Going Beyond Trees and Rhizomes: How Biomimicry Can Inform Collaborative and Multi-Disciplinary Learning in the Digital Age

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Design   Collaboration   Education   Teaching   Higher Education   Diversity   Learning

Feminist Pedagogies   Teachers   multi-disciplinary

Bringing together multi-disciplinary teaching approaches emphasizes that there are more similarities than differences across disciplines and that intertwining these different pedagogies creates more fruitful learning environments. This chapter considers botany and critical feminist pedagogies as a source of collaboration to highlight—just as in nature—that growth does not occur without diversity and therefore the design of educational practices should not be mono-cultural. Allowing for space to question institutionalized learning structures by considering botanical structures, multi-disciplinary learning can carve new spaces for collaboration, both physically and digitally, and can inform how teachers create more sustainable, adaptable, and restorative learning practices for students. This chapter explores different kinds of conceptual models that can be used to inform multi-disciplinary approaches to learning in the digital age and as a result encourage cooperation, collaboration, and diversity in the higher education.

> *What if you were a teacher but had no voice to speak your knowledge? What if you had no language at all and yet there was something you needed to say? Wouldn't you dance it? Wouldn't you act it out? Wouldn't your every movement tell the story? In time you would become so eloquent that just to gaze upon you would reveal it all. And so it is with these silent green lives.*

> *- Robin Wall Kimmerer, Braiding Sweetgrass.*

In botany, any species of plant that is crossbred from two genetically different varieties is a hybrid. In many cases, the collaborative genes of the parent varieties come together and produce a more sustainable and resilient plant by a process known as *hybrid vigor*. Hybridity, as a theoretical concept, is used across many higher education paradigms. Additionally, hybridity as an abstract metaphor has been used, both successfully and unsuccessfully, in archaeology and anthropology to discuss cultural changes (Stress, 1999). When it comes to processes of learning, hybridity can function as both a fluid theoretical and methodological concept. For example, similar to Gilles Deleuze and Félix Guattari's (1980) concept of rhizomatic thinking to make sense of knowledge, rhizomatic learning takes the botanical structure of the rhizome as a metaphor for the complex and messy ways people learn (Cormier, 2012). Rhizomatic learning relies on patterns and structures of botanical hybrids as a form of collaboration to inform how teachers create more sustainable, regenerative, and restorative learning practices for students. For the purposes of this chapter and inspired by bell hooks'

critical pedagogy, I will explore how other botanical structures can inform multi-disciplinary approaches to learning in an increasingly digital format and, as a result, encourage cooperation, collaboration, innovation, and diversity in higher education. This mutually symbiotic collaboration will be discussed using Robin Wall Kimmerer's description of the indigenous planning technique known as The Three Sisters as a conceptual framework.

Context

My interest in multi-disciplinary learning kept me on the outside of the higher education institution for many years. I tried and failed many times to follow a traditional academic path. Although I was interested and dedicated to research and academia, I felt limited by traditional forms of learning that reinforced linear ways of thinking. This type of exclusionary approach is rampant in higher education contexts as departments often prioritize the replication of homogeneous research and struggle to embrace new technological forms of teaching as pedagogies become more digital. The higher education classroom felt claustrophobic at a time when the global community was becoming more accessible because of technological innovations increasing connections with people and things that once required years of field research and expensive grants to foster.

I learned quickly that my approach to learning was anything but conventional and I became estranged from the formal education system after my Master's degree. I felt alienated from my subject and ultimately left academia for the professional world. Once outside the academic institutional walls, I discovered the potential that multi-disciplinary learning provides. For me, the process of weaving together academic disciplines, like art history and anthropology, with practical experiences, like cultural economics and commerce, elucidated how complementary avenues pushed me to further investigate a topic.

