ways in which opinions flourish on the blogosphere. And at a deep level there is a hunger for meaningfulness and purpose (FRANKL 2006, HILLMAN 1996). The practical implication is that training and development is much more productive, even if conducted in primitive ways, when it resonates with something that people care about.

Principle 3

Another aspect of the search for meaning is the importance of deep meanings. It involves core values and purposes and the questions that drive us, such as »who am I?« and »why am I here?« Why is it that so much of the advice provided in the world of self-help, therapy, management, and human resource development is that purpose and meaning are crucial to peak performance? »Begin with the end in view« is one of author STEPHEN COVEY's seven habits of highly effective people (1989). JAMES HILLMAN reaches deeper. He writes that »what is lost in so many lives, and what must be recovered: [is] a sense of personal calling, that there is a reason I am alive« (1996, p. 4).

4. The search for meaning occurs through patterning

Whenever we try to figure out what something means, we search for patterns that make sense to us. Bateson called them »patterns that connect.« We are biologically equipped at birth with many basic capacities for perception that reflect the way the world is and operates, all of which are modified and supplemented through education, experience and the cultures in which we are immersed. In practice this is reflected in the manner in which, say, new software becomes familiar and manageable as a person figures out how it is organized, or in the new employee who begins to »feel at home« in a new job when the patterns of behavior and the nature of the job make more sense. There are many ways to support the discovery and creation of new patterns, one the best of which is play. Both infants and experts play with life in order to make sense of it, and, of course, because play is fun.

Principle 4

5. Emotions are critical to patterning because cognition and emotion interact

This is an extension of the point made about the importance of deep meaning and the power of passion. Neuroscience now shows (PERT 1997, DAMASIO

Principle 5

1999) that emotions are involved in every thought, decision, and response. This explains many aspects of decision making, both rational and irrational, because all decisions involve emotions of some sort (DAMASIO 1999, ARIELLY 2008). For the purposes of training and development, it is vital to grasp that how well a person masters new ideas or skills is tightly bound up in how he or she feels about them. So powerful learning is enhanced by the appropriate emotional experiences. For example, the very fact of learning together can enhance the way that people feel about what they are learning.

That is a challenge for instructional design because the tendency is to design courses with content in mind while ignoring processes that would make the material feel familiar and attractive to learners. Good authors and public speakers know this. That is why they often use powerful stories to make a point. For the same reason, social learning often works through the personal stories that people share. And a key strategy in mastering new material of any sort is to personalize it in some way.

6. The brain/mind processes parts and wholes simultaneously

Principle 6 This means that the best way to help people understand concepts and develop new skills is to always embed specific elements in a »natural whole« such as a project or a story (FUSTER 2003). Of course, this happens naturally in a great deal of training and development that is done on the job, because the job is the »natural whole«. But sometimes the connection is not obvious, or needs to be enhanced. Facts, concepts, and skills that are »taught« or »communicated« without any meaningful context are much more difficult to grasp and master than when they are embedded in a setting that makes sense. The cognitive scientist Roger Schanck focused on this aspect of learning through the use of what he called »goal based scenarios«. Here, learners are introduced to masses of new material in the context of a social setting that serves a purpose. For instance, one way to teach people about broadcasting is to set them up as broadcasters in a studio, even if they have never performed that function before.

7. Learning involves both focused attention and peripheral perception

Principle 7 While it is clear that learners have to pay attention to the ideas and processes that they are seeking to master, they also »pick up« a great deal of information indirectly (CLAXTON 1997). This can be from the physical context, or from the ways in which their co-workers and others are behaving. LAVE/WENGER (1991) call this »legitimate peripheral participation« and it is one of the more hidden but more powerful aspects of a good community of practice. Attitudes, values, ways of responding, use of language, approaches to new information, and a whole lot more are partly picked up from the way that others act, and from the physical environment, which is an additional reason why so much attention is paid to corporate culture. The power of context is one of the factors that e-learning, for the most part, has not yet dealt with adequately, and may never be able to deal with fully.

8. Learning is both conscious and unconscious

In addition to intentionally trying to make sense of things and master them, the brain/mind also functions in two additional ways. On the one hand it can take charge of its own processing (an example being the way that people can develop emotional intelligence and regulate themselves and their emotions). On the other hand, the brain/mind processes information and experiences below the level of awareness, by what has been called the cognitive unconscious (LAKOFF/JOHNSON 1999). An example comes from research on creativity. In the creative process, one critical phase is incubation. This is the time that is given to the mind to process a problem or situation without thinking about it. Often the »aha« of insight comes after these periods of incubation. The practical implication for training and development is that results are improved when efforts are made to prime the unconscious processing of complex material. In effect, deep learning for understanding and the creative process for generating insight are two sides of the same coin.

