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Informed Eclecticism in the Design of Self-Access Language Learning Environments

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Abstract

Self-access learning environments traditionally received only rudimentary treatment and attention compared to classrooms as many educators presumed that it was a teacher and the instructional models, methods, and approaches that were the greatest mediators in learning. In recent decades, self-access centers and subsequently other self-access learning environments and digital spaces have been burgeoning throughout the world, created primarily with the goal of supporting learner autonomy. However, old classroom-centric learning and design paradigms are sometimes applied to the design of self-access environments despite the relative spatial, temporal, and grouping freedom available. By distancing themselves from the tendency to choose one particular learning paradigm on which to base their designs, as is often the case in instructional design, educators and designers open their designed environments to the possibility of becoming a rich space, informed by numerous and diverse fields, that can account for varied ways of learning and knowing. Looking to other fields to further understand what variables can either catalyze or obstruct various ways of knowing and learning can inform the design, development, support, and management of self-access language learning environments. Drawing on knowledge from a variety of disparate fields, this paper suggests six principles that can be applied in order to augment a wide variety of types of learning in self-access learning environments, and particularly those concerned with language learning.

Keywords: self-access language learning (SALL), learning environment design, grounded design

Context

The author's institution, Kanda University of International Studies, in Makuhari, Japan, is currently constructing a new building, which will not only contain a number of new classrooms, but will also become the new home of the institution's Self-Access Learning Centre (SALC). While the architectural decisions have long since been set, over the course of last year and into this year the SALC's learning advisors (LAs), as well as some other relevant parties, have been given the opportunity for input regarding the design (non-architectural elements) of the new SALC. As this is the first foray into educational design for the design firm, and considering that there is often confusion regarding the differences between the needs in language classrooms and

self-access language learning (SALL) environments, the LAs sought to bring attention to concepts relevant to SALC user (LAs, managers, staff, teachers, and students) practices in order to optimize the space to support the kinds of activity and learning intended to take place there. While the process is still ongoing, the idea is that, given all parties have the students' best interests at heart, by working together and pooling our knowledge we can help those operating in decision making capacities make the most appropriate design choices.

Types of Learning Environments

The term learning environments can encompass a myriad of spaces. In an EDUCAUSE Learning Initiative white paper, Warger and Dobbin (2009) define learning environments as follows:

> The term learning environment encompasses learning resources and technology, means of teaching, modes of learning, and connections to societal and global contexts. The term also includes human behavioral and cultural dimensions, including the vital role of emotion in learning, and it requires us to examine and sometimes rethink the roles of teachers and students because the ways in which they make use of spaces and bring wider societal influences into play animates the educational enterprise (p. 3).

In much of the literature in the field of learning environment design, *learning environment* and *classroom* appear to be conflated terms. In fact, an examination of journals like *Learning Environments Research* reveals a sizeable majority of articles gathering data from and/or oriented to classroom environments. Goh and Khine (2002) illustrate the some of the depth and breadth of this classroom-focused research that has taken place in the last 50 years. In reality, learning is not an activity confined to classrooms and educational institutions, and so nor are learning environments limited to such confines. Learning is everywhere, and so learning environments are everywhere. Perhaps more accurately, everywhere is a learning environment, whether deliberately intended as such or not. Learning environments may be planned or natural; formal or informal; real, physical spaces or digital and potentially in the ether that is the Internet. Strange and Banning (2001) give an idea of the elements to look for when trying to understand learning environments: "Key components of all human environments include: Physical

condition, design, and layout; Characteristics of the people who inhabit them; Organizational structures related to their purposes and goals; Inhabitants' collective perceptions or constructions of the context and culture of the settings" (p. 5).

Learning Environment Design

Learning environment design comprises a field of study that began in the late 1960s (Goh & Khine, 2002) and has grown rapidly since. However, literature on the effects of campus learning environments may prove "too *unwieldy and disparate"* for complete and critical synthesis (Strange & Banning, 2001, p. xiv). Still, there is worth in the field because "We never educate directly, but indirectly by means of the environment. Whether we permit chance environments to do the work, or whether we design environments for the purpose makes a great difference" (Dewey, 1993, p. 22). Moos (1986) also states that the "arrangement of environments is perhaps the most powerful technique we have for influencing human behavior" (p. 4). While research in learning environment design outside of classrooms is lacking, Strange and Banning (2001) circumvent this by drawing from literature on human environments, which signals the importance of integrating other relevant lines of study.

