Building a Culture to be Deliberately Innovative in Education

The Georgia Tech Commission on Creating the Next in Education (CNE) quickly realized that it would be a challenge to develop concrete ideas for a long horizon because of rapidly changing technology and the corresponding skills needed for the workforce. This realization came with an epiphany: rather than concentrate solely on ideas, the Commission would also consider ways to create a culture at Georgia Tech in which new educational ideas are encouraged and pathways exist to pilot ideas.

Community mindset, curricular structure, organizational structure, and administrative processes all work together to sustain an academic culture. Like other organizational cultures, an academic culture is composed of often unspoken and unwritten rules of working together in community. It reflects the underlying assumptions, values, beliefs, attitudes, and behaviors shared by a group of people. The question is: what features are desired in Georgia Tech’s academic culture so that the long-term recommendations of the Commission (or any future educational innovation within the Institute) will take root? Moreover, what steps can Georgia Tech take to move closer to that culture?

The Commission recommends using a systems approach to reshape educational innovation at Georgia Tech on the organizational level as well as at team and individual levels. Furthermore, the Commission recommends that Georgia Tech become a deliberately innovative organization in education, where programs and incentives are in place to encourage individuals to develop innovation skills in a supportive manner.

Innovative Organizations

Commonly noted characteristics of innovation organizations include a shared vision among all the stakeholders of the importance of innovation, a reward structure for creativity, an acceptance of experimenting and taking risks, a safe space where people can discuss ideas openly without fear of being belittled, and an infrastructure to support innovative ideas. Coupled with these features is agility, the ability for the organization to make changes quickly in response to external market trends or internal initiatives.

As an example, most research universities are structured in an innovative manner to bolster the pursuit of research. Faculty feel free to pursue different topics, even if they are risky in terms of the certainty of the outcome. There are few to no barriers for them to write research proposals or begin work on any given topic. Because faculty are agile, they can self-organize into effective teams, reach across disciplinary bounds, and respond quickly to new research opportunities and directions. They are acknowledged and rewarded for their innovation, and there is extensive infrastructure to support research activities.

By comparison, the academic side of a university tends to be less agile. Changing the status quo is difficult. Updating textbooks, courses, curricula, or policies requires consensus in large committees or across multiple committees. Educating students is a collaborative activity and requires written rules or a high level of trust in the idea that deviations will yield effective learning that corresponds to the credential earned.

The model of faculty governance over academics means that change is difficult, partly because there is a natural resistance to change in any culture. Even if faculty agree that a curriculum needs to change, a challenge exists to achieve consensus on what that change will be and ensure that sufficient human capital is available to execute the change. The goal is to make an academic organization more agile without detracting from the integrity of the academic mission.

The Commission recommends that Georgia Tech shift its academic structure and processes to align with those of being an innovative organization in education. One of the fundamental steps is to achieve shared visions, beliefs, and assumptions among the leaders of the units, the colleges, and the Institute at large. Currently, many of the unit leaders act locally in order to improve their respective units’ reputations or resources. There is very little, if any, incentive for a school’s chair to act in the interest of another school if that action does not directly benefit his or her own school, even if the end result would have a large, positive impact on Georgia Tech as a whole. A shared vision for Georgia Tech would require some alignment in the goals of these leaders as well as the goals of other stakeholders. Proper incentives should be developed to change behaviors through a reward structure that favors movement towards this desired vision.

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Faculty governance for academics adds an additional set of leaders and stakeholders, many of whom can have a great deal of power to encourage or discourage innovation. To move the faculty governance structure towards the model of being an innovative organization, faculty committee chairs could be gathered at the beginning of each academic year to discuss the campus vision, examine their committee charges, and gain instruction on ways to run meetings effectively, including ways to overcome the natural resistance to change without sacrificing the integrity of the academic process. Moreover, there needs to be some level of agreement within these committees on the amount of risk that is allowable for educational innovation, since risk-taking and experimentation are facets of innovative cultures.

The recommendation that Georgia Tech become a deliberately innovative organization builds upon the work by Kegan, Lahey, and their collaborators (Kegan et al. 2016), in which the development of individuals is a guiding principle. In particular, a cohort-based program should be created that develops innovation skills among the participants. This program should be built upon research in cognitive science and social psychology in order to help individuals identify a genuine demand. The program should also have a facilitated mechanism in which individuals in the cohort help each other create, evaluate, evolve, and pilot their own educational innovations in a developmental, rather than a competitive, manner.

