BOARD # 340: Changing Culture: Policies and Practices for Lasting Departmental Transformation

Prof. Kay Wille, University of Connecticut

Dr. Kay Wille is a Professor and Interim Director of the School of Civil and Environmental Engineering at the University of Connecticut fostering an inclusive and supportive academic environment. He earned his Ph.D. in Civil Engineering from the University of Leipzig, Germany. His research focuses on ultra-high-performance concrete (UHPC), concrete durability, and sustainable infrastructure. Dr. Wille is a recipient of the prestigious NSF CAREER Award and the C.R. Klewin Excellence in Teaching Award. He actively advances the civil engineering profession through leadership roles in the American Concrete Institute (ACI) and contributions to national standards and innovation in concrete technology.

Ms. Connie Syharat, University of Connecticut

Connie Syharat is a Ph.D. student in Engineering Education and a Research Assistant at the University of Connecticut as a part of two neurodiversity-centered NSF-funded projects. As the Program Manager of a Revolutionizing Engineering Departments (NSF:RED) project titled, ”Beyond Accommodation: Leveraging Neurodiversity for Engineering Innovation”, she has co-facilitated a range of Neuroinclusive Teaching Institutes and workshops for STEM instructors and Teaching Assistants. As a graduate researcher, she conducts qualitative research related to the experiences of neurodiverse graduate students in STEM fields through an Innovations in Graduate Education (NSF:IGE) project titled, ”Encouraging the Participation of Neurodiverse Students in STEM Graduate Programs to Radically Enhance the Creativity of the Professional Workforce”. Previously, she spent eight years as a K-12 teacher in Connecticut, where she maintained a focus on providing a varied learning environment and differentiated instruction for all types of learners.

Prof. Arash Esmaili Zaghi P.E., University of Connecticut

Arash E. Zaghi is a Professor in the Department of Civil and Environmental Engineering at the University of Connecticut. He received his PhD in 2009 from the University of Nevada, Reno, and continued there as a Research Scientist. His latest

Dr. Sarira Motaref P.E., University of Connecticut

Sarira Motaref is an Associate Professor in residence in the Department of Civil and Environmental Engineering at the University of Connecticut. She is a licensed Professional Engineer in the State of Connecticut. She received her PhD in 2011 from the University of Nevada, Reno. She has been teaching junior and senior-level design courses, as well as several large-enrollment classes. Sarira is currently serving as Assistant Director of Faculty Development at the School of Engineering and Center for Excellence in Teaching and Learning (CETL) to enhance teaching and learning effectiveness of engineering courses. She is the winner of 2021 University Teaching Fellow award, 2019 Distinguished Engineering Educator Award, and recipient of 2016, 2017, and 2018 Klewin Excellence in teaching award.

Prof. Marisa Chrysochoou, University of Missouri - Columbia

Marisa Chrysochoou is the Dean of the College of Engineering at the University of Missouri. Before joining Mizzou, she served as Professor and Head of the Department of Civil and Environmental Engineering at the University of Connecticut (UConn). At UConn, she directed the EPA Technical Assistance for Brownfields Program, which supports communities in redeveloping contaminated properties, and the NSF-funded Revolutionizing Engineering Departments (RED) project titled ”Beyond Accommodation: Leveraging Neurodiversity for Engineering Innovation.”

Chrysochoou has been a member of the American Society of Civil Engineers (ASCE) Department Heads Coordinating Council since 2021. She was also recognized by the Association of Environmental Engineering and Science Professors (AEESP) in 2023 for her contributions to environmental engineering education.

Throughout her career, Chrysochoou has secured funding for various projects, collaborating with federal and state agencies, industry partners, and multidisciplinary academic teams. Her work has focused on

environmental geochemistry, surface chemistry, the treatment and reuse of industrial waste, remediation of contaminated soils and sediments, brownfield redevelopment, and environmental justice. She has also worked on engineering education reform, emphasizing neurodiversity and service learning.

Chrysochoou has extensive experience working with government entities, program managers, and academic faculty across disciplines to develop partnerships that support research and innovation. As an educator, she has focused on creating experiential learning opportunities and adapting curricula to address modern engineering challenges.

