Engineering at Illinois IT Governance:

Education Working Group

Final Recommendations and Report on Activities

during the 2024-2025 Academic Year

Members:

Lucas Wagner (Physics, chair)

April Novak (NPRE)

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Elaine Robbins (Engineering IT, Ex-Officio)

Executive Summary

The working group makes the following recommendations:

- If classes are meant to be taken online, departments should make a plan with regards to which classes will be taken online and what upgrades will need to be made. This should be developed in consultation with Engineering IT.
- Contact people, who can interface between Engineering IT and faculty, should be supported and in some cases they may need to be designated.
- The College should support a variety of applications that allow students to access computational resources, keeping in mind that there are diverse requirements and overall cost. Citrix should be supported, and the campus cluster is highly used. It may be worth considering Google Colab Pro but depending on the cost the current free implementation may be sufficient.

1. Introduction

At the request of Executive Associate Dean Phillippe Guebelle, a committee representing GCoE[1] faculty, GCoE administrators, and EngrIT[2] was formed to conduct a strategic-focused assessment of GCOE's research/educational computing needs and return advisory recommendations and comments. In specific, the charge letter[3] details the following primary responsibilities:

•   Reviewing policies concerning the sustainability and prioritization of any needed educational IT that enhances the College teaching mission, both at the Engineering College level and at the campus level.

•   Considering IT support for new educational pursuits in our College, anticipating new opportunities and responding to interests and initiatives from our units.

•   Monitor, assist with prioritizing, and provide feedback on the implementation of any proposals concerning educational IT.

•   Assist with monitoring, providing feedback, and reporting on the progress of work to align Engineering IT services with campus-level IT services, in particular with respect to teaching.

•   Coordinating and communicating with the other IT working groups with overlapping interests.

And requests particular attention this year to these topics:

•   Evaluate and recommend technology investments that would enable the college and individual faculty and instructors to provide excellence in education at increasing levels of enrollment.

•   Evaluate the current capabilities and recommend future directions to enable our vision of expanding online education, particularly for professional programs.

•   Analyze the impacts of recent advances in Artificial Intelligence products and how IT can best support their integration into instructional practices.

•   Recommend methods and pathways for improved communication and feedback between instructors and technology providers.

•   Propose possible model(s) for funding and allocating technology resources and effort towards instructional innovation

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[1] Grainger College of Engineering
[2] Engineering IT Shared Services
[3] See appendix for entire letter

2. Actions of the Committee

Meetings were held on: Nov 4, Dec 2 2024, Feb 4, Feb 11, Mar 4, Apr 1 2025.

3. Findings and Recommendations of the Committee – Specific Topics

At the request of Executive Associate Dean Philippe Geubelle, the EWG focused on the following particular items, which are discussed in detail below

3.1 Evaluate and recommend technology investments that would enable the college and individual faculty and instructors to provide excellence in education at increasing levels of enrollment. There was a significant amount of discussion regarding courses that operated in the following mode. An instructor is at the front of the classroom, and is showing students how to use a piece of software, which may or may not be proprietary. To avoid the students having to pay for the software, they often use engineering workstations and/or Citrix with personal laptops.

It was noted that often Citrix is very slow during class periods. We followed up with the Citrix maintainer and it appears that the servers are not typically overloaded; instead we believe the slowness experienced may be due to networking. We recommend some investigation into Citrix performance since it is otherwise a cost-effective way to teach on proprietary software that is commonly used in engineering fields.

As mentioned before, another option is to use the Engineering Workstation labs to teach courses. However, these labs are typically not set up for the teaching modality described above, in that often students cannot see the instructor's screen. In addition, many courses which could benefit from these labs exceed the room capacity.

We would also like to recommend to instructors and departments to consider use of the test kitchen, which can help develop new classes.

3.2 Evaluate the current capabilities and recommend future directions to enable our vision of expanding online education, particularly for professional programs
Our understanding of this item is that it is desired to have all or most graduate courses online by 2026. Currently, there are not nearly enough video enabled classrooms to achieve this. At the same time, room recording is not 100% reliable, and the current setups provide almost no notification or feedback that enables instructors to tell if something is wrong. So it is quite common to give a class and find out only later that the audio didn't record, or the wrong video record, or some other issue occured. We want to emphasize that adding online components to classes [while maintaining quality] is not as simple as turning on recording for a room. There is a significant increase in instructor effort to add online education for an instructor.

We identified several non-exhaustive modalities for online instruction that should be supported:

1. A recorded traditional course, which is then placed online.
2. An assisted flex room in hybrid mode, with room microphones to capture the class discussion and a moderator. (this costs about $250,000 per room)
3. An independently produced course intended for online consumption. This involves recording in a studio-type environment.

The above three modalities have quite different support requirements for EngrIT. In order for the online plan to be supported, academic units and the College should make sure to develop and communicate a clear plan in terms of what courses will be put online, what modalities will be used, and what is required.