Ten Commission members have already worked together as a cohort to develop and pilot such a program using Flashpoint methodologies developed within Georgia Tech’s Center for Startup Engineering (CSE) to help business entrepreneurs become more reliably and deliberately innovative. The results of the pilot program demonstrated that this approach shows tremendous potential for developing educational innovations. Read more in the CNE Report Supplement Formative Leadership (Flashpoint): One Georgia Tech-born Approach to Deliberately Innovative Education (Georgia Tech 2018a).

Another Commission recommendation is that organizational transformation and change management strategies be used to help adopt or spread innovation across the Institute. These strategies are plans and programs that are directed at easing the changes for the stakeholders and improving an innovation’s chances of success. If possible, innovation and change should be piloted in a realm that is not contentious so that creative ideas and experimentation are not inhibited.

As an example, alternative pathways, which are optional for both students and faculty, can be created to pilot an innovative method. Faculty who oppose the change can stick with the traditional approach, while faculty who are interested in changing are freer to explore more innovative solutions. Students can choose either pathway. If the innovation is well conceived and executed, then the demand for the piloted program will outpace that for the existing programs. Other change management strategies for deliberate diffusion of innovation are aimed at supporting stakeholders, such as faculty and students, by providing education, coaching, and resources throughout the transition.

There is a current provost-led Educational Innovation Ecosystem (EIE) at Georgia Tech that has had tremendous impact on the quality of teaching, the educational research, the STEM pipeline, and even on the level of intellectual discussions across campus regarding pedagogy. There are five Georgia Tech entities within this ecosystem: Center for Teaching and Learning (CTL), Center for the 21st Century Universities (C21U), Center for Engineering Integrating Science, Mathematics & Computing (CEISMC), Georgia Tech Professional Education (GTPE), and the Office of Information Technology (OIT).

CTL assists faculty and graduate students to develop better teaching methodologies and adopt evidence-based pedagogy through workshops, seminars, courses, cohort groups, and one-on-one interactions. C21U provides a living laboratory for scholarship in teaching and learning, in which educational researchers and instructional designers assist faculty to develop and pilot new innovations in education. CEISMC develops programs to promote and enhance K-12 STEM education. GTPE develops, delivers, and supports online education, flipped classroom instruction, and professional education workshops, seminars, and other outreach to industry and alumni. OIT supports the technological platforms used in education, such as the learning management system (Canvas) and campus web services.

The Commission recommends that the current EIE should evolve into a broader more coordinated ecosystem with a scope that ranges from concept to institutional implementation. This expanded ecosystem should continue to serve as a “sandbox”—a space to run educational experiments that range from new courses and course formats to new educational products. However, this new ecosystem would increase its collaborative interactions with other academic units and offices through new or stronger mechanisms and campus-wide incentives.

Such collaboration would help support the initiatives of the ecosystem, provide broad feedback on needs and improvements, and help spread successful pilots.
across campus. The new ecosystem should continue and even expand its efforts in outreach and development for foundation, industry, and research funding as well as seed funding for new ideas. The ecosystem should establish a structure that supports and encourages partnerships with different stakeholders (students, faculty, alumni, and industry) for creating innovative ideas.

A research mindset should be fused to educational innovation by encouraging curiosity and intellectual pursuits in education among a much larger and more diverse community of scholars than currently exists. A newly imagined ecosystem would include the following:

- An infrastructure (place and opportunity) that allows the community to gather regularly and hear thought-provoking seminars or have open-ended intellectual conversations that might stimulate truly novel ideas.

- An established network of educational scholars that are self-organized into agile innovation teams that address new opportunities in education and pivot the directions of their innovations based on their sandbox experiments.

- A physical space allocated for any faculty or student on campus to experiment with educational technology under guided support, such as what might be built as part of the Library Next initiative.

The overall support for the community of researchers and innovators that is currently supplied by CTL, C21U, CEISMC, GTPE, and OIT should be expanded and made more cohesive so that it forms a widespread and continuous spectrum of support such that support mechanisms become increasingly transparent to campus users. This indicates that the current ecosystem should expand to become more collaborative and coherent. New capabilities for the ecosystem would include a Flashpoint-style cohort-based innovation program as well as support for change management strategies used in transitioning successful pilots to a wider user base.

**Enhanced Teaming by Bridging Organizational Silos**

Teams made up of people with diverse backgrounds and perspectives can be a fruitful resource for forming new ideas. One example of this viewpoint, identified in IDEO’s Design Thinking approach (IDEO U, 2018), describes a fruitful area for innovation lies at the intersection of three attributes—desirability, feasibility, and viability—all of which can be mapped to different disciplines.

