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Designing Informal Learning Environments

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For the past 30 years, the prevailing 70-20-10 industry model of employee development postulates that 70 percent of individual learning and growth occurs through relevant but challenging experiences, 20 percent through relationships and social interactions, and only 10 percent through formal learning activities (Center for Creative Leadership, 2020; Watkins et al., 2014). What, then, is the implication for learning design given these trends? To assist in taking advantage of such patterns, this chapter is dedicated to the design of informal learning environments.

Defining Formal and Informal Learning

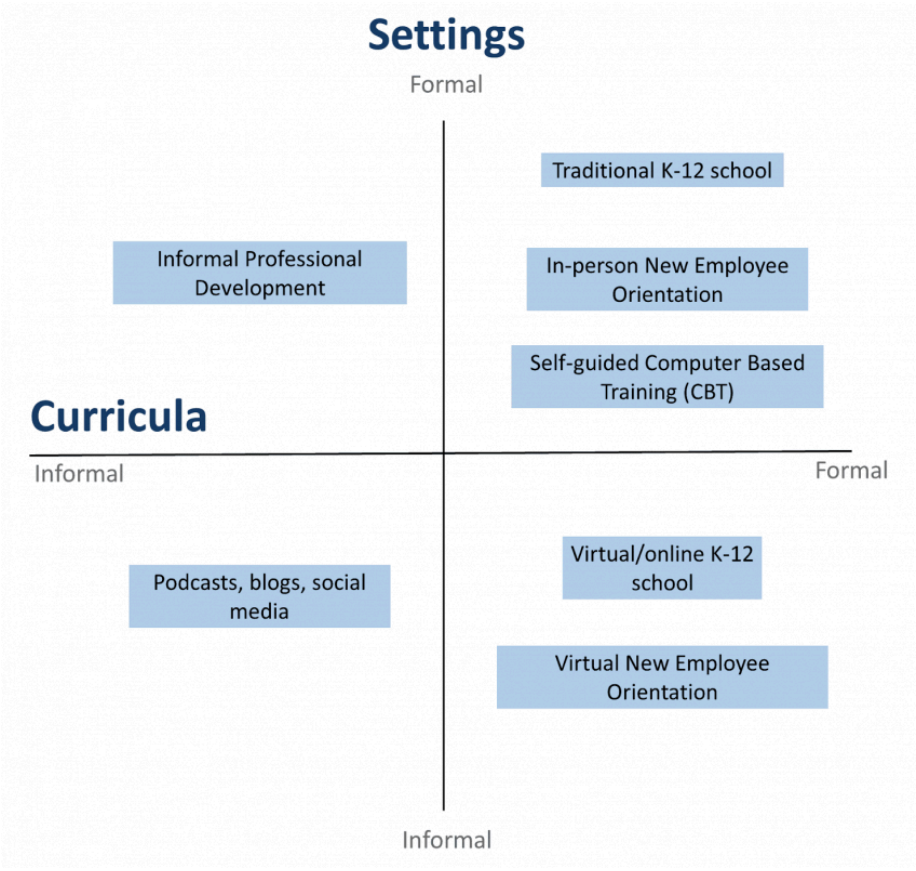
Have you ever sat outside at night and gazed up at the stars? Perhaps you have done this with a child as you talk about constellations. Now imagine you pick up a smartphone with an augmented reality app that can provide instant information and feedback on the stars that you see. Without stepping foot in a classroom or reading a textbook, personalized and on-demand informal learning has occurred. This scenario of real-time information and feedback not connected with any formal setting is one example of informal learning.

According to TrainingIndustry.com, formal learning refers to "a type of learning program in which the goals and objectives are defined by the training department, instructional designer, and/or instructor." Informal learning can be defined as the pursuit of any knowledge, skill, or understanding that occurs outside a formal or non-formal learning event, such as a classroom, training facility, or eLearning course (Dirksen, 2015). Informal learning includes family discussions at home, Googling a topic on the Internet, seeking advice from a colleague, visits to museums, and other everyday experiences (Livingstone, 1999; Bell, 2009). Informal learning has shown to be effective across many contexts (Allen, 2004; Bell, 2009; Miller et al., 2008), especially in work environments (Carliner 2012). Examples in the workplace include "brown bag" learning, like Talks at Google; the Boeing Leadership Center, which devotes an entire portion of the learning path to an open-ended, unstructured mentoring program; and GE's Crotenville training, which is famous for the shadowing and rotation program that was created precisely to take advantage of the informal learning that occurs between a novice and an expert.