Principle 8

9. There are at least two types of memory

Although scientists have actually identified several different memory systems (SCHACTER et al. 2009), a key practical distinction is between systems that are used to archive and store information and develop routines and skills, and systems that naturally register, make sense of, and store ongoing experience (sometimes called autobiographical memory). The practical implication is that memory can be enhanced in several different ways. Skill development, for instance, requires what ERICSSON (2006) called deliberate (mindful) practice. In addition, however, when material is initially organized in terms of scenarios, projects, stories, problems, and so on, the very organization taps into autobiographical memory and so helps recall. But long term memory still needs deep processing (CRAIK/LOCKHART 1975).

Principle 9

10. Learning is developmental

There are at least two different dimensions of development. One is the natural progression from novice to expert. The other is the natural progression from the simple to the complex. (These two dimensions overlap but are not the same.) The practical implication for instructional designers is to master the art of scaffolding. This means that material is introduced at the level where it is challenging but still manageable. For example, one course on accounting for executives is unorthodox but very effective. It takes executives back to the time when they were children running lemonade stands, and it introduces core ideas about bookkeeping and accounting in that very simple (and therefore quite manageable) context. At the other end of the spectrum, when new products are introduced to people who already know the field very well, they tend to examine and analyze those products in terms of complex personal templates that are already well developed.

Principle 10

11. Complex learning is enhanced by challenge and inhibited by threat associated with helplessness and/or fatigue

Principle 11 A great deal of research from neuroscience (e. g. LEDOUX 1996) and cognitive science OLSEN/SEXTON (2008) shows that effective mental functioning can be sabotaged by threat and fear associated with helplessness. The brain/mind literally becomes less effective and people lose access to their own capacities for higher order functioning and creativity when this, the traditional, survival response kicks in. LEDOUX (1996) calls this response the »low road«. And OLSEN/SEXTON (2008) call it »threat rigidity«. It is triggered by such factors as being overwhelmed, losing control, experiencing excessive stress, and meaninglessness. This has many practical implications, such as the need to avoid overwhelming learners with too much too quickly. One of the benefits of e-learning, from this perspective, is that courses can be self-paced and so learners gain more control over their experience and can reduce the sense of overwhelm.

12. Each brain is uniquely organized

Principle 12 Learners are the same in some respects (we are all human, after all), but learners are also different. There are many ways of identifying individual differences. A good example is GARDNER's theory of multiple intelligences (2006). Another is the MYERS-BRIGGS personality typology. And in addition to individual differences, there are social and cultural differences that impact how people learn. These differences pose a challenge for instructional design. For instance, an elegant video in one culture may be culturally inappropriate in another, and voice simulations may annoy some people.

3 Practical implications

With the above principles in mind, some interesting questions arise. For instance:

1. What happens if a learner's preferences, likes, and dislikes play no part in the training and development?
2. What happens if there is no social learning?
3. What happens if a learner is under so much stress to produce that he or she feels helpless?

Inert/surface knowledge

The short answer is that when most natural learning capacities are disregarded, the perception-action cycle is sabotaged or is incomplete, and so the learner ends up with some »knowledge« that cannot adequately be deployed in the real world. It is still what WHITEHEAD called »inert knowledge« and what we have called »surface knowledge.« And because it is not useful, it won't be used.

How does that show up?

1. The learner may simply not recognize situations to which the new knowledge and skills should apply.

2. When threatened, the new patterns – which tend to be fragile – will be »overruled« by old programming and will not be implemented.
3. The new knowledge and skills will be implemented in a clumsy way, almost by rote, with little or no adjustment to what the circumstances require.
4. The learner may lack the confidence needed to implement the knowledge in full because he still lacks ego strength – he will not have developed the identity that is needed to accompany the knowledge and skill.

In essence, it turns out that the problem of poor transfer of knowledge has been misnamed. The real problem is that knowledge has not been adequately developed to the point where it is a useful part of the learner's perceptual field and psyche.

It should be noted that these concerns apply to all training and development, irrespective of whether courses and programs are live or online. The same principles of learning apply, even though the vehicles are sometimes quite different.

What, then, can be done? The key is to ensure that the principles of natural learning surveyed above are adequately incorporated in programs of training and development.

4 Making it real

MillerCoors (ANDERS et. al. 2010) needed to introduce a new online reporting system in 2010 to deal with sales metrics. They wanted to implement it for 1.200 users in many different locations, over a period of three months. The company only had a small team to work on the project, and they wanted to reduce the costs of training and development. They also wanted content to be available on demand, searchable, and to cater to different levels of learner knowhow.

Online reporting system

The MillerCoors solution was to use online training and development that was intentionally grounded in social learning.