Desirability asks the questions “Why should we do this?” and “What do we need?” These human values are explored in the fields of liberal arts and design and can include societal, cultural, or ethical contexts. Feasibility asks the question “Can we do this?” and is addressed in the fields of science, engineering, and computing. Viability asks the questions “Does this have a chance of success?” and “Is it sustainable?” and is explored in the field of business.

A well-functioning multidisciplinary team that has coverage in all of these attributes can be highly effective in innovation. For optimal function at the intersection of these three attributes, individuals should have basic knowledge and skills in other disciplines, an appreciation of interdisciplinary work, and an ability to work in multidisciplinary teams.

Organizational silos are policies, procedures, or cultural limits that inhibit people of different groups from having free interaction. An academic example is disciplinary silos. In order to provide an academic culture in which both students and faculty can interoperate across disciplinary lines, the current disciplinary silos between schools and colleges at Georgia Tech must be bridged.

While some graduate-level interdisciplinary programs and undergraduate minors exist, Georgia Tech students often face long prerequisite chains and are commonly blocked from registering for a course by “major restrictions” built into the registration process. Courses that encourage teaming of students across multiple disciplines are rare. The challenges faced by graduate-level interdisciplinary programs include logistical problems involving admissions, teaching load, and student advisement.

Due to the current funding models for instruction, there is no easy mechanism for instructors to team-teach across disciplines, to teach courses in another discipline, or to teach “service” courses that are targeted to another discipline. Sometimes successful cross-listed courses (in terms of enrollment) are administratively challenged because neither unit wants the course to count towards the workload of the faculty member teaching (i.e., there is an attitude of “let the other school do it”).

To break down these academic silos, inroads must be made to allow students greater access to education outside of their primary disciplines and a larger number of faculty to teach across disciplinary lines.

The Commission recommends that new organizational and financial models that would help to break down the disciplinary silos be examined as viable options.
Institutional leadership should provide incentives rather than burdens for departmental faculty to teach non-departmental students. A recommended pilot would create an interdisciplinary department to serve as an umbrella unit for interdisciplinary programs.

This unit would allocate funds for teaching interdisciplinary courses and would facilitate graduate student admissions into interdisciplinary programs. Another approach could have units contribute funds toward a cross-unit pool for teaching efforts. This pool could be used for teaching courses in other units with high demand, cross-listed courses with a clear enrollment split, team-taught courses with faculty in multiple units, and commitments to initiatives like the Honors Program.

Breaking down stakeholder silos by encouraging partnerships in education will result in a more integrative culture for academic innovation. Currently, stakeholders in education generally have very distinct roles: faculty teach, students learn, and companies hire. Administrators, staff, and alumni have their own roles in the educational ecosystem. This silo-focused view seems to run contrary to the significance that is placed on teamwork and collaboration in education and in the workforce. This general model for classroom instruction and participatory education gives students greater say in the content and flow of a class while instructors take on more of a facilitator role to guide students through open-ended discovery.

Partnerships in education forged between students and teachers, teachers and industry, students and alumni, etc., can improve the overall educational experience while possibly decreasing the overwhelming amount of additional work placed on educators. For example, there are pockets on campus at Georgia Tech where students expand their roles beyond just learners to also become teachers and advisors through peer-to-peer mentoring, advising, and tutoring. Some departments hire students to develop resources for specific courses, and some faculty give students course credit for developing videos, for example, that demonstrate a difficult concept. Experiential learning outside of the classroom is a fertile ground for partnerships in education. For example, staff, students, and industry representatives frequently work together in maker spaces to run workshops to teach specific skills.

A more organized effort along these lines is the Vertically Integrated Projects (VIP) Program, in which groups of students work on design and research programs with a faculty advisor over the course of several semesters. There are four existing VIP teams that are devoted to developing new resources or methodologies for education: Hands-On Learning, Intelligent Tutoring, Data-Driven Education, and the Georgia Tech Mobile STEM Lab.

An example of a pilot program using this approach would be the extension of the VIP Program to high-school-level teams. The Commission’s student shadow group suggested this idea as a way for Georgia Tech students to expand the benefits of the VIP Program to pre-college. These students are excited about the prospect of being partners in developing this new program, and they (along with the involvement of a greater community of Georgia Tech students) would be essential to its success and the success of many of these pilot projects.