3.3 Analyze the impacts of recent advances in Artificial Intelligence products and how IT can best support their integration into instructional practices.

AI is a very quickly changing field, so we particularly need to be agile. We highly recommend avoiding long multi-year contracts for this reason. We discussed a number of topic related to AI:

1. Cheating concerns
2. "Virtual TA" to improve instruction in large classes
3. AI/ML topics in the curriculum (i.e., training models as class projects)
4. Using AI tools as an assistant (i.e., helping with research or coding projects)

Cheating. At this point, we should assume that some fraction of students are using AI tools to cheat on any unsupervised assessment. Attempts to combat this will be an arms race and taxing on instructors' time. There are assessment methods that are resistant to AI; controlled testing environments and oral assessments are some of these. With regards to the plan to expand online education, it is important to note that it is very difficult to detect use of AI tools in online students.

Virtual TA: PHYS 211 has been using Arist AI as a virtual TA, which can improve efficiency and use of instructor resources, including TAs. We recommend that this technology is monitored both for the possibility of adding it to other courses and maintaining instructional quality, both perceived and actual.

Courses that teach AI/ML. There is a growing number of courses that incorporate some kind of training of an AI/ML model as part of the curriculum. These projects can require bursty usage of significant amounts of computational resources. Currently, we have the Campus Cluster Illinois Computes which is heavily used. Google Colab Pro negotiations are ongoing; however, Google Colab has AI Gemini enabled by default. A part of the negotiation should be to be able to control whether AI is used or not in a given class. We believe the need for computational resources to train AI/ML models will increase in the future.

AI as an assistant. We are aware that at least NPRE 247 uses this - the AI model is fed a limited set of course materials (syllabus, textbook, homeworks, course notes) as training material. This is a valid use of the tool. It appears to the committee that there are not clear ways to access and/or purchase tools such as OpenAI's tiers. Many companies do not know how to deal with university

purchasing requirements, and the glacial pace of procurement does not match the speed of the field.

3.4 Recommend methods and pathways for improved communication and feedback between instructors and technology providers.
We noted the Engineering IT monthly email, which some people read. However, most faculty remain overwhelmed by the large array of services offered by Engineering IT, and do not know what falls under Tech Services versus Engineering IT. We also note that IT professionals tend to be process-oriented in contrast with the solution-oriented nature of requests. We recommend that training continue to help the Engineering IT staff better interface with academic staff. Some departments have contact people who are a huge help.

3.5 Propose possible model(s) for funding and allocating technology resources and effort towards instructional innovation
To some extent we believe our committee has only limited ways of suggesting funding models, since we do not have access to the current college funding model. We recommend that the executive committee and/or budget committee examine the proposal currently being made by Engineering IT. Unfortunately that proposal was not ready by the end of the Spring 2025 semester so the committee was not able to evaluate it.

4. Findings and Recommendations of the Committee – Additional Topics

The committee also discussed and has recommendations/comments in the following additional areas that fall within the general charge of the committee.

4.1 Pain Points
Communication continues to be a pain point.

Appendix 1: Charge Letter

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Dear Colleagues:

Thank you for agreeing to serve on the Grainger College of Engineering IT Governance Education Working Group for the academic year 2024-2025. This working group is critical to helping ensure that IT support of the educational needs of faculty, instructors, and students in the College is of the highest quality and reliability.

Your recommendations and comments are advisory to the Executive Associate Dean, with primary responsibilities for:

·   Reviewing policies concerning the sustainability and prioritization of any needed educational IT that enhances the College teaching mission, both at the Engineering College level and at the campus level.

·   Considering IT support for new educational pursuits in our College, anticipating new opportunities and responding to interests and initiatives from our units.

·   Monitor, assist with prioritizing, and provide feedback on the implementation of any proposals concerning educational IT.

·   Assist with monitoring, providing feedback, and reporting on the progress of work to align Engineering IT services with campus-level IT services, in particular with respect to teaching.

·   Coordinating and communicating with the other IT working groups with overlapping interests.

In particular, over this academic year, I would like to ask you to

·   Evaluate and recommend technology investments that would enable the college and individual faculty and instructors to provide excellence in education at increasing levels of enrollment.

·   Evaluate the current capabilities and recommend future directions to enable our vision of expanding online education, particularly for professional programs.

·   Analyze the impacts of recent advances in Artificial Intelligence products and how IT can best support their integration into instructional practices.

·   Recommend methods and pathways for improved communication and feedback between instructors and technology providers.

- ●   Propose possible model(s) for funding and allocating technology resources and effort towards instructional innovation

You will also be asked to provide an assessment at the end of the academic year (no later than June 1, 2025) on the current state of IT support for instructional activities. Dr. Wagner has graciously agreed to chair this working group. He will be in contact with you soon to arrange for your first meeting.

I am thankful to all of you for your willingness to contribute to this important work for our College.

Sincerely,

Philippe H. Geubelle