In trying to delineate formal and informal learning, it may also be helpful to consider the formality of instruction on a scale. Sefton-Green (2004) stated that informal learning is used quite loosely to describe many kinds of learning that occur outside of schools or other formal settings. Rather than pointing to a specific definition for informal learning, he proposed that learning environments be evaluated on a scale from informal to formal on two criteria: (1) organization of the curricula and (2) the setting, as seen in Figure 1.

Figure 1

Evaluating Learning Environments



If we use this as a guide to identify informal learning spaces, we can determine not only if a learning environment is formal or informal, but we can see where it might sit on this spectrum. For example, schools have traditionally been highly formal on both the setting and the curricula. But recent growth of online/virtual schools may still be formal and highly structured in terms of the curricula, while the setting may be in someone's own home and on their own time schedule. Similarly, workplaces are using more informal newsletters, podcasts, wikis, or informal professional development, rather than formal, in-person training meetings, or assigned computer-based training.

Designing for Informal Learning

With informal learning now defined, the focus of this chapter shifts to four principles that are effective guides to consider when designing environments conducive to informal learning.

Principle 1: Provide Learners a Choice in Their Learning

Instructional designers should deeply consider how learners are going to interact with content. For teachers and professors developing a syllabus, allowing the learner a choice in their learning experience can have a direct link to intrinsic motivation (Cordova & Lepper, 1996). Consider providing several options for a midterm assignment and allow the learner to decide which assignment looks most relevant to them. Or, rather than assign a topic for a project, allow the learner to submit a proposal of a topic of personal interest.

In a corporate setting, developers can provide a list of possible related topics, and only require mastery of one. Consider curating a library of resources in various media such as video, image, text, audio (podcast), self-guided modules, and then allow learners to decide how to gain mastery of the topic. Even in instances where there is a more strict set of regulations (e.g. compliance) that must be covered, there are options to allow the learner some control over their learning. For example, consider presenting the content not in a linear way, where the learner proceeds from topic A to

topic Z, but instead allow them to choose the order of topics they may want to go through first. Instead of a bulleted list or outline in a computer module, consider a more visual layout where they can choose the order from a group of topics.

Museums have long been an excellent example of providing learners with a choice in their learning experience. While museums may provide courses, scripted tours, and other formal learning experiences, for many, museums are open spaces that encourage exploration and even learning through failure (Simpson et al., 2019). Museum educators carefully plan out displays, flow of the rooms, and many other factors to create fun and engaging environments. Learners in a museum choose where they go, how long they interact with a specific exhibit or section, and generally do not have many constraints.

Principle 2: Design for Collaboration, Idea Sharing, and Peer Interaction

While teamwork, collaboration, and group projects are all components of formal learning, informal learning is also well suited to benefit from social interaction. Albert Bandura argued that "most human behavior is learned observationally through modeling: from observing others, one forms an idea of how new behaviors are performed, and on later occasions this coded information serves as a guide for action" (p. 22, 1977). Further, Lev Vygotsky maintained that social learning consists of learning through social interaction (1978).

When more specific knowledge is needed by an individual, a personalized informal experience in the form of coaching or mentoring will allow a novice to learn directly from an expert. A learning experience that centers on group work and peer interaction will invite informal learning to take place as individuals pose questions to and receive answers from their teammates and colleagues. To do this, consider assigning group tasks or projects, or posing problems that require multiple individuals to complete. A technique to take advantage of the unscheduled nature of informal social learning is to design a wiki or forum system that leverages the knowledge of the community in a socially constructed manner. Lastly, an emerging trend in informal learning is *microlearning*—small learning units such as text phrases, photos, or audio snippets—and its associated affordances for instructional designers (Giurgiu, 2017). For the specific principles of microlearning design, see Zhang and West (2020).

