Pathways to Knowing

A Hands-On Minds-On Approach to General Education

This packet encapsulates years of faculty discussions and efforts, particularly on the part of the members of the University Committee for the Curriculum for Liberal Education, to improve the general education curriculum for all Virginia Tech students.

We aspire to provide all undergraduate students with the essential thinking skills and an integrated, interdisciplinary approach to problem-solving and inquiry important to a lifetime of citizenship and leadership.

We have ensured an opportunity for all students to explore, for transfer students to enter the Virginia Tech curriculum without barriers, and for all students to graduate within the current limits of their degrees. We have reviewed every major checksheet in every department across campus to test our concept.

We believe this curriculum will create exciting and rewarding opportunities for faculty and students to engage in transformative learning.

-The Pathways Support Team

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THE CASE FOR A BETTER GENERAL EDUCATION

NATIONALLY:

- According to 318 employers surveyed in 2013, 93% said that "a demonstrated capacity to think critically, communicate clearly, and solve complex problems is more important than [their] undergraduate major."

- More than 9 in 10 said it is important that hires demonstrate **ethical judgment and integrity; intercultural skills; and the capacity for continued new learning.**

- The majority of employers agree that having **both field-specific knowledge and skills and a broad range of skills and knowledge** is most important for recent college graduates to achieve long-term career success. Few think that having field-specific knowledge and skills alone is what is most needed for individuals' career success.

- 80 percent of employers agree that, regardless of their major, **all college students should acquire broad knowledge in the liberal arts and sciences.**

Source: *It Takes More than a Major: Employer Priorities for College Learning and Student Success*. 2013. Washington, DC: Association of American Colleges and Universities and Hart Research Associates.

AT VIRGINIA TECH:

"The university will launch a new general education curriculum that provides foundational learning in discourse and computational thinking; a capstone experience; and interdisciplinary programs across the sciences, social sciences, arts, and humanities to complement a student's major field of study with a coherent and substantive course of study. This curriculum will engage students in self-authorship, deep reflection, and ethics."

Source: Academic Implementation Strategy for *A Plan for a New Horizon*

"Considering that the CLE is such a significant part of a student's experience, the University has not done enough to assure the quality of that experience. The CLE needs the same level of curriculum planning we would expect in any other program or department."

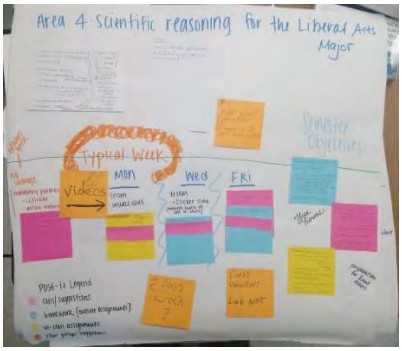
"While I believe the CLE is a great first step, it needs to move further in terms of getting faculty and staff to believe in its goals and work collaboratively. Currently, I find that there are few formal structures of support for students who want to truly integrate their learning across courses and between experiences."

Source: 2009-2010 Faculty Survey

STUDENT FEEDBACK UPDATE ON CLE REFORM, 2013-14

STEPHEN BISCOTTE, COORDINATOR OF GENERAL EDUCATION AND LUAN BUI, ARCHITECTURE STUDENT

FOCUS GROUP OVERVIEW



For the past year, Luan and I have been conducting student focus groups to gather the student opinion on the CLE, specifically reaching out to cadets, veterans, transfer students, and other underrepresented student groups on campus. We have met students with a variety of majors, but a majority from engineering and visual arts. In the fall, students shared their **best learning experiences in the CLE**. In the spring, students were asked to design their **own CLE course**, based on their best past experiences, to meet a chosen Area requirement (see picture for example of Area 4).

PRELIMINARY THEMES FROM STUDENT FOCUS GROUPS

Purpose/Value of General Education – "When will I need it?"

