Shaping the Futures of Learning in the Digital Age

The STAC Model: Rethinking the Basic Functionality of Informal Learning Spaces

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Abstract: Productive "Third Spaces" are often an afterthought when designing learning environments, both in a physical sense and online. These areas, properly mediated by technology and designed around humans, can often be a key facilitator for student success. The STAC Model is designed to provide a framework for understanding what makes these spaces successful in capturing and retaining students who would otherwise leave the learning environment at the first opportunity. STAC stands for "Stickiness, Toolsets, Adjacencies, and Community" and is an order of priority system for prioritizing design and technological elements within any space. This article describes the rationale behind the model and how it can be applied in both physical and online environments.

The STAC Model: Rethinking the Basic Functionality of Informal Learning Spaces

Every environment tells a story to its inhabitants. The story can be one of control or one of empowerment. While both physical and online spaces are sometimes radically adapted to the needs of their human inhabitants, their design sets a tone for the kinds of activity that can occur in them. In a controlled classroom environment, a dynamic teacher can overcome some of the limitations of the instructional space (although arguably he or she shouldn't have to). In informal environments this is not really possible. Students will walk with their feet if the space doesn't meet their needs. Informal spaces are where students see learning happening. Better students model behavior to students who aren't used to self-directed learning and behavior as well as culture shift productively.

Informal spaces are an intersectional "third space" between students' home/social lives and their academic lives. As such, they form critical connective tissue between the more focused learning environments they experience in the classroom and a tendency to leave school behind when they leave the learning environment. These "hybrid" environments facilitate the creation of communities of practice among the students. As Muller and Druin pointed out:

> in such a hybrid space, enhanced knowledge exchange is possible, precisely because of those questions, challenges, reinterpretations, and renegotiations. These dialogues across differences and—more importantly—*within differences* are stronger when engaged in by groups, emphasizing not only a shift from assumptions to reflections, but also from individuals to collectives. (Muller & Druin, 2003, p. 1063, emphasis in original)

Frans Johansson makes a similar point in *The Medici Effect* when he argues that innovation occurs in the intersections (Johansson, 2003). In other words, spaces "in between" are critical to growth and learning. The trick is keeping students in these in-between spaces long enough for groups to form.

If designed properly, a student-centric, empowered learning space can become a critical tool for facilitating learning throughout the college, school, or online program. Jean Lave and Etienne Wenger wrote in their classic *Situated Learning*, "learning is an integral and inseparable aspect of social practice" (Etienne and Wenger, 1991, p. 31). All spaces in an environment need to facilitate this social practice of learning, but none more so than informal spaces as, in addition to the learning imperative, their very use is predicated on social norms. In an era when online learning has become such an important modality, informal spaces have become even more critical to success. For hybrid students a well-designed campus space can provide a critical learning anchor for their online activity. Taking this to another level, the creation of wholly online, student-informal environments could help bridge the engagement gap that is a serious impediment to effective online learning.

At the beginnings of online learning, Diana Laurillard engaged in a deconstruction of teaching and learning in an attempt to construct technological environments that would augment teaching and learning. Obviously, online environments are technological environments, but properly designed physical environments are also interfaces with technology and should follow the same principles. All should be "productive" environments, which Laurillard describes as including "microworlds, productive tools, and modelling environments" in which the learner can "build something," "engage with the subject," and "learn how to represent these relationships in some general formalism" (Laurillard, 2003, p. 171). All informal learning environments, both online and in person, should aspire to be productive environments. Students will be drawn to such environments, and they will form a critical backbone to their educational journeys.

Environments designed in this way have the potential to transform a billboard of information into a community of learning.

Informal spaces should therefore be viewed as a set of learning tools. Tools must be driven by their purpose and in this case the purposes are threefold (in order of priority): 1) Keep students engaged and coming back to the space; 2) Provide modes of communication and interaction; and 3) Expose students to a wider community of learning and opportunities. The STAC Model is designed to prioritize these three kinds of "productive" engagement and align college services to support them. The four elements of the STAC model are, *Stickiness, Toolsets, Adjacencies, and Community Engagement*. Together, they are designed to create an environment that keeps students in the space and interacting with other students while exposing them to new opportunities and resources designed to elicit curiosity and creativity.