IUSE/PFE:RED: Changing Culture, Policies, and Practices for Lasting Departmental Transformation

Abstract

The Revolutionizing Engineering Departments (RED) program aims at long-term transformation of academic departments. The RED grant at the University of Connecticut School of Civil and Environmental Engineering adopted a strength-based neurodiversity paradigm as the main driver of cultural and pedagogical transformation. Drawing on data from faculty and student interviews, student surveys, and project reports produced by external evaluators, this paper describes our journey and the key lessons we learned along the way. First, the adoption of a strength-based paradigm, embedded into regular practice through participation in an epistemic community, was effective in catalyzing shifts in faculty mindsets and the adoption of inclusive teaching practices. The adoption of inclusive teaching practices enhanced engagement, sense of belonging, and learning outcomes for students. The findings point toward success creating departmental change, with sustainability of the work as the next milestone. With this in mind, we present a practical vision for institutionalizing transformational practices as the project comes to a close amidst multi-level transitions in leadership.

Introduction

The Revolutionizing Engineering Departments (RED) initiative provides a pathway for visionary leaders to create groundbreaking transformations of the current system [1]. Traditional approaches to departmental change often emphasize immediate interventions, such as introducing new courses, adjusting syllabi, or launching short-term faculty development workshops. However, in the absence of deeper shifts, such initiatives can fail to take hold, especially when unanticipated leadership transitions leave newly implemented practices without champions or embedded policies. In this example, the University of Connecticut (UConn) School of Civil and Environmental Engineering (SoCEE), former department of CEE, embraced a transformative vision for engineering education by cultivating a strength-based culture in which neurodiversity is embraced as an asset [2]. Instead of seeing cognitive variations like attention deficit hyperactivity disorder (ADHD), dyslexia, or the autism spectrum as weaknesses requiring remediation, the school sought to emphasize neurodiversity-related strengths in academic practices, leveraging both student and faculty talents to spur innovation. To promote this paradigm shift, the team designed a structured transformation using epistemic communities as our model to effect culture change among faculty, staff and students.

What We Did: A Model for Change

Epistemic communities create change through shared principles, language, and methods [3], moving away from hierarchical changes that are common after a leadership transition [4]. Originally from international relations, the theory describes expert groups that influence policy through shared understandings [5]. Our project applied this model by using an ecological approach to emphasize neurodiversity's benefits (theory), fostering strength-based messaging

(code), and embedding these principles into departmental structures, policies, and practices (tools) to drive cultural change [3], [4].

The epistemic community consisted of faculty, staff, students, and external advisors. This group started with the initial RED team, gradually expanding and developing a shared understanding of neuroinclusivity. The goal of the community was to create and establish an "infrastructure for change" that might outlast the project. Core elements of this infrastructure were a) inclusion teams (I-teams), b) incentives, and c) policy and structural interventions. In the first year, a small cohort of dedicated faculty formed the "I-Team," tasked with co-creating "I-Standards," inclusive teaching standards tailored for a neurodiverse student body [6]. Each subsequent year, a new cohort of faculty joined the I-Team, functioning as a network of peers who mentored each other through the transformation of sixteen courses into "I-Courses," that have been designed specifically to foster neuroinclusive learning environments [7]-[11]. The department had, on average, 23 tenure-track and 5 non-tenure-track (teaching) faculty members during this time. Thus, the I-team represented a little over 50% of the faculty body, transforming almost all required core technical courses in both the civil and environmental engineering curriculum.

Incentives for participation in the I-Team effectively fostered faculty engagement with the epistemic community. These incentives included workload adjustments, stipends, recognition in annual reviews, and visibility in departmental meetings, reinforcing the value of their contributions to inclusive teaching and community building. Workload policies were designed to reward faculty who invested effort in neuroinclusive teaching, while merit reviews recognized contributions to inclusivity and student support as integral to academic excellence. Resource allocation (e.g., teaching assistants, active-learning classrooms, course assignments and scheduling) and faculty development funding were strategically aligned with advancing the department's inclusive mission. A teaching observation policy, developed as a parallel initiative, promoted reflective teaching practices and continuous improvement in inclusive methods [12]. By linking desirable actions, such as revising courses to accommodate diverse learning styles or mentoring neurodiverse students, to tangible rewards and support structures, the project ensured that inclusivity became a core and sustainable aspect of departmental culture.

The team collaborated with partners across and beyond the university. Within the university, partners included student support offices, inclusion centers, academic departments, and the graduate school. Project personnel conducted dozens of presentations and outreach activities each year with undergraduate and graduate students, staff, faculty, and administrators, encouraging the development of neuroinclusive services across the university and creating a feedback loop reinforcing the impact of the work to the institution. We also formed external partnerships with neurodiversity-centered programs at other universities and conducted outreach in the higher education community through workshops and presentations, ultimately developing a Neuroinclusive Teaching Institute for STEM faculty. In this way, the project's reach extended far beyond departmental boundaries, contributing to a broader cultural shift.