Principle 3: Leverage the Benefits of Constructionism and Project-Based Learning

Constructionism and project-based learning are two additional areas where we can design informal learning opportunities. With constructionism and project-based learning, learners typically become active participants in the experience and learn organically as they work through a challenge. Designers working to implement informal learning principles can include opportunities for exploration and creation. Many businesses have implemented innovation centers or creativity labs where new ideas can be tested and prototyped. For example, Pixar fosters innovation and encourages their employees to develop new skills through their Pixar University. As part of the "university," employees can sign up for free classes in painting, ballet, or sculpting. Additionally, Lowe's Home Improvement company has created innovation labs where employees reimagine how to help customers using augmented reality to plan virtual home renovation projects. Allowing learning through experimentation and failure can lead to better quality products and services (see April 2011 issue of Harvard Business Review).

A recent trend in schools, communities, museums, and even healthcare, is the rise of makerspaces. Makerspaces provide a physical space where many forms of constructionist and project-based learning may occur (Peppler et al., 2016). Maker Faires have been promoted and popularized by *Make Magazine* and other organizations around the globe. The effort to overcome constraints can often lead to creativity in these spaces (Stokes, 2005). In a makerspace, learners may be mentored by another individual on how to use a machine such as a 3D printer or laser cutter. Often, small groups may work together to prototype and test ideas.

Principle 4: Leverage the Benefits of Gamification and Playful Competition

Playful competition and gaming are proven mechanisms for increasing learner engagement (Steinkuehler & Squire, 2014). While the principle holds for formal learning, it is particularly effective in designing informal learning environments. Gamification is “a relatively recent term that describes using game thinking and game mechanisms in nongame contexts to engage users (Deterding, 2013)” (Steinkuehler & Squire, 2014, p. 389). The key criteria for an effective gamified design are exploration, immersion, socialization, and competition.

To design for exploration, it is important to design an experience that does not necessarily have a single path toward a solution. This allows the learners to truly discover, explore, make mistakes, and iterate. To design for immersion, it is important that the challenge be such that the only way to solve the problem is with dedicated, focused time, over an extended period. For example, learners can (a) build or produce an artifact from scratch, (b) solve a problem that requires the synthesis and application of multiple concepts simultaneously, (c) give or receive feedback to or from peers or experts where they must refine their work as part of the final solution, or (d) some combination of all three. (Socialization is discussed in Principle 2 above.) To design for competition, it is helpful to consider something that determines one or multiple winners. Challenges with levels, simulations, scoring, badges, and leaderboards are features of competition that you can incorporate into your design.

Designing for Informal Learning at Adobe

In late 2016, the Adobe CTO set forth a new charge: to upskill all software engineers (SWE), of which there were approximately 6,000 globally, in the machine learning (ML) discipline. To accomplish this, an ML Training Program was launched to begin the process of mass upskilling. After one year, an initial cohort of 1,000 individuals had completed the five-month e-learning courses, bringing with them many lessons learned. One consistent point of feedback across multiple stakeholders was that an opportunity for more in-person, hands-on learning was needed compared to the one-hour-per-week classroom sessions that had been available for the participants over the five months. In this instance, the challenge loomed large to introduce a more intensive in-person, hands-on experience to 1,000 people who were scattered across the globe.

To address the feedback, the training team designed and implemented a bootcamp model that incorporated a project-based competition in the form of a hackathon for the second cohort of 1,000. The bootcamps would be three consecutive days each. Over those three days, the team would spend three-fourths of one day delivering company-specific material related to the company’s AI/ML platform. The remaining two and one-fourth days for the learners would be spent in the hackathon competition, thus allowing for the immersive and dedicated time-on-task.

To start each hackathon, the training team provided the basic rules and constraints. Bootcamp attendees would divide into small teams of two to six people, organized by their shared ML interests. To gamify the hackathon, each team was asked to prepare a brief "Venture Capital Pitch" to present the ML feature they each worked on over the two or more days. There were four categories that would be awarded winners: most interesting feature, most likely to become an actual Adobe product feature, most whimsical, and best overall feature. During the course of the entire hackathon, a small number of ML experts would roam the large room and answer any questions a team may have.

By creating this environment, the learners spent two or more days laboring to develop their ML feature. The ID team observed that the competition fueled their natural interest by increasing the participants’ drive to ask project-relevant questions and to consume publicly available ML content on the internet. Numerous teams arrived hours before the days started and stayed hours past the day’s allotted block of time. Participants would extend what they had learned from the e-Learning courses by scouring publicly available websites to find help for their unique scenarios. Some would watch brief tutorials and, if relevant, immediately teach their teammates what they learned; other teams would divide and test out open-source code and, once successful, exclaim “I got it, it worked!” for the others on the team to know they need not search further.