Learning has not always been central to design, and sometimes design is informed by outdated ideas of how people learn (e.g. You sit down in a library and read to yourself quietly, and that is what learning is). Over the years, this has led to many ineffective (or less effective) educational environments at postsecondary institutions (Strange & Banning, 2001).

As learning environment design in SALL contexts is yet a fledgling area of study, it may be of benefit to probe a number of relevant fields in regard to factors that can mediate action and learning, thus allowing for informed, grounded design decisions for self-access learning (SAL) and SALL environments. Fields as diverse as sociology, psychology, ecology, cognitive science, neuroscience, information technology, architectural design, and engineering can inform design in terms of physical spaces, organizational factors, and even social spaces.

In this paper, the author will detail some of the differences between grounded design in a SALL environment and instructional design for classrooms, specifically with interest to how various or even "competing" learning paradigms and epistemologies can be viable and accounted for in SALL contexts. Finally, the author will draw on information in a variety of fields to show how those ideas might inform design interventions by citing research in the relevant fields,

discussing the implications, and illustrating what each principle might look like in a real learning spaces.

Learning Environments in Self-Access

The environment can include more than just the *space*, becoming a *place*—the difference between which can understood accordingly, "Ultimately, what makes these [self-access] facilities places are the actions people perform in these spaces and the meanings they ascribe to them" (Murray, 2014, p. 82). Gardner and Miller (1999) make a distinction between two primary kinds of self-access learning environments—*controlled* and *uncontrolled* (p. 20). Essentially, controlled learning environments are those that are designed and organized for learning. On the other side of the spectrum are uncontrolled learning environments, which might include unplanned spaces outside of the control of teachers/counselors/advisors. "These are environments in which learners may see potential for language learning and take advantage of it" (p. 20). Learning environment design, by nature, focuses primarily on the former.

The divide between controlled and uncontrolled learning environments may not in fact be binary. It is not difficult to imagine a continuum ranging from heavily controlled learning environments to uncontrolled learning environments in which there was no deliberate planning (e.g. cafeteria spaces that students use for studying and practicing in various ways, but for which no thought was actually given to activities other than eating). To imagine such a continuum, it may be helpful to employ an ecological lens, viewing environments in terms of *affordance,* "which means a relationship between an organism (a learner, in our case) and the environment, that signals an opportunity for or inhibition of action" (van Lier, 2004, p. 4). Some affordances might be more explicit than others, and learners' noticing and orientation to them may be variable. For example, while a chair affords sitting, so might a window sill. This difference in relative strength of affordance symbolized by a thing helps illustrate a space on the continuum between what may be thought of as controlled and uncontrolled environments. A highly controlled learning environment might explicitly label a space as "conversation practice area," whereas a semi-controlled learning environment might be designed to afford such conversation and speaking practice through the layout and orientation of seating, among other design considerations, but not explicitly state "This is the area for speaking practice!" A highly controlled environment is more prescriptive, either explicitly (the naming of an area), or

implicitly ("These are the materials you should use, because they are the ones provided for you to select from."). A semi-controlled environment might describe a designed learning environment that is designed to present a wealth of affordances but with a less prescriptive tilt. This somewhat parallels how Hannafin, Land, and Oliver (1999) classify *enabling contexts* of open learning environments as externally imposed (explicit prescriptive), externally induced (implicit prescriptive), or individually generated (non-prescriptive) (p. 123-126).