The Holy Grail of informal learning spaces is the achievement of true peer-learning environments. There is ample evidence to indicate that if you can get the students to pull together toward their learning goals, then outcomes will dramatically improve. Residential campuses have a distinct advantage in this area because the number of opportunities for social interaction on campus grows exponentially when students also live there. Conversely, nonresidential campuses often struggle with student interaction and, ironically, community-building, because students tend to "visit" campus and then return to their "real" lives. Online "campuses" face perhaps the greatest challenges in this area because of the interface between instruction, the design of their technology, and the remoteness of the student experience.

Anything that keeps students interacting with peers longer has been shown to improve learning outcomes. As Alexander Astin wrote over a quarter century ago:

> The single most powerful source of influence on the undergraduate student's academic and personal development is the peer group. In particular, we found that the amount of interaction among peers has far-reaching effects on nearly all areas of student learning and development. (Astin, 1993, p. 7)

David Zandvliet notes, "[a] review of the eco-psychological literature similarly reveals a focus on interpersonal and community factors that reflect value, fairness, respect, and collaboration. This emphasis indicates the importance of community for environmental learning at both the micro and macro levels" (Zandvliet, 2012, p. 127). The design and integration of informal spaces into the overall learning mission of the institution is therefore critical.

The first level of the STAC model is designed to support student-centric needs *now* and is driven by the need to facilitate productive peer interaction. The key to this level is the development of community. As Lave and Wenger point out, "[t]he idea of identity/membership is strongly tied to a conception of motivation. If the person is both member of a community and agent of activity, the concept of the person closely links meaning and action in the world" (Lave and Wenger, 1991, p. 122). Most undergraduates—particularly those challenged by the new experience of college—struggle with the concept that they have some power over their own learning journeys. An effective learning environment can provide a key bridge to *linking meaning and action in the world*. The second level of the STAC Model represents the supporting elements that the college provides to expose students to *new* opportunities and support. However, if the needs of the first level are compromised by the second, the overall effectiveness of the space will be substantially undermined. If students find the spaces to be unreliable places to gather and are robbed of agency in the process, they are far less likely to stick in them.
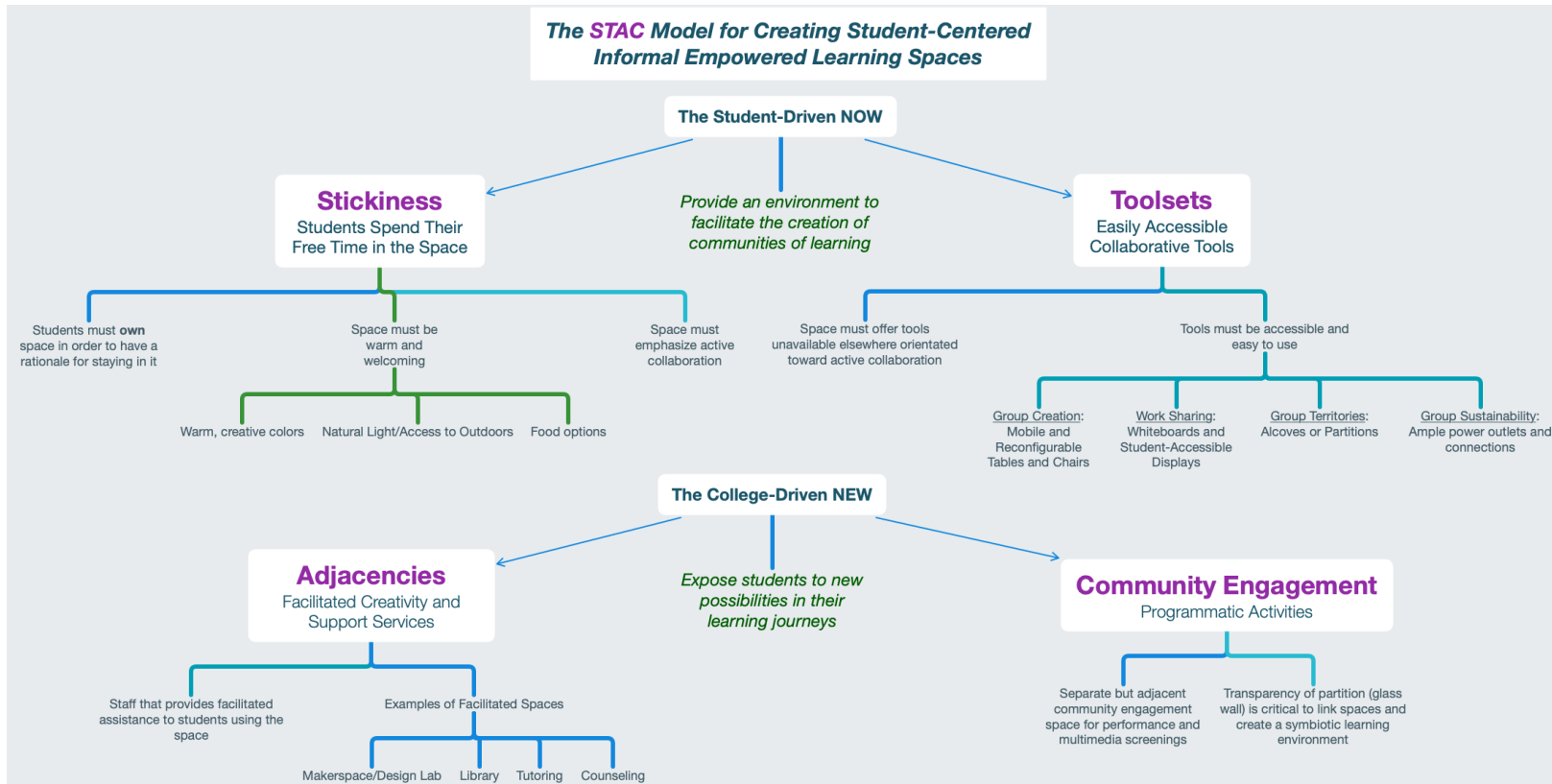
The STAC Model for Creating Student-Centered Informal Empowered Learning Spaces