The design, using their in-house website, had several features. There were virtual courses (self-paced, relatively short, modules). There was a reference library and job aids. And they created a discussion board that provided all participants with the opportunity to ask their own questions, on any aspect of the product, and to respond to the questions of others. These ranged from defining in more depth terms used in the program, to discussing such issues as territory and sales data. (A webinar was conducted by Corporate University Exchange on the Miller Coors program. <http://www.corpu.com/solutions/social-learning/>).

The company was extremely happy with the results. And although development time was much greater than the development of in-class programs, the overall delivery costs were substantially lower.

Now let us look at this from the perspective of how people learn naturally, both to comment on the process and to see where value could be added by using other learning processes and publicly available online tools.

- Reinforcement of social learning**
- Social learning**

A great strength of the MillerCoors model was to intentionally design-in and support social learning. The use of discussion boards, for instance, resembles the way in which new products are launched (such as accounting packages) with self-directed online user groups springing up in which users help each other. In terms of natural learning, they were creating a self-paced, partially self-directed, online community of practice. This dynamic can be reinforced in several different ways. One is to invite co-learners to share their personal stories, because story telling is one of the most powerful ways to build relationship and to find shared meanings. Sometimes spelling out the context in depth can clarify the question being asked. At other times, just telling the story of a transaction with a client, and including the ways in which a product was used or a service was performed, can be of benefit to others. And sometimes just recounting incidents in one's life can establish connections with others that can turn into foundations for learning together.

There are several ways to engage in story telling. Sometimes personnel can set up personal blogs on a corporation's in-house system. For instance, Sprint's intranet engages all employees from entry level to executives. Sometimes a CEO might set up a personal blog, as happens at SAS, a 2010 Best Company To Work For, where senior executives have blogs. And sometimes people can select what I call process partners. These are co-workers who want to spend time talking to each other. In this situation, Skype is a wonderful tool.

There are several risks, of course. For example, it is possible to flood users with stories that are of very little interest or value (as can happen to anyone who builds up a large list of friends on Facebook, for instance). And discussion boards and user groups can have people who function at different levels and whose tone and manner may cause concern to others and dissuade them from participating. Hence it might be important to use moderators, as MillerCoors discovered.
 - Creation of context**

 - The power of context**

The MillerCoors context supported the content because a digital product was being mastered in a digital environment. This supportive context is simply unavailable in much e-learning, where training may be for performance in a concrete, physical world. The solution, more and more, is to incorporate videos, and digital simulations of various sorts. These range from laboratory settings to the factory floor to the office.

One deficiency in these virtual settings is that they lack the richness of real world environments, with all the semi random, semi-orderly activity within which skills, concepts and information are actually being used. A partial solution is for participants to occasionally video the environments in which they find themselves and which they are struggling to master. This means using a web cam in some way on the job, either in the course of work or to make a structured video. While this can also be awkward, it personalizes an issue for learners and their colleagues. It also has an additional teaching element in that, when people create videos they often look at situations in new ways and this, in itself, deepens understanding and mastery.
 - Emotional and cognitive processes help learners**

 - Process for patterns**

There are many different ways to examine new products and materials, of which one is play. When I was the education services manager of a soft-

ware company in Australia, we imported a product that had a new graphics package of its own. I was studying it alone, when I heard loud laughter come from the owner's office. He and the marketing manager were using the product to draw pictures of the human anatomy. While not an intended use of the product, it proved to be a remarkably quick way to develop some deep understanding of its capabilities! Play and other emotional/cognitive processes all help learners, working alone or together, to grasp the core features of new material.

- **Review and regroup**

Many years ago, DONALD SCHON (1983) coined the term the reflective practitioner. He spoke about reflection in action (on the job) and reflection on action (after the job was over). One of the most powerful learning processes is to take time each week for a few people to collectively reflect on what transpired. I have seen regrouping done everywhere from sales meetings to doctors discussing difficult cases. The focus can be general and open ended, or it can refer to a specific product, service, or process. In either situation there are three immediate benefits. First, as he or she revisits the week, the person doing the reflecting has an opportunity to look for insights, and sometimes sees what happened in much greater depth. Second, the situation can become a center for analysis and discussion, so that the group learns together. And third, the people listening will be exposed to situations that they might not have experienced personally, and so the range of learning is increased.

Reflective
practitioner

5 Final thoughts

A human being is neither a computer nor a machine. Learning is an organic process and »knowledge« and »skill« describe the ways that a person interacts with his or her environment. Knowledge is not stored or accumulated, it is processed. And skills always combine changes in perception and action. This holds true for both physical and virtual environments. An important key for those using e-learning is to appreciate the benefits of technology without losing sight of the fact that real people are involved, and that their natural learning processes need to be acknowledged and incorporated. E-learning does a lot. But it does not and cannot do everything. Once that fact is accepted, paradoxically online learning can become even more effective.

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