In self-access areas aiming to support agency and autonomy, as they most often do, it would seem best to avoid prescriptive environments. This comes with one caveat, however, and that is that students exhibit varying levels of prior knowledge, expertise, and autonomy. David Ausabel, known for his contributions to educational psychology, asserted, "The most important single factor influencing learning is what the learner already knows" (1968, p. vi). This applies not to just language, but the noticing, orientation to, and use of affordances in an environment as well. Skilled and experienced self-access users may find a plethora of affordances to act upon in an open environment, whereas novice self-access users may find themselves relatively lost without any sort of prescription or recommendation, dependent upon prior knowledge. From the perspective of fostering autonomy, rather than simply supporting those learners who are already effectively autonomous, it would behoove educators and designers to develop learning environments which allow for some guidance to learners that need it. By avoiding outright explicit prescriptivism, though, spaces can also accommodate learners with other ideas of how they might want to use the space to support and further their learning. The degree to which prescription features in the design of a space will be dependent upon the context and the institution's goals.

Classroom learning environment design has been greatly informed by instructional design and often presupposes the presence of someone operating in a teaching capacity, meaning that design decisions feature mostly in terms of classrooms' *built pedagogy—"*the ability of the space to define how one teaches" (Oblinger, 2007, p. 1.1)—whereas in a traditional self-access environment such as a library, greater emphasis has been placed on materials selection, organization, structure, and other provisions (including staffing and support) which may mediate users' effective navigation of the space and selection and use of materials as autonomous agents. There may be a wealth of knowledge that can be incorporated in SAL from library design. While self-access centers (SACs) began simply as resource centers, they became distinctly different

from libraries in that many SACs started focusing on resource use and activity. In recent years, however, libraries have followed suit, abandoning the position of being only materials repositories—modern libraries now often feature learning commons (Beagle, 1999). Even in the traditional sense, libraries shared many commonalities with SACs: They are both self-access spaces, unbound by many classroom limitations, and have an interest in making sure that materials and resources are organized and arranged to support access, selection, and use.

Without a class teacher to act as prescriber of action, the other mediating factors of self-access learning environments are doubly important. Design in classroom contexts is not unimportant—in fact, the opposite is true (Allford & Pachler, 2007; Goh & Khine, 2002; Murphey, 2013; Oblinger, 2007; van Lier, 2004) and built pedagogy can have powerful positive effects (Oblinger, 2007). However, physical aspects of a designed learning environment in a self-access context may play a larger relative role in learning and activity for a particular space, thus underscoring the importance of good design in those spaces to create effective places for learning. Design certainly plays a mediating role in possible action, and thus learning, and so it is helpful to think of built pedagogy from the stance that it is also possible for learners to both teach themselves and be taught be others (and teaching themselves is expressing agency over their own learning).

Complexity in Self-Access Language Learning

Language learning can be considered relatively complex and inclusive of a variety of learning processes, particularly when compared with some other subjects and knowledge areas (e.g. history). With regard to learning environments, while this complexity necessitates many design considerations, it also implies that language is a particularly useful lens for studying and understanding appropriate design interventions for many kinds of learning. SALL can include, for example: the development of higher order thinking processes, such as analyzing and evaluating resources; knowledge acquisition, including content knowledge and vocabulary; cognitive skills, notably when receiving or producing language; and metacognitive skills, as used in planning, monitoring, reflecting upon, and revising personal approaches to learning. In addition to the variety of things people learn through and with language, language learners make use of the encoding (creation), potentiation (storage), and recall of all memory types, which can

be regarded as various ways of learning at the physiological level. For discussion on memory types, see Carey (2014) or Hattie and Yates (2014).

This all means that through language learning and learner development in SALL, learning can be understood as a rich, complex, and varied process, suggesting educators remain wary of oversimplification, which could lead to prescriptions that turn out to be either ungeneralizable, or worse, detrimental to learners in varied self-access spaces. This complex nature of language learning can inform approaches to design, and thus design interventions can more appropriately address the needs of language learners in SALL contexts.