The Student-Driven NOW

Stickiness
Students Spend Their Free Time in the Space

Provide an environment to facilitate the creation of communities of learning

Toolsets
Easily Accessible Collaborative Tools

Students must **own** space in order to have a rationale for staying in it

Space must be warm and welcoming

Space must emphasize active collaboration

Space must offer tools unavailable elsewhere orientated toward active collaboration

Tools must be accessible and easy to use

Warm, creative colors   Natural Light/Access to Outdoors   Food options

Group Creation: Mobile and Reconfigurable Tables and Chairs

Work Sharing: Whiteboards and Student-Accessible Displays

Group Territories: Alcoves or Partitions

Group Sustainability: Ample power outlets and connections

The College-Driven NEW

Adjacencies
Facilitated Creativity and Support Services

Expose students to new possibilities in their learning journeys

Community Engagement
Programmatic Activities

Staff that provides facilitated assistance to students using the space

Examples of Facilitated Spaces

Separate but adjacent community engagement space for performance and multimedia screenings

Transparency of partition (glass wall) is critical to link spaces and create a symbiotic learning environment

Makerspace/Design Lab   Library   Tutoring   Counseling

Figure 1. The STAC Model for Physical Spaces. © 2019 Author

Designing Physical Spaces Using the STAC Model

Level 1 – The Student-Driven NOW

The fundamental rule of productive spaces is that they need to provide an environment that is driven by the students first and foremost. If the students are deprived of agency, they are unlikely to persist in the space, and/or they may find alternatives at the first possible opportunity. The two basic levels of the STAC model are therefore fundamental to the success of any productive space because they provide a rationale for being in the space in the first place and, more importantly, a rationale for coming into the space and returning to it whenever possible. Without these preconditions, any activities related to the second level will have to first overcome the burden of creating an audience before anything programmatically new can even begin. These are not facilitated spaces; they are facilitating spaces. The second-level spaces are where the facilitation occurs. While having a complete suite of services available to students is the ideal circumstance, if first-level criteria are met, the space will still be productive. The inverse is not true. Consequently, second-level activities cannot be allowed to impinge on first-level functions at the risk of ruining the student-centric logic of the space.

Stickiness: The space needs to provide an environment that is welcoming to students and provides a rationale for them to stay on campus to work and interact with peers. The critical aspect of this is that the students—within the bounds of reasonable safety and maintenance considerations—should be able to reside in and reconfigure the space to meet their immediate needs. The space should also accommodate longer-term occupancy and provide food services where appropriate. Finally, the décor should reflect these priorities. The best way to get students to congregate is to give this space a "clubhouse" feel where they know they can establish and sustain their communities of practice.

Toolsets: The space needs to include easily accessible collaborative tools. These fall into four functional categories:

1) **Group Creation –** Furniture must be mobile and reconfigurable to support a range of group sizes up to 10 people. Tables and chairs on casters that can be easily combined to create larger group sets are essential here. Round tables are generally to be avoided because they dictate the size of the group.