I returned to academia in 2019. Bridging these seemingly separate paradigms made me a stronger student, researcher, and teacher. I believe incorporating this way of learning from the beginning of a student's higher education will produce a more sustainable career and a more supportive and inclusive approach to pedagogy. While I am at the beginning of my own teaching career, I simultaneously remain closely connected to my own student experience (or my own "autobiographical experience" as suggested by Brookfield, 1998) as well as the context through which I built my non-academic career. This intersection allows space for a more critical and reflexive perspective on how to shift pedagogy to meet the needs of a post-pandemic world and navigate the possibilities brewing in the digital age (McLean, 2020). The ways in which we learn are constantly changing. Technology shifts and innovations question traditional modes of academic research and delivery (Santos et al., 2016). To explore this further, I turn to biomimicry to inform multi-disciplinary collaborative approaches to higher education pedagogies by looking at botanical structures as a model for learning (Stevens et al., 2020).

Hybridity

Teaching new ideas and approaches to others is not an automatic process. Teaching requires both creativity, ingenuity, and confidence of the subject from the teacher as well as some level of interest and attention from the learner (Freiman, 2021). It is a collaboration grounded in reciprocity - a hybrid. Multi-disciplinary learning moves away from a traditional linear learning monoculture towards the creation of multi-disciplinary spaces— both physically and digitally— where different perspectives can be interacted with and considered. As these individualized approaches to learning coalesce, they ultimately create something stronger - hybridity.

As Deleuze and Guattari explore in their book *A Thousand Plateaus: Capitalism and Schizophrenia* (1980), making sense of knowledge is messy and more akin to a root system of a plant that spreads out in multiple directions through self-replication (Deleuze and Guattari 2017). Deleuze and Guattari use biomimicry as a metaphor to inform learning and teaching practices that question established power structures. Teresa Castro (2019) also uses plants as metaphor to suggest alternative and counter-hegemonic ways of thinking about the world. But in *The Mediated Plant*, (2019) Castro departs from Deleuze and Guattari, arguing that plants are non-hierarchical.

The relationship between a tree and a rhizome is mutually beneficial through symbiosis. Castro's approach is more helpful when thinking about learning in higher education precisely because it creates space for multi-disciplinary, holistic, and collaborative ways of developing skills. Similarly, the root system of plants are actually highly individualized, each branch exploring its own autonomy to increase its own growth. But most importantly, individual plants and root systems can't flourish without the whole (Kimmerer 2013). It is the encounter, according to Castro (2019), between entities—roots, teachers, students, disciplines, technologies etc.—that can help us radically rethink higher education pedagogy.

Technology changed how we think about plants and forms other than humans in the biological world. This realization pushed western science towards fields already explored through Indigenous knowledges for centuries (Castro, 2019). Technology can also be harnessed to transform higher education teaching as long as we allow such innovations to help develop our teaching and shift our understanding of our own fields while encouraging students to question and critique the field. Like Robin Wall Kimmerer's quote at the beginning of the chapter, what would you do if you couldn't lecture or teach according to western linear curriculums? You would probably turn to other modes of knowledge production and dissemination to chart new ways of teaching. We need to reimagine what it means to teach in the digital age where technology and other man-made catastrophes shift our ways of learning and developing careers. We need to push the ways we conceive pedagogy and create learning spaces—in person and virtual—that are truly inclusive and holistic. Disciplines are no longer isolated from one another and teaching shouldn't progress as if they were.

Moving beyond the hierarchical and linear focus of the traditional classroom to one that integrates multiple avenues and diversions from both inside and outside the classroom has the potential to expand ways of learning. For example, hybrid learning methods have become a valuable tool for teaching at the height of the Covid-19 pandemic as schools and higher education institutions navigate new definitions of what and where the "classroom" is. While the mixture of in-person and online learning spaces can be tenuous, it has also opened up connections and opportunities for collaboration between students, professors, and institutions in different geographical locations that were independent of one another only a short while ago. Connections between scholars in the Global North and the Global South could drastically change how local histories are perceived, taught, and explored, returning long overdue agency to non-western approaches to academic research, writing, and teaching.