Grounded Design in Self-Access

Land and Hannafin (2000) illustrate the importance of *grounded design*, which they view as "the systematic implementation of processes and procedures that are rooted in established theory and research in human learning" (Hannafin, Hannafin, Land, & Oliver, 1997, p. 102). However, Land and Hannafin (2000) are careful to note that, "[grounded design] does not advocate or presume the inherent superiority of a specific epistemology or methodology for design. Rather, grounded design provides a framework for reconciling diverse design practices with the basic tenets of associated belief systems" (p. 3). The point they seek to make is that by design the affordances in a space should match the kind of learning and knowing expected to take place in that environment. They continue to detail the types of activities supported by different learning environments based on different psychological learning paradigms. They illustrate how a behaviorism-grounded learning environment (skill-based drilling and repetition) would differ from a cognitivism-grounded learning environment (focused on mental processes), which would still then differ from a constructivist learning environment (building on prior knowledge and experience).

Reconciling "Competing" Learning Paradigms and the Need for an Informed Eclecticism

Hannafin et al. (1997) asserted that a level of reflexivity awareness is required for the deliberate application in a design, implying a decision to focus on design based on some one

particular theory with which the designers are very familiar. This argument is based on the perspective of Bednar, Cunningham, Duffy, and Perry (1995) who contest that activities informed by one paradigm may derail the effectiveness of an instructional model informed by another paradigm. Wilson and Myers (2000), however, question whether design should be theory-based (suggesting exclusivity, as above) or theory-informed (suggesting possibilities, among others), stating that in reality "Practitioners tend to be opportunistic with respect to different theoretical conceptions; they might try viewing a problem from one theoretical perspective, then another, and compare results" (p. 82). This view is also supported by Allford (in Allford & Pachler, 2007) who states, "There is no single approach suited to all types of learner and all learning environments, and it seems likely that different approaches will be appropriate for different activities and stages of development" (p. 136-137). Sfard (1998) also highlights the danger in narrowly applying a single theory of practice, "When a theory is translated into an institutional prescription, exclusivity becomes the worst enemy of success" (p. 10). He then continues to illustrate why this can be a pitfall: "Because no two students have the same needs, and no two teachers arrive at their best performance in the same way, theoretical exclusivity and didactic single-mindedness can be trusted to make even the best of educational ideas fail" (p. 10-11).

Those in favor of following a single paradigm are very often presupposing a limitation on resources in classroom. SAL environments, however, are not constrained by some of the limitations often associated with classroom instruction, and thus they have the possibility of accommodating a plethora of ways of learning, relatively unbound by time, space, and grouping considerations. Further, with situated cognition as a potentially unifying framework, Wilson and Myers (2000) view various learning paradigms as commensurable, as also posited by Greeno and the Middle School Mathematics Through Applications Projects Group (1998, p. 14).

Many SAL environments to date, with a focus on learner autonomy, have been developed from a constructivist perspective (Hannafin, Land, & Oliver, 1999; Jonassen & Land, 2000; Pritchard, 2005). However, many instruments to measure constructivist environments, such as the constructivist learning environment survey (CLES)—cross validated and used in a variety of countries around the world (Goh & Khine, 2002)—still most often focus on classroom learning environments (see Aldridge, Taylor, Fraser & Chen, 2000; Kim, Fisher & Fraser 1999; Taylor, Fraser & Fisher, 1997), and may require adaptation for SAL environments. Jonassen (1999)

states that actually "To impose a single belief or perspective is decidedly nonconstructivist. Rather, I prefer to think of them as complementary design tools (some of the best environments use combinations of methods) to be applied to different contexts," also noting "This diversity of perspectives and methods is an important aspect of the new paradigm of instructional theories" (p. 217). Kwo, Moore, and Jones (2005) also see the benefit of eclecticism through discussing the sorts of knowledge needed by different fields, adding that "New forms of knowledge are yet to be discovered through connections between interdisciplinary groupings" (p. 5).

Developments in Cognitive Neuroscience and Brain-Based Learning

In recent years, a positive view of eclecticism with regard to approaches to learning and ways of knowing has become further supported by advances in cognitive neuroscience and brain based learning, which offers evidence of the neurological mechanisms behind various types of learning and their respective memory encoding (formation), potentiation (storage), and recall as they work in behaviorist, cognitivist, constructivist, and other paradigms. This is especially important in language learning as it is a domain in which learners benefit from each of these paradigms in different ways (Greeno et al., 1998).