2) **Work Sharing –** Whiteboards and student-accessible displays are critical to group functionality. These should also be as mobile as possible throughout the space in order to support different group locations. These tools should also provide a linkage to digital tools such as concept mapping and file repositories.

3) **Group Territories –** Groups need to be able to establish temporary territories where they can segregate themselves from other groups. There are at least two ways to accomplish this. First, mobile partitions (which could also be writable surfaces such as whiteboards) should be provided. A second option is to build alcoves into the space where groups can congregate. The second solution is a bit more inflexible and uses up edge space which might be better used to support *adjacencies* (see below).

4) **Group Sustainability –** There should be ample power outlets and other relevant connections so that group cohesion is not dictated by battery life. Ubiquitous Wi-Fi is assumed to be a part of the space as well to support access to online resources.

Level 2 – The College-Driven NEW

The second-level functions of these spaces are where the institution can make an impact with its own agency. Part of college is exposing students to people and experiences that enrich

their skills or views of the world. That is fundamentally what level-two spaces are about. More importantly than the spaces themselves, however, is the people that inhabit those spaces. Some of these are regular staff who can expose students to new ways of learning or entirely new disciplines. These spaces can also act as a conduit to the larger community outside the institution. Using technology, these experiences can even be geographically unbound, such as bringing in a remote speaker or facilitator via videoconferencing technology.

Adjacencies: Services that support student activity should be located *adjacent* to the space and not in the space itself. These are staffed areas that may have more limited hours than the main space. These spaces provide specialized capabilities and, more importantly, have support staff who can assist students in exploring new things. Transparency is key to linking these spaces to the central hub of informal learning. Some examples of adjacencies are:

1) **Design Lab (Makerspace) –** Making and design are increasingly important skills in a world that we can increasingly shape to our needs. Students need to learn the theory and practice of making throughout their academic careers. The Design Lab is an accessible space for creating physical products that can range from 3D printing to vinyl cutting to laser cutting. This should be a low barrier-to-entry space that hosts periodic workshops on a variety of topics to include both student requests and staff initiatives.

2) **Library –** Information and media creation services are another critical skill modality for the 21st century. More than ever our students need support navigating and creating media. The library is the logical place for this to occur as librarians have always been stewards of information. Its role is to provide information support to the space as well as tools associated with a Digital Media Commons to complement the activities of the Design Lab in the creation of digital products, such as videos, websites, etc.

3) **Tutoring –** A series of small rooms should be provided for tutoring support for students. These rooms can be shared with the main space or the library for quiet study or small group work when they are not staffed by tutors.

4) **Counseling –** Many students require emotional support and guidance during their educational journeys. Having access to advisors and counselors can meet critical needs that can often determine success or failure in school.

Community Engagement: This is a key intersectional space that can be used to provide a venue for speakers, films, and other kinds of events. In addition to internal initiatives, it should also be used as a key linkage to the outside community in order to expose students to the life of the wider communities in which the school resides (geographical, academic, professional, etc.). Like adjacencies, transparency should be provided to the greatest extent possible so that the space can be visible from the main space without competing with it acoustically. This space should be configured as a theater-like area with reconfigurable seating, a large display or projector, and some sort of podium or stage for speakers. It should be acoustically insulated from the larger main collaboration area.