The Commission recommends that its major initiatives be pursued through partnerships in education and that these types of partnerships be encouraged through advertisement of the successes of existing programs, such as those mentioned above, as well as promotion of pilot programs. For example, to expand the opportunity for student involvement in course resource development, units could advertise the practice in departments along with helpful hints from faculty who follow this practice. Faculty can also integrate more closely with Student Government Association (SGA) groups to forge partnerships.

Similarly, companies often develop instructional materials meant to be resources for courses, but their value would be enhanced if companies were to work more closely with faculty in the development of these resources. Schools should expand this portion of their corporate partnerships. Alumni might be equally involved. While there are very successful pockets of partnerships on campus, the true potential has not yet been achieved, because the roles of the different stakeholders are still very distinct and isolated by silos.

A concept that could address both the disciplinary and stakeholder silos is offering a matrix of minimester courses—one-credit-hour short courses that cover a wide range of general-interest disciplinary topics and are aimed at introducing a specific topic to a broad audience from multiple disciplines. Being only one credit hour and short in length (five weeks), these minimester courses can become a low-risk platform for pedagogical experiments in areas such as partnership in education. Greater detail on minimester courses is discussed in the CNE Report Supplement New Educational Pathways: Better Granularity and Greater Flexibility (Georgia Tech 2018b).
Motivating Individuals in the Innovation Process

Institutional goals for educational innovation must be matched with appropriate levels of individual motivation—for faculty members and unit leaders—to adopt, create, or promote innovative educational methodologies. To achieve such motivation, the Commission recommends a two-pronged approach: increase the value of the institutional goals to individuals through incentives, and increase the ability of individuals to achieve the goals through programs that develop appropriate skills.

Incentivizing Excellence and Innovation in Education

As a means of addressing the gaps in the culture of educational innovation at Georgia Tech, the Commission recommends initiatives that acknowledge, reward, and incentivize faculty and departments in educational innovation. The Institute should seek to encourage and reward faculty accomplishments that are significant, including educational innovations that impact student development. There should be an Institute-level award for the Scholarship of Teaching and Learning (SoTL) and another for Educational Innovation in a Department, to match the University System of Georgia (USG) Regents Awards for these categories. In this context, educational innovation means more than new methods of classroom teaching—it also encompasses new courses, new degree programs, and the cocurricular and extracurricular types of experiential learning experiences.

From the National Science Foundation (NSF) educational directorate to National Academy of Sciences reports, it is clear that successful educational practices, including evidenced-based instruction, are not being adopted into mainstream teaching practices on campuses. Currently, the promotion and tenure (P&T) process is often cited as the main incentive (or detraction) for faculty members to engage in innovative educational activities.

The Georgia Tech P&T process explicitly lists contributions to education among the evaluation criteria. The implementation of the P&T process, though, varies by school and college, especially the scope and role of educational activities, and even their recognition. Many schools use Course Instructor Opinion Survey (CIOS) scores as a proxy for teaching in the P&T evaluation, but this survey is based on student opinion rather than the quality of teaching.

The Commission proposes recommendations that address these limitations in the P&T process, plus additional incentives that can be applied at the dean and school chair levels and at the Institute level. The way that teaching is assessed should be reevaluated. Currently, the results of the CIOS question “Is this an effective teacher?” are used as the primary metric for quality teaching. The CIOS reports student opinion, which certainly gives valuable feedback on the classroom climate but has limited and controversial implications on teaching performance.

In fact, overreliance on CIOS results can act as a deterrent for faculty to experiment with new teaching methods if they normally get “good” scores. The education component of the P&T process can be enhanced by incorporating an evaluation from a person or committee trained in educational excellence and innovation. For candidates who wish to use the scholarship of teaching and learning as one of the main themes in their creative contributions, a separate campus-wide committee of experts may be asked to evaluate their contributions and write a supporting letter, since expertise may not lie at the academic unit level.

A modification to the P&T documentation might include an impact statement on educational contributions. External P&T references focus on a candidate’s provided papers and their impact as well as recognition within the profession. Some faculty, via their books, online lectures, and teaching methods, are noted in having significant impact on a broad community, whether it be students or industry practitioners. External statements of such impact could add value to the P&T package and supplement, not replace, the use of external references.

School chairs and deans can change the culture of educational innovation through evaluation and reporting, awards, hiring, and flexible faculty workload models. Adding targeted categories in annual faculty evaluations raises awareness of those topics and incentivizes action. For example, adding a “Report on the Use of Evidence-Based Instruction” section to an annual performance report places importance on the topic and requires faculty to think about what evidenced-based instruction is and how do they do it.