Ultimately, multi-disciplinary learning allows students to develop deeper critical thinking skills as they engage with different theoretical, logical, and methodological approaches. But, these essential components of learning processes are constantly changing. The influx of new research and technological means of engaging with materials has altered the landscape of higher education. For example, the need for a physical library space becomes exclusionary when access to primary source materials is accessible and de-hierarchized with an internet connection. Similar to the research process itself (Mackness & Bell, 2015), teaching must resist the hegemonic dominance of thought processes. Teaching must constantly question, re-examine, and explore new possibilities (hooks, 2000) that align with contemporary situations. If done with consideration to the body of persons involved, hybrid learning environments can reward cooperation and diversity and push such ideas even further.

The Three Sisters

Botanist Robin Wall Kimmerer in *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants* (2013) explores the ways the natural world and Indigenous knowledge can function as tools to illustrate the concept of reciprocity in human relationships. These lessons are also applicable to ways of learning. Kimmerer (2013) states "Plants tell their stories not by what they say, but by what they do" emphasizing the importance of learning about things in different ways by teaching through different lenses (p. 86). Botanical models are socially constructed. The hybrid plant is dependent upon the interaction of parent varieties. The resulting hybrid is constructed through the different biological pathways, or lenses, of the parent. In the learning space, this can be as simple as connecting knowledges learned in class to overall life experiences (hooks, 1994). By providing context through our own career experience, we can encourage students to think about how these knowledges may already be in practice and support their own expression moving forward.

But multi-disciplinary learning suggests multiple different logical and methodical approaches. How can we move beyond a dual-hybrid approach towards a multi-hybrid approach to learning? If we are looking at other examples from the plant world and from Indigenous cultures as Kimmerer suggests, we can look to her chapter titled "The Three Sisters" (Kimmerer, 2013). Kimmerer uses the tale of the *Three Sisters* (Figure 1)—corn, beans, and squash grown in that order—to show how these three crops planted in the same garden not only protect one another but enhance each other. Each plant is made stronger through the interaction with the other. In both the online and on-campus classroom, we can view multi-disciplinary learning in the same way.
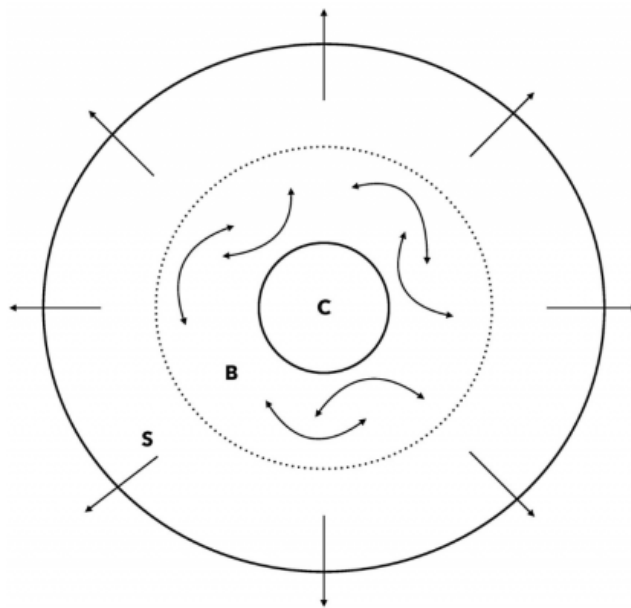
Figure 1

The Three Sisters

This figure demonstrates the individual crops of the Three Sisters. They are corn, beans, and squash, grown together in that order. This rendering shows how the three individual plants grow together in one crop. Drawing by author.