Theories of learning and epistemologies have long belonged to the domains of psychology and philosophy. Knowledge does not progress in isolation, though, and "During the past few decades, research on how brains enable people to perceive and produce language has been advancing at a dramatic pace. As a result, the field now contains a wealth of fascinating findings about this uniquely human capacity" (Kemmerer, 2015, p. xix). These advances purvey knowledge that better informs educators of some of the biological and physiological underpinnings of learning processes, and this knowledge, applied for pedagogic purposes, has become known as *brain-based learning*. "… there are some principles that have developed out of the brain-based learning movement which, if applied, seem to have the potential to improve the learning environment and lead to improved learning" (Pritchard, 2005, p. 75).

What Eclecticism Looks Like: Example Principles for Informed Design Interventions

Drawing from some of the fields, theories, and learning paradigms discussed in this paper, a number of design principles emerge, several of which are detailed in this section. It is

worth noting that the following principles are by no means an exhaustive list, but were developed by the author for the purpose of sharing with faculty involved in the design and decision making processes of a new building that will include a new SALC. The goal was to find core and overarching principles that can positively inform the decision makers involved in the design process while accounting for the variety of activity and learning that can take place in the center. It is worth reiterating that an environment is not just its space, but also organization (and policy) and social aspects, and thus these too should be considered in and as part of the design process.

Principle 1: <u>Positive emotional response</u> improves memory encoding, potentiation, and recall

Memory is vital to language learning, with memories that are connected to strong emotions are easier to recall than neutral memories, with relative emotional-ness as a strong predictor of recall. People can often easily recall emotionally charged memories, including both painful moments in their lives as well as the euphoric ones (Dolcos, LaBar, & Cabeza, 2005). This leads to the first half of the first principle—*emotional response is a strong predictor of memory recall* (see Ludmer, Dudai, & Rubin, 2011).

The relative strength of recall for a memory is also related to the number and quality of connections made with a memory (Carey, 2014), which is in part regulated by working memory. Working memory, often referred to as short-term memory, allows people to make connections with other aspects of the learning context, and it also allows them to effectively juggle known concepts and knowledge/memory at the same time. Effective working memory leads to richer associations and connections, which leads to stronger recall ability. Attention, though, is a limited resource (Carey, 2014; Hattie & Yates, 2014). When learners are anxious, their cognitive processes are busy dealing with stressors and they have less capacity in working memory to devote to other learning (Ashcraft & Kirk, 2001; Ashcraft & Krause, 2007). This is because the fear and anxiety affects working memory similarly to "a resource-demanding secondary task" (Ashcraft & Krause, 2007, p. 243). Further, strong and especially repeated negative experiences associated with some stimuli can lead to fear conditioning, by which stress and anxiety levels are triggered by those stimuli even in the absence of any new negative event. Thus, even in setting morals and values aside, it is impossible to advocate a pedagogy of fear or negativity because of

the detrimental effects on learning at the neuro-cognitive level, which is why this principle necessarily includes a *positive* orientation.

In terms of real SALL environments, this principle might feature in color choices and lighting, which can have an effect on emotions, as well as positive imagery. It would be helpful to have staff who are friendly and welcoming, and processes in place to help students feel they are valued in an environment (Achor, 2009; Strange & Banning, 2001), such as welcoming learner input, and taking real steps to address learner grievances). On the language side of things, it might include helping learners develop the ability to find appropriately-leveled materials, which should be challenging enough to be interesting without being so challenging that learners cannot understand (Pritchard, 2005). This could be achieved through helpful diagnostics, recommendations, signage and organization, or assistance from advisors or staff. If a learner deems their experience worthwhile, they will generally regard it positively.