There is sufficient training on campus (through CTL) to assist faculty in invigorating their teaching and meeting the objectives in this recommendation. Deans can add incentives for the school chairs by making them responsible for educational excellence and innovation in their respective schools’ annual reports by asking for
details on topics such as how poor teaching is addressed, how faculty are encouraged to use evidence-based teaching, and experiments in education. They can give school-level and college-level awards for excellence and innovation in teaching, as some schools do now.

Faculty workload and hiring decisions can be made with the perspective that the Institute as a whole can achieve its mission of “innovation in teaching and learning, our research advances, and entrepreneurship” with faculty who serve different roles and have different strengths among these thrusts. One way to formalize this spectrum of contributions is to introduce a flexible workload model where faculty members have the ability to negotiate with supervisors or school chairs about the scope and direction of creative initiatives. Yearly evaluations and periodic reviews (possibly even tenure decisions) would be partially based on initiatives and goals that were predetermined.

In this way, faculty would have the flexibility to spend more of their time on educational initiatives and be guaranteed that their work would be fairly evaluated. Creativity in education might be evaluated in a multitude of ways—including internal impact on students and programs, external impact such as on other universities or organizations, and resulting research funding and publications. A flexible workload model could also help faculty who want to change emphasis throughout their career, perhaps pulling back from disciplinary research for a period in order to develop educational innovations.

This model would incentivize efforts that could lead to programs similar to VIP, CREATE-X, and maker spaces, as well as new educational research programs. Georgia Tech is a large enough organization to support various models of success and contributions, striving for excellence and not holding faculty to the notion that discipline-based research is the only avenue for advancement.

Faculty hires, including both non-tenure and tenure-track positions, with disciplinary focuses in educational innovation and/or research could make large contributions within individual schools. A professorship in education in a college is a platform that can provide leadership to build impactful interdisciplinary educational programs. Even the simple practice of using “teaching potential” in choosing to hire one faculty candidate over another when personal research potentials are reasonably comparable can make a difference in the level of teaching within a unit.

Faculty Development Programs for Becoming Innovative

There are some apparent gaps in skill sets among faculty and administrators at research universities. For example, the majority of faculty in STEM-based academic units have a deep understanding of technical topics but are not as well versed in cognitive science, sociology, or change management. Faculty development programs typically focus on teaching as well as leadership training for select groups.

The Commission recommends expanding faculty development programs to cover a broader range of topics, such as team science and networking, and that the Institute make this expanded training available to all faculty. In essence, the Commission recommends “whole-person education” for faculty. The modular professional skills for the graduate students program recommended in the CNE Report Supplement Whole-Person Development (Georgia Tech 2018c) could be the basis of such a faculty development program.

The Commission recommends faculty leadership and administration development programs focused on organizational transformation and/or change management. In particular, a university is an organization composed of people who must be convinced that an idea is beneficial enough that the university should pursue the concept. If more faculty leaders had an understanding of these areas of practice and gained experience in applying change management ideas, innovative ideas would be more viable and would be implemented in a way that would yield a higher success rate.

While the Commission’s motivation for recommending faculty development programs is focused on educational innovation, these programs would also benefit faculty in their research, mentoring and guidance of students, and effectiveness within campus and professional committees. These added benefits would incentivize faculty to participate in new and available programs.

The Commission further recommends a new set of faculty and student development programs focused on the innovation process. These development programs would focus on Formative Leadership principles and lessons learned during the CNE Flashpoint effort. The key to developing formative leadership skills around education is to help members of the Georgia Tech community improve in their ability to determine authentic need for specific educational innovations and to evaluate their ideas via direct interactions with students, faculty, alumni, and administrators. Read more in the supplementary report
Formative Leadership (FlashPoint): One Georgia Tech born Approach to Deliberately Innovative Education (Georgia Tech 2018).

The VIP program is a specific avenue for piloting a Flashpoint-like innovation development program, especially if the pilot starts with the education-themed VIP teams. The VIP teams can be structured to be deliberately developmental using the new view of innovation in which ways to determine authentic need are examined, cognitive biases are explored, ideas are evaluated in a formative way, and change management strategies are practiced.

In summary, the recommendations mentioned in this CNE Report Supplement would help Georgia Tech build a culture that is deliberately innovative through a systems-level approach that targets organizational structure as well as the interaction between teams of stakeholders and the motivation of individuals.
References