This pattern repeated itself constantly over the approximately two days. Ultimately, the hackathon experience fostered an environment in which participants would seek out anything and everything to assist them in overcoming an obstacle and therefore advance the ML feature they were designing in hopes of building a competitive feature for the competition. In the end, knowing (and hearing) the effort put forth by all teams, the participants reported taking great pleasure in listening to the presentations and viewing the demos of each team's ML solution developed over the hackathon.

Reflection

Table 1 below lists several informal learning activities with their associated strengths and limitations. The application exercise that follows Table 1 will assist in your thinking of when and how to apply the informal learning design principles discussed in this chapter.

Table 1

Strengths and Limitations of Informal Learning Activities

Learning Activity/Tool	Description	Strengths	Limitations
Project- or problem-based scenarios	Projects/problems allow learners to appropriately struggle through arriving at a solution. The struggle area is essentially the zone of proximal development, where informal learning occurs.	• Can address multiple learning objectives with a single problem scenario • Can be accomplished in small groups, thus alleviating the need for a high number of experts to provide guidance or help	• Cost: potentially very expensive to execute • Time: potentially very time-consuming to design, execute, and evaluate
Coaching or mentoring programs	An example of social learning, where a novice can learn directly from someone more expert. The cycle of practicing/trying, receiving feedback, and trying again is strongly supported by an expert who serves as a guide.	• Close proximity to relevant expertise • Feedback that is very specific, timely, and personalized • Often 1:1	• Time: often difficult to design a program that requires so much time of someone senior in experience • Challenging to find one (let alone many) individuals with seniority willing to participate
Job aids, wikis, tutorials, or internal forums	A strong collection of relevant resources is generally superior to formal instruction. In contrast to formal instruction, these resources require little cost, take little time to design and produce, and are extremely tactical in nature.	• Cost: minimal • Speed: utility is all that matters, so they can be created quickly • Crowd-sourced information is often highly actionable	• Potential lack of monitoring/governance • Because utility is most important, they can sometimes be poorly designed visually

Communities of practice, learning networks, or external forums	A community of practice is designed for, and by, the interested participants themselves.	• Cost: typically free or inexpensive • Typically more broadly applicable than information in an internal forum • Maintenance & governance	• Can be overly general (i.e., not applicable enough)
Exhibits, museums, or performances	Exhibits and museums are open spaces that encourage exploration and even learning through failure. At a performance, an individual learns through observation.	• Exhibits and displays can be highly engaging • Socializing with other attendees/participants is common, thus inviting the social component of informal learning • Observational learning is also very effective (Bandura, 2003)	• Cost: entry can be potentially quite expensive • Time: to maximize learning at a performance or museum often requires multiple hours, minimum.

Application Exercise

For your reflection:

1. What is the relative amount of information intended to be taught?
    1. If it is a considerable amount, consider a formal learning approach.
    2. If it is a small amount, formal learning could simply be excessive. Consider a simpler solution like a wiki or job-aid that would require much less time/cost to create.
2. What needs to be learned? Is it explicit or tacit?
    1. If it is explicit information (i.e., codified or written down), then consider formal instruction.
    2. If it is tacit information (i.e., not codified or recorded), consider leveraging an informal learning environment.
3. How complex is the material?
    1. If it is highly complex, consider formal instruction.
    2. If it is not highly complex, consider leveraging a social learning component, where participants must work together or share knowledge to achieve a common goal.
4. How much/often is the content subject to change?
    1. If it is not often, consider formal instruction. Taking the time, cost, and effort to design a formal experience is justified when it will have a long shelf-life.
    2. If the content will change fairly often (or more), then consider an informal learning design which, by definition, embraces a changing landscape and seeks up-to-date, accurate information—regardless of the source.

Conclusion

The evidence is clear that often, learners gain knowledge predominantly outside of formal settings. As a result, instructional and learning experience designers should be intentional about taking advantage of the affordances of informal learning. To that end, as you follow the four design principles shared above, you will be able to design informal learning experiences that take advantage of the natural interests and curiosity of your learners.

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