Designing Online Spaces Using the STAC Model

The same basic principles used in designing physical spaces can be applied to online environments. Students studying in online environments need third spaces as much as, if not more than, traditional students. This is because the transition space between "home" and
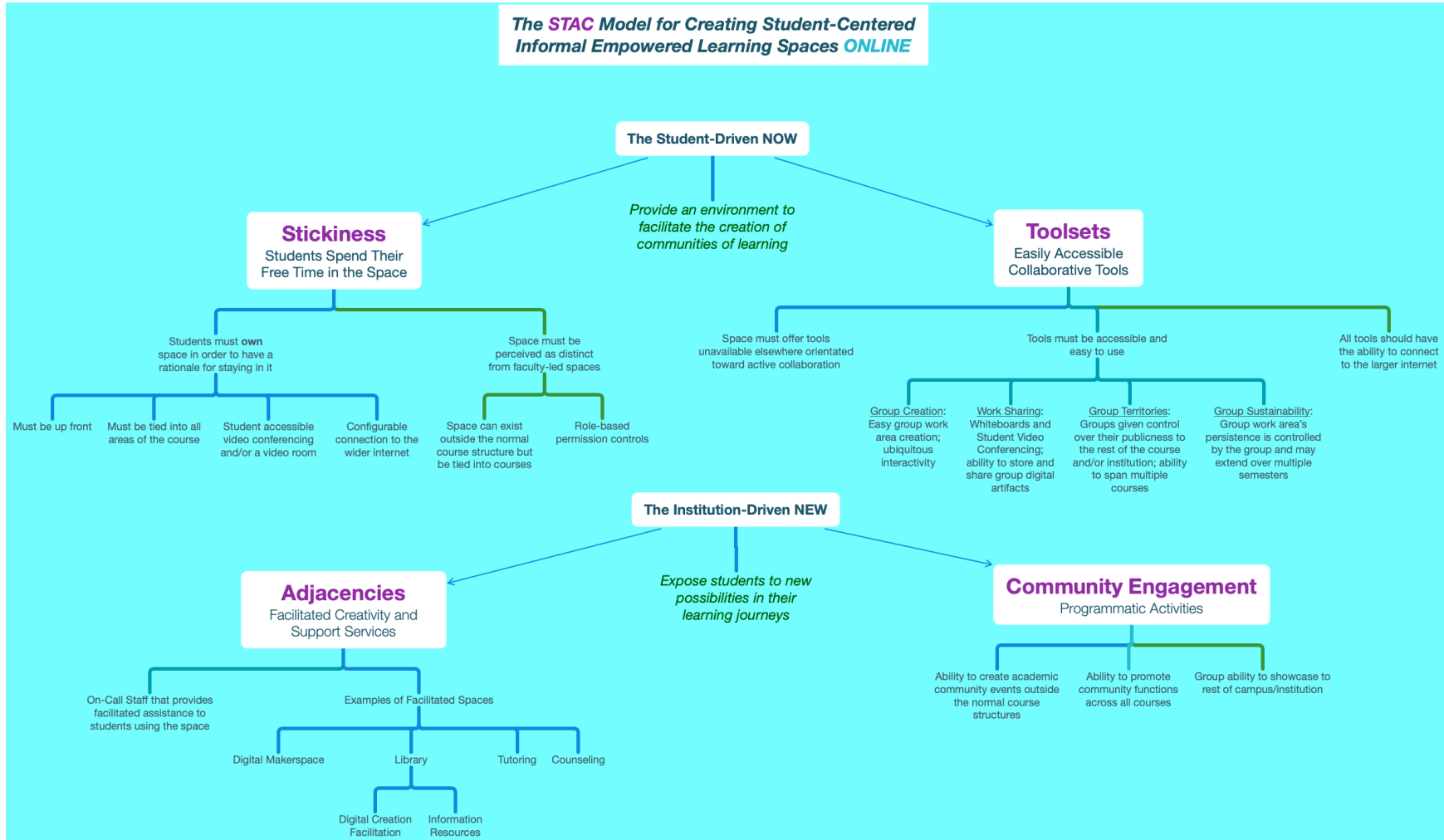
Figure 2. The STAC Model for Online Spaces. © 2019 Author

"school" is in many instances even more abrupt and porous. There is little incentive for students to spend more than the minimum time necessary in learning environments when they are literally sitting in their home environments in many instances. However, as was noted in the introduction to this article, it is critical for their success that they spend as much time interacting with virtual learning environments as possible. This will simply not happen without a "sticky" informal environment that exists between and above the formal environments represented by the "classroom" spaces.

The STAC Model avoids the McLuhanesque mistake that characterizes many online environments by focusing on the underlying *purposes* of any space instead of simply replicating functionalities that might work in a physical environment into a virtual one. Effective learning is universal. Its modalities aren't. If you understand *why* you are designing a space the way that you are, it is possible to create new kinds of online spaces and identify areas of opportunity that augment the human capacity for learning using the tools made available by the disconnection from space and time that online networks offer us.

Level 1 – The Student-Driven NOW

Students have often been viewed with a level of suspicion in online spaces. There seems to be far more discussion of controlling the environment because of fears such as cheating or electronic vandalism than there is of student agency in online environments. It's no accident, therefore, that students often perceive their learning environments as being uninviting places to spend their hours online. The logic for level-one spaces remains the same in an online environment even as its realization becomes even more challenging. If we don't want students to log on, go to their class spaces, and do the minimum necessary before logging off, then consideration must be given to designing student-centric spaces that are at least partially under student control.

Stickiness: To the extent possible students must feel that they have ownership and control over their online congregation spaces.
1) Sticky spaces need to be very obviously accessible throughout any course as this environment will be unexpected to most students.
2) On-demand videoconferencing or other interactive modalities (think *Fortnite* without the shooting) can be used to facilitate a club-like atmosphere.
3) These spaces must have the capability to seamlessly integrate with their existing modes of online social interaction such as Twitter, Instagram, or messaging.