Corn. *Corn (Figure 2) is the first crop because it grows tall and fast creating a strong foundation for its sisters (Kimmerer, 2013). The corn of learning is the specific discipline, department, and field that initially piques the student's interest and brings them into the higher education classroom. Corn creates the template for everyone to follow. The students in my first year BA module this year were in the classroom to learn about History of Art, some for the purpose of wanting to build a career in the arts and others because they love the subject. Corn is a trajectory, a constant that learning revolves around and returns to in order to situate the learning experience and from which we can enhance our own excitement and understanding of the academic material (hooks, 1994).*

Figure 2

Three Sisters as Pedagogy

This figure demonstrates how we can use the metaphor of the Three Sisters to inform multi-disciplinary learning in the higher education classroom.

Learning is not only about memorizing foundational material. Learning is also about how to apply diverse fields in real life and cultivate a visual idea of what research, a career, or even life could look like (Cormier, 2012). For me, this method of learning only happened once I was out of the institutional space and working in the art world. I saw the value of incorporating other disciplines and the importance of building knowledge from different avenues to animate the learning process. In many instances, however, the promise of what comes next is contradictory to how higher education is taught. There is an emphasis on constantly looking back to the foundations of a discipline as immutable, rather than cultivating the growth of something new. This encourages the view that excitement is disruptive to the seriousness deemed essential to learning in a traditional classroom (hooks, 1994).

Beans. Excitement, the beans of learning (Figure 2), is what makes students passionate about learning; it is vital to the learning experience. Only a handful of teachers throughout my educational career seemed to care about what got students excited about learning. In many ways, this is a result from the traditional classroom model that focuses more on learning as memorization rather than critical thinking. Critical thinking for me didn't happen sitting in a lecture hall trying to understand Michel Foucault, it was about the experiences I had outside of the classroom that put the theory and methodology to work. Excitement in learning must originate from the teacher but also be reflected back by the student. When discussing Foucault in one class, I was anything but excited and so I found a way to make the topic more approachable. During the seminars, I incorporated more visual material to help move the discussion along and pique students' interest in actually learning how to navigate this difficult topic. I incorporated contemporary digital media that referenced Foucauldian thought for the students to reference. I allowed the students to question the validity of using a controversial figure like Foucault as a methodological foundation for History of Art. This resulted in a lively discussion that moved beyond Foucault and gave the students better tools through which to critique his work. This would have not been possible without excitement.

Bean stalks are flexible yet adaptable as it snakes up and around the stalk of corn. The bean plant begins as a leaf but quickly changes its mind, transforming into a long vine (Kimmerer, 2013). The bean is how we navigate the disciplinary field. It is a metaphor for how we, as humans, use different means to process information. Adaptability is key. This could be as simple as incorporating unexpected visual material during a seminar to get otherwise reluctant students to engage with the material beyond the written page. Or it could be the transformation of the physical/digital space where learning happens. The beans of learning are meant to challenge existing knowledges, to question positionally, and transform dominant—and at times harmful—pedagogical claims (DiAngelo & Sensoy, 2009).

Squash. Squash (Figure 2) grows slowly. It is a late bloomer and grows close to the ground, its leaves providing shelter for the base of both corn and beans and the fertile topsoil (Kimmerer, 2013). It keeps water in and harmful weeds and pests out. Squash is a dual metaphor for multi-disciplinary learning. On the one hand, it provides a sense of grounded-ness by creating a safe space to encourage students to be active participants rather than passive consumers within learning frameworks (Freire, 1968). On the other, as the squash grows it moves away from the corn and the beans (Kimmerer, 2013) exploring different avenues that contribute to the strength of the whole. What can be learned by engaging with alternate fields of inquiry or incorporating web-based practical assignments to provide real-world examples of how the core discipline—the corn—operates.