Principle 2: Low-stress and safe environments encourage risk taking and lower inhibitions to practice, which leads to further learning

While there may be some overlap with the prior principle, the reasons for having a low-stress and safe environment are numerous. First, maintaining a low stress level is beneficial in that it keeps the pre-frontal cortex and working memory functioning appropriately (encoding new memories—learning new things). It also helps avoid fear conditioning, which can stem from anxiety, whether logically justifiable or not. From an identity perspective, if people feel safe, comfortable, and accepted, they are less likely to experience a sort of cognitive dissonance between identities, and instead are more easily able to slide between various appropriate learner and linguistic identities (Gee, 2007; van Lier, 2004). Perhaps the most important thing afforded by safety is the support to try, without fear of failure, and retry if needed. This is important in following an approach to learning called *experiential learning*, which posits that people learn by doing and then reflecting on their experiences (Kohonen, 2001; Kolb, 1984). Gee refers to the ability to act without fear of failure as the *"psychological moratorium" principle,* which he defines as the idea that, "Learners can take risks in a space where real-world consequences are lowered" (Gee, 2007, p. 64).

The need for practice is especially necessary with language activities, like speech, that include motor skills. This need is supported by the concept of myelination in neuroscience, which details how neural pathways get stronger the more they are used (Kemmerer, 2015). While the majority of myelination in the brain happens up through adolescence, healthy adult brains also contain myelin producing cells that are important in the learning and development of at least motor skills (McKenzie et. al, 2014) and potentially other skills. There is also evidence that suggests neuronal pathway use influences the degree and location of myelination (Hines et. al, 2015), meaning that the more you use one of these skills, the more efficient it becomes on a physiological level.

The implications of the concepts detailed above are that: first, a safer place leads to lower fear of failure and increased risk-taking; second, more risk-taking means more experience, offering opportunity for reflection and; third, use and practice of certain skills also supports and influences myelination, which is a biological mechanism implicated in learning and which continues to take place in adults for at least motor skills learning and use (meaning it is useful in supporting speech skills at a minimum).

An environment applying this principle might focus on the culture of learning, where risk taking is encouraged and praised, whether the outcome was "correct" or not. It might orient students to the ability to learn as much or more from failures as from successes, casting trial and error in a positive light. SALL environments are particularly suited to this kind of support as they may not be required to provide some form of summative assessment (i.e. grades), allowing learners and support staff to focus on reflection and feedback that is formative in nature, helping the learners develop from their missteps rather than becoming paralyzed by them.

Principle 3: <u>Social interaction</u> can positively augment learning and development

Vygotsky (1962, 1978) illustrates learner development as inherently social. Learners operate in a metaphorical space called the zone of proximal development (ZPD) or "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). Murphey (1996, 2013) also notes the presence of adjustment, and "that students and teachers had variable abilities to adapt

or adjust to partners and situations, displaying variable zones of proximal adjusting or ZPAs" (Murphey, 2013, p. 173). This plays an important role in both learning and communication, perhaps by allowing learners to better target the range at which to engage with others and environments for an optimal ZPD, effectively scaffolding for either others or themselves.

Some learners want relative privacy when working with friends, while others do not mind more public settings and may enjoy opportunities to meet new people. Groups come in different sizes, too, and thus moveable furniture that can be arranged in various groupings and orientations would be helpful. Some groups may want large desktop spaces where they can work together on projects, whereas other groups may be focused more on comfortable furniture where they can relax and chat in a target language. Ideally, a learning environment would be able to accommodate groups of learners of a variety of sizes and with a variety of goals. In addition to this, though, designers should look for ways to create or foster connections between people to build communities of learners (Strange & Banning, 2001). Teachers, tutors, counselors, and other staff may also be part of the community, and may also serve as a more knowledgeable other to help learners function, learn, and develop within their ZPDs.

If institutions are to exploit the benefits of social learning, design interventions need to account for social interaction, including group sizes, orientations, and systems of design in place for connecting learners with one another. At the author's current institution, for example, there is a learning communities wall on which many students attach a paper they have filled out with information on languages they speak and languages they would like to learn, as well as some additional information about themselves, their interests, and their hobbies. Other students interested in an exchange of learning and practice in those languages can get their information and contact them. This helps facilitate contact between students with similar goals and can help them identify who is a more knowledgeable other in a particular area of interest.