Toolsets: The environment needs to include easily accessible collaborative tools. These fall into four categories:
1) **Group Creation –** Group spaces must be easy to form from a wide variety of areas in the online environment.
2) **Work Sharing –** Groups should have access to a range of shared interactive tools such as digital whiteboards, concept mapping, and student videoconferencing on demand, in addition to a mechanism for storing and sharing files.
3) **Group Territories –** Groups need to be able to define their digital territories. This means that they need to be able to control the publicness of their group activities from the rest of the institution (subject to administrator override). Group spaces should also have the capacity to span multiple courses and even be disconnected from any online course registration at all.

4) **Group Sustainability –** Groups should also be able to control the persistence of their online spaces, extending even beyond the bounds of a given semester or even graduation. While limits will probably need to be placed on this capability there is benefit in extending learning beyond the traditional boundaries of classroom instruction and even to bringing in non-student members such as community members and mentors.

Level 2 – The Institution-Driven NEW

The online environment provides interesting and—for the most part—unexplored possibilities for experience and support facilitation. With the right tools, staff and faculty could fairly easily devise online experiences for students divorced from the need for a physical infrastructure. Online tutoring and counseling are perhaps the most developed in this area, but other environments have real potential to transform the online student experience.

Adjacencies: Services need to be packaged with the student experience. The key distinguishing factor of these elements is that they are staffed (and consequently may have more limited hours than other spaces within the LMS). These spaces need to be accessible from anywhere within the LMS environment and to be readily apparent to student users to be effective.

1) **Digital Makerspace –** As in the physical environment, the core of this experience needs to be centered around making and design. There are a number of interesting virtual possibilities that might support these modalities. Perhaps this could be a hackerspace with digital programming tools that allow students to build coded creations rather than physical artifacts. Another possible model for this would be to create an online design studio with remote 3D printing where students could go into a lab and pick up their products at their convenience. In either case, the staff should be well-versed in the design process and should offer periodic workshops in design and prototyping as they would in a physical space.

2) **Library –** In many ways the online library resembles the physical space more closely than most other environments. This is not surprising in that media has become increasingly disconnected from its physical manifestations. Library staff should provide information support via videoconferencing to the environment. Media tools associated with a Digital Media Commons can complement the activities of the Digital Makerspace in the creation of digital products such as videos, websites, and others. The staff would give periodic synchronous and asynchronous workshops on strategies for effective research and communication.

3) **Tutoring –** Online tutoring services are a critical part of the support package. Synchronous and asynchronous modes should both be supported in this area. This would also be a logical place for workshops on student success strategies.

4) **Counseling –** In a physical environment, it makes sense to place counseling services (ADA, course planning, and psychological) in a separate area, but online there is a logic to proximity because students are more likely to struggle in finding these kinds of resources, and privacy is defined much differently if physical proximity is a nonissue. As such, counseling and related student services need to be digitally "adjacent" to all areas of the online learning environment in order for them to be apparent to the student users.

Community Engagement: All of these online environments need to have a built-in tool to create online events where speakers and other events can be broadcast to the larger community rather than within the "walls" of a single course. These tools must be easily accessible and ubiquitous to administrators and faculty wishing to reach out to the larger community. This is actually easier in an online environment as speakers can be remote and the usual physical limitations of room size can be eliminated altogether (although organizers should still have the ability to manage group sizes for interactive reasons).

Designing Environments that Create Community

By drilling down to the basic principles of what the environment is intended to provide, we can establish a set of priorities centered on student empowerment and engagement. At a minimum, any effective informal space must cover the individual needs of students in the STAC Model (stickiness and toolsets) to create an environment where students will willingly congregate. Most of the cost and complexity of this space is associated with institutional-level learning support activities (adjacencies and community engagement).

Finally, and most importantly, STAC must form the basis for the management of the environments, both online and in person. Environments can facilitate desired activities. They do not in themselves create those activities. They must be managed according to the priorities of the STAC Model, giving student empowerment and access to tools priority over all other activities in the environment. Informal spaces are, by their very nature, fragile environments, often occupied by students who are unsure of how to make maximum use of them. Attempts to control these spaces can easily disrupt these tentative explorations of what it means to be a lifelong learner and diminish the overall dynamic of the campus or online platform as an effective learning environment. That is not the story we want our learning spaces to tell.

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