This sharing of information is the squash of learning. It breaks through the perimeters that set academia apart from the rest of the world (Freire, 1968), encouraging bringing personal narratives and experiences into institutional spaces (hooks, 1994). This can be in the form of a practical experience shared, a case study, or a real-world example that helps students visualize and develop skills to analyze and "critically challenge mechanisms of ideological domination" (DiAngelo & Sensoy, 2009, p. 445). These external experiences are necessary to forge connections between students, professors, and institutions that never quite fit in traditional pedagogies. hooks describes the importance of an *Engaged Pedagogy* that not only allows us to teach and share information but also believe in the learning process as inclusive of sharing in both "intellectual and spiritual growth with our students" (hooks, 1994, p. 13). Pedagogical theories and methods as isolated ideas can be exclusionary and hierarchical. By bridging the gap between theory and practice to work in tandem, they can create a much stronger pedagogy that challenges and innovates the higher education classroom. It is the heart of multi-disciplinarity.

Conclusion

As a student, I was desperate to understand how what I was learning in the classroom could be put in context or connect with life experiences. Like corn, squash, and beans, bringing together different types of disciplines, spaces, and fields of thought make learning stronger because of the interactions with one another. Using the *Three Sisters* and collaborative multi-hybrid metaphors rooted in critical feminist pedagogies allows us to better analyze relations of knowledge production, challenge unequal power relations, and move learning beyond hierarchical structures of knowledge toward ones that are more equitable and fluid. By bringing together multi-disciplinary teaching approaches we realize that there are more similarities than differences across disciplines. By intertwining these different pedagogies, more fruitful and adaptable learning environments are created. Looking to botany as a source of collaboration we realize that nature doesn't exist without diversity and neither does learning. Therefore the design of educational practices and learning spaces should not be mono-cultural. We can improve student learning by incorporating and collaborating with different people, topics, departments, subjects, and technologies, benefiting from each other's perspectives to build a stronger crop of knowledge.

References

Brookfield, S. (1998). Critically Reflective Practice. *The Journal of Continuing Education in the Health Professions*, *18*, 197–205.

Castro, T. (2019). The Mediated Plant. *E-Flux Journal*, *102*. https://www.e-flux.com/journal/102/283819/the-mediated-plant/

Cormier, D. (2012). Embracing Uncertainty: Rhizomatic Learning. In *YouTube*. https:// www.youtube.com/watch?v=VJIWyiLyBpQ

Deleuze, G., & Guattari, F. (2017). *A Thousand Plateaus: Capitalism and Schizophrenia*. Bloomsbury. (Original work published 1980)

DiAngelo, R., & Sensoy, Ö. (2009). "We don't want your opinion": Knowledge Construction and the Discourse of Opinion in the Equity Classroom. *Equity & Excellence in Education*, *42*(4), 443–455. https://doi.org/10.1080/10665680903196354

Freire, P. (1970). *Pedagogy of the Oppressed*. Bloomsbury.

Frieman, C. J. (2021). *An Archaeology of Innovation: Approaching Social and Technological Change in Human Society*. Manchester University Press.

Hooks, B. (1994). *Teaching to transgress: Education as the Practice of Freedom*. Routledge.

Hooks, B. (2000). *Feminist Theory: From Margin to Center*. Pluto Press.

Hooks, B. (2003). *Teaching Community: A Pedagogy of Hope*. Routledge.

Kimmerer, R. W. (2013). *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants*. Milkweed Editions.

Mackness, J., & Bell, F. (2015). Rhizo14: A Rhizomatic Learning cMOOC in Sunlight and in Shade. *Open Praxis*, *7*(1). https://doi.org/10.5944/openpraxis.7.1.173

Mclean, J. (2020). *Changing digital geographies: Technologies, Environments and People*. Palgrave Macmillan.

Santos, S. B. D. L., Kupczynski, L., & Bain, S. F. (2016). The Lecture Method is D-E-A-D. *Focus on College, Universities, and Schools*, *10*(1), 1–7.

Stevens, L., De Vries, M. M. J., Bos, M. M. J. W., & Kopnina, H. (2019). Biomimicry Design Education Essentials. *Proceedings of the Design Society: International Conference on Engineering Design*, *1*(1), 459–468. https://doi.org/10.1017/dsi.2019.49

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