What We Learned

Strengths-based teaching operates from the understanding that allowing students to use their assets within the learning environment enhances motivation and engagement [13]. Data from

pilot courses, surveys, and interviews with students and faculty showed that strength-based language and faculty mindset was a powerful driver of change for both students and teachers. For example, in one reflection interview conducted at the end of the project, a faculty member reflected on the importance of mindset in her course redesign process:

> The most important features for neuroinclusive teaching? Maybe instructor's mindset of openness and accessibility. […] When they have inclusive mindset then they will learn more about inclusive practices and then try to implement those practices into classes.

In addition to transforming faculty mindset and practice, neuroinclusive course redesign impacted the sense of belonging of students. A survey of 144 students in both traditional and redesigned courses showed that inclusive courses positively impact neurodiverse students; students in redesigned courses reported significantly higher levels of inclusion, instructional quality, and sense of belonging compared to those in traditional courses [14]. Departmental communications affirming neurodiversity as an asset gradually reshaped expectations and attitudes. Highlighting the unique strengths that neurodiverse students bring, such as 3D visualization, pattern recognition, and creative divergent thinking, promoted a more inclusive climate and sense of belonging. In some cases, strength-based mindset and pedagogy allowed faculty to understand that flexibility goes beyond supporting student challenges, and can in fact empower students to showcase their strengths, as in this quote from another I-Course instructor:

> the strengths… propelled them to be really different… their thinking is very different and they can have very creative solutions and very interesting ideas. […] I probably didn't appreciate that enough before this experience… because a lot of our training is focused on providing flexibility and that sometimes comes with the connotation of help is needed, right?

Reframing the conversation from remediating weaknesses to leveraging unique capabilities reduced stigma, encouraged self-advocacy, and empowered students. Students also reported the impact of the strength-based approach in developing a greater understanding of group dynamics and supporting student challenges:

> … those collaborative spaces definitely help to… bring out everybody's strengths, and… make it less daunting. […] I've appreciated the Include courses more as I've progressed in my academic career, just because the courses get harder. […] So, it really helps to have those connections […] to overcome your own challenges as helping others with theirs.

There is also some evidence that the neuroinclusive courses enhanced learning outcomes for students; an analysis conducted by the project's external evaluator showed that students in redesigned sections of department courses were more likely to receive higher grades than students in traditional sections of the same courses. Overall, we found that the strength-based approach proved to be a powerful driver of change, with positive messaging playing a vital role, and that research and evaluation affirmed the project's theory of change.

Moving Forward

As the project nears completion and College and School leadership are in transition, the school

stands at a turning point, facing the challenge of sustainable educational reform. Organizational change principles emphasize the importance of embedding reforms into the core cultural and operational norms of the department rather than relying on external support [15], addressing the problem of sustainability by rooting key practices in established decision-making processes, such as workload assignments, promotion reviews, and curriculum standards.

While sustaining every aspect of the initiative may not be feasible, preserving the most impactful elements that reshaped the department's collective mindset increases the likelihood of long-term cultural transformation. Such elements might include the formal adoption of neuroinclusive course standards in teaching observation processes and the continuation of faculty development opportunities and annual trainings for graduate teaching assistants. Embedding inclusive and strength-based principles into the recommended format of core courses ensures that future instructors inherit these guidelines to embed into their own teaching portfolio, supported by peer collaboration and feedback. These practices eliminate the need for external funding leveraging existing departmental committees and teams to sustain institutional knowledge and uphold the innovations. The epistemic community framework (embedded in the department's structure and processes) becomes the foundation for maintaining the transformation. As new faculty and students join the department, they are socialized into a community defined by shared values and inclusive language. This approach embeds inclusivity into the department's cultural identity, transforming it from a project-based initiative into an enduring norm while remaining adaptable to new challenges driven by technological and societal changes.

Conclusion

By integrating strength-based and neuroinclusive values into departmental policies and teaching standards, this project has set the stage for lasting cultural transformation. Sustaining these gains will require ongoing commitment despite leadership transitions and funding shifts. Future research should examine long-term student outcomes and faculty engagement, while broader adoption of this model could promote systemic change in engineering education.

Acknowledgements

This material is based upon work supported by the National Science Foundation under Grant No. 1920761. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

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