Principle 4: <u>Comfort</u> attracts learners and reduces distraction, increasing focus

Several years ago at the Directions in Self-Access Language Learning Symposium at Kanda University of International Studies, there was a session on considerations to account for when setting up a new center (Foale, 2013), and one of the most salient bits of information was the statement that, "Students will usually default to the most comfortable place." That comfort may be physical or psychological in nature. For example, a student may avoid a seating option

that is physically more comfortable if it is near someone they dislike, because it is more psychologically uncomfortable. Comfort is important because it pertains to the most fundamental step students need to take in order to access and exploit the resources available to them—coming to the center. At the other end of the spectrum, people generally avoid uncomfortable places. Oblinger (2006) stated that institutions need to account for users of different body types and movement abilities instead of just assuming that learners are small and healthy. She referred to a sobering experience wherein one university found through a panel discussion that two of four panelists had actually dropped courses they were taking because of the amount of discomfort caused to them by the seating. She argued, "Discomfort makes a compelling distraction to learning" (Oblinger, 2006, p. 2.6).

Dörnyei & Murphey (2003) discuss how temperature, lighting, decoration, and music can play a noticeable role in activity and interaction among language learners (p. 83-84), furthering the case for comfortable design having a positive effect on learner action and engagement, within groups and without. Carey (2014) further illustrates the importance of decoration and variable settings in learning, describing how detail-rich and varied environments allow people to more effectively encode and recall memories, ostensibly due to a richer network of associations and synaptic firing, creating a "stronger" memory by making recall easier. He points out that, similarly, having a variety of study locations supports later recall better than repeated study in the same space, possibly because of the novelty and the overall variety of connections that can be associated with a memory.

In a real SALL environment these ideas might be manifest as a collection of spaces—each unique, but all sensory-rich while still being comfortable. They might include soft touch furniture or a variety of seating options. A good environment would provide ample lighting to all of its spaces, and keep the climate hospitable. Materials and signage, too, should be considered, with extreme high and low heights on shelving reserved for decoration so that learners can search through and for materials with minimal obstruction or discomfort.

Principle 5: Removing barriers and increasing <u>accessibility</u> facilitates action and learning

Accessibility can influence action in profound ways. In saving a small amount of time in access, people can gain a great amount engagement in learning. In his book, *The Happiness*

Advantage, Achor (2009) details what he calls *the 20-second rule*, named after the 20 seconds it would take to retrieve his guitar from the closet if he wanted to practice playing it (p. 150). The 20-second rule essentially states that people become more likely to do things as they lower the barriers to initiation, and less likely to start the things for which they have raised the barriers to initiation (p. 154). Those barriers might be with regard to time, as was the case with Achor and his guitar, or they might be with regard to other cognitive load—if one can make rules or decisions ahead of time, it takes away some of the load associated with the decision making processes when it is time to actually get started (less impetus needed). This principle has several implications for learning environments, and SAL environments in particular. Achor suggested that people can augment their environments in ways to help them form good habits by lowering impetus required for initiation, and discourage bad habits by raising the impetus required to initiate an activity. From a very practical standpoint too, easy access means that, even with all other variables equal, learners will have more time freed up for activities that lead to learning.

In physical spaces, this principle can be applied in regard to materials or other resources. Materials can be placed in a way such that they are near where learners would often use them, and by categorizing or labeling them in ways that make them easy to find, physical and cognitive barriers to access are diminished.

This can also be applied to how learners access resources in digital environments, where one might think about the number of clicks or links between where they start—opening a browser or app—and where they need to end up in order to access resources or engage in some kind of learning activity. As students navigate through these pages or apps, the time it takes to move and to select items and links, and for the computer to process and display information is in a sense the physical barrier of the digital world, whereas the time it takes for a learner to process the pages and complete the navigation presents additional cognitive load. In this case, a homepage or portal that learners can use as a jumping off point for resources and programs that they might use would be helpful.

Socially speaking, the aforementioned learning communities wall and language exchange example (see: *Principle 3)* sports an organization that lowers the barriers—both affective and organizational in nature—that would exist if one student went out searching for others of their own accord to start a language exchange.