The student perception of the purpose of the CLE is vague and varies wildly. One student said its necessary "**to be well-rounded**," but wasn't sure for what ends. One said it was just a **"repeat of high school."** Another felt it was a total waste of time as it "**gets in the way of their major**" while another was "**thankful for the CLE**" as it forced her to take classes she normally wouldn't have thought to take and paved the way for her new minor. Students thought that attendance and completion of weekly readings should be sufficient to "get a good grade without much effort" on exams that "should not be difficult". How can we conjure greater perceived value in Gen Ed?

Role of Professor and Teaching Methods – "Motivational Teachers"

According to students, the professor should be supportive, accessible, and engaging. One group mentioned that office hours for a particular professor/instructor was held through videoconferencing, ideal for reaching them in the evening. From their CLE experiences, students liked the incorporation of multimedia in PowerPoint presentations, the use of "i-Clicker quizzes" in class so that professors and students can evaluate comprehension of the material, and the use of social media as "**an outlet for expression**" and a way to gain perspective, like when role playing as an important person.

Role of Student and Autonomy – "We don't want to be babied"

Students want more responsibility over their learning. They see the value in weekly short writing assignments or journals as a way to reflect on content or "provoke" and "**inspire creative thoughts**". Students expect to learn both in and outside the classroom through "prepared debates", "open-platform discussions", "peer-editing", "weekly forum posts that added to discussion", attendance to an event outside class like a "visit to Squires Perspective Gallery". In addition students want a flexible grading system that attends to their own interests and areas of excellence, implying that students do not currently see the class assessments aligned with their learning or the goals of the course.

Relevance of the Topics – Write a "paper on a social issue"

Students value discussion of "political/social/cultural/industrial/current issues" in the "context of the U.S. and the world". To keep students engaged in the topics, the curriculum should allow for "short, focused, and **more-in-depth**" topics (instead of cramming information), while using guest lecturers for greater expertise and real-world application.

WHAT STUDENTS WANT IN THEIR COURSES

Analyzing the student-designed course artifacts, they want the following from their Gen Ed experiences:

- *Consistency* = Syllabus aligns with assessments aligns with grades, all clear from Day One, but topics flexible
- *Personal relevance* = Students choose own course materials based on personal interest and real-world relevance
- *More active classes* = More in-class time to explore, practice, free-write, discuss, and get professor/TA feedback
- *Complementarity* = Topics that complement their majors: different perspectives on background knowledge
- *Assignments build* = Every assignment should build up to the final (paper, test, lab report, project, etc.)

FACULTY COLLABORATION IN CURRICULAR DEVELOPMENT:

LEARNING OUTCOMES TEAMS AND UCCLE

Discourse
Marlene Preston (Comm)
Patty Raun (Performing Arts)
Quinn Warnick (English)
Willie Jester (PCOB)
Alma Robinson (physics)
Vickie Mouras (CEE)
Carolyn Meier (Libraries)

Critique and Practice in Design and the Arts
Kathryn Albright (Arch)
Ben Knapp (ICAT)
Alan Weinstein (Music)
Greg Justice (TA)
Jack Lesko (Eng)
Kevin Concannon (SoVA)
Barbara Leshyn (Kraft) (Hort)
Ed Dorsa (Industrial Design)
Matthew Volmer (English)
Ann-Marie Knoblauch (Visual Arts)
Willie Caldwell

Quantitative Thinking
Peter Haskell (math)
Art Keown (finance)
Mike Ellerbrock (AgEcon)
Nicholas Polys (ARC)
Eric Lyon (Music)
Jane Robertson (stats)
Don Orth (FW)

Computational Thinking
Barbara Ryder (CS)
Tom Ewing (History)
Dennis Kafura (CS)
Liesl Baum (ICAT)
Tom Martin (ECE)
Lydia Patton (Phil)
John Simonetti (Physics)
Marie Paretti (Eng Ed)
Shelli Fowler (TLOS)

Scientific Reasoning
Richard Walker (BIOL)
John Chermak (GEOS)
Jeannine Eddleton (CHEM)
Mark Barrow (HIST)
Sarah Karpanty (FW)
David Schmale (PPWS)
Renee Selberg-Eaton (HNFE)
Stephen Biscotte