Principle 6: <u>Flexibility</u> (adaptability) allows an environment to become and stay relevant

Most people have heard the adage most commonly attributed to Heraclitus that states, "The only constant in life is change." Technologist and X-Prize Foundation founder and chairman, Peter Diamandis expands on this to extoll, "The only constant is change… And that rate of change is increasing" (2014). This is certainly true in the field of education, and particularly so in SAL environments. Education sees a great many innovations, and occasionally *disruptive innovations*—that is, new innovations that have the power to disrupt and displace established markets (this could be in regard to materials, spatial design, or a number of other variables in education). At the author's institution for example, all incoming students have tablets (i.e. iPads), in part to try to provide greater access to digital materials and go paperless. This proliferation of digital materials and the ability for teachers and other faculty to incorporate materials and tools for teaching and learning from a variety of sources means that, in this context, the iPads have displaced many traditional textbooks in terms of usefulness as a classroom resource. Innovation, including disruptive innovation, is evidence of a healthy field full of people constantly seeking to improve the accessibility and quality of learning available to learners.

A healthy and constantly adapting, evolving field also means that those in the field face constant change, or else run the risk of getting left behind. Diamandis asserts that the world will see an increase in disruptive change through the interaction of exponential technologies in the coming years, and at the company level (or perhaps institutional level to educators) he states, "You either disrupt yourself, or someone else will" (2014). Educators often observe this in regard to the rapid introduction and proliferation of new technologies in schools and learning environments. Moreover, given time, there are also changes in faculty, staff, and management; changes in incoming students and their respective skills, dispositions, and needs; and constant changes in materials, tools, and other learning resources. In order to properly address these changes, environments and educators need to be able to adapt as they occur; and for them to be adaptable, they need to be flexible.

Learning Spaces, edited by Diana Oblinger (2006), contains 21 cases of learning environments at various higher education institutions. Flexibility (also expressed in terms of adaptability) features as one of the most repeated design considerations across these spaces. In real terms, a highly flexible environment needs to accommodate for changes in the number of

faculty, staff, and learners; or materials, tools, and technologies; or even spatial configuration and focus in order to better support learners. Moveable partitions in combination with moveable furniture would allow learners to adapt work spaces to be either more public or more private, as they see fit. It would have enough room to allow for reasonable reorientation and a variety of arrangements of furniture. There would likely be a variety of soft and hard-touch furniture, as well as a variety of work surfaces, including digital surfaces and monitors that can connect to a variety of devices via different connectors (i.e. for iPads and Macintosh computers) and ports (i.e. currently including at least VGA and HDMI connections, potentially DVI and Display Port connections, and soon potentially Thunderbolt connections). Other digital considerations also need to be taken into account too, such as ubiquitous access to stable Wi-Fi (or WLAN) coverage and potential Ethernet connections to give Internet access to a variety of users across platforms, which would prevent users from becoming figuratively tethered to some particular area. Such a SALL environment would be flexible in terms of access, too, remaining open for student use as long as realistically possible. It may have an experimental area that allows for new spaces to be trialed. Flexibility would also be built into the budget and staffing considerations, allowing for the reasonable opportunity to adjust to shifts in user needs and numbers.

Conclusion

The field of learning environment design offers valuable perspectives on ways to enhance learning in various spaces. While many considerations that pertain to learning in classrooms may also apply to SAL environments, there are also considerable and important differences between these two types of environments. SALL design in particular is an under-researched area of learning environment design, representing a uniquely rich and diverse context that would benefit from further and deeper inquiry. While grounded design in classroom-based instructional design often focuses on one particular learning paradigm for an environment, the diversity of learning processes at play in learning and language development in SALL environments affirms the necessity for an eclectic approach to SALL design, informed by a number of learning paradigms and disparate but relevant fields. Advances in cognitive neuroscience in recent years have helped bolster the brain-based learning movement and clarify brain-friendly pedagogic implications to augment learning, making learning more efficient and more effective. Many of these implications in fact validate a variety of learning paradigms in different ways, further supporting

the argument for informed eclecticism in SALL environments. Example design considerations informed by a variety of fields and distilled into principles include orientations toward positive eliciting emotional response, low-stress and safe places, social interaction, comfort, accessibility, and flexibility. While these represent only a small number of possible informed design principles, the field of SALL environment design warrants further attention and can potentially benefit from wide variety of relevant fields.

Notes on the Contributor

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