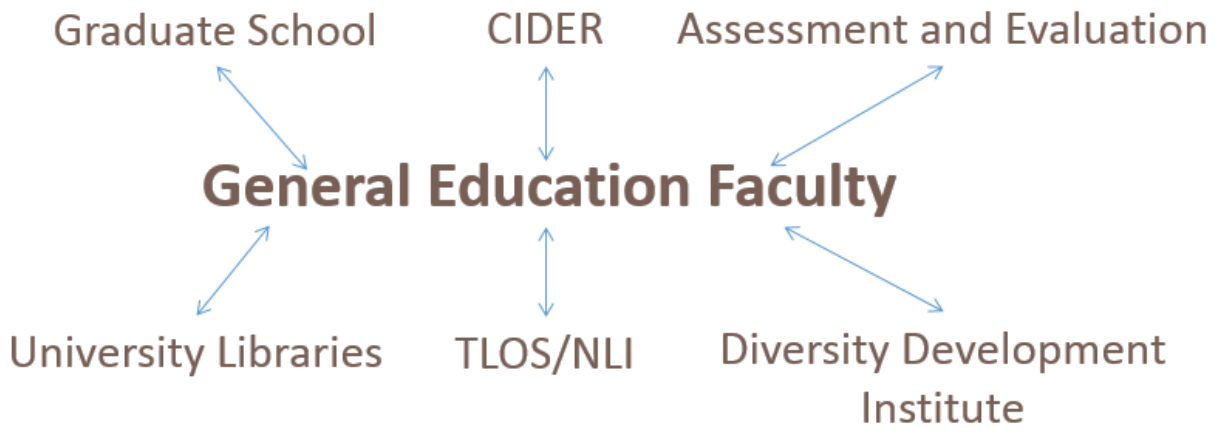
Critical Thinking in the Humanities and Social Sciences
Anisa Zvonkovic (HD)
Kurt Hoffman (Psyc)
Matthew Gabriele (Rel)
Kwame Harrison (Soc)
Greg Tew (Interior Design)
Brian Murphy (FW)
Sheila Carter- Tod (English)
Jill Sible

UCCLE 2013-14
Blake Barnhill (SGA)
Stephen Biscotte
Willie Caldwell
Sheila Carter- Tod
Jay Crone
Rick Ferraro
Art Keown
Anne-Marie Knoblauch
Kate McConnell
Carolyn Meier
Bob Oliver
Donald Orth
Marie Paretti
Michel Pleimling
Marlene Preston (chair)
Renee Selberg-Eaton
Jill Sible
Debbie Smith
Daniel Strock (SGA)
Dan Thorp

INTERNAL SUPPORT AND COLLABORATION:

ONGOING PROFESSIONAL DEVELOPMENT

- Tapping into existing resources and expertise
- Ensure ongoing campus-wide support for General Education
- Engage faculty as peer mentors/trainers/developers



2014 PATHWAYS FACULTY SCHOLARS

These eight individuals, already recognized as great teachers, engaged leaders, and collaborative colleagues by students and fellow faculty alike, will serve the next two years to design and implement pilot Pathways courses, as liaisons between the academic programs and the Office of General Education, and to provide counsel and leadership to the Office of Undergraduate Education.

John Chermak, Associate Professor of Practice in Geosciences

Sean Conaway, Instructor of English

Ben Jantzen, Assistant Professor of Philosophy

Dennis Kafura, Professor of Computer Science

Ann-Marie Knoblauch, Associate Professor of Art History

Gyorgyi Voros, Senior Instructor of English

Alan Weinstein, Associate Professor of Music

Zac Zimmer, Associate Professor of Spanish

PATHWAYS TO KNOWING:

THE PROPOSED GENERAL EDUCATION PROGRAM AT VIRGINIA TECH

MISSION:

To develop and sustain a new general education program as a central component of a signature undergraduate experience at Virginia Tech. The Pathways to Knowing curriculum will guide undergraduates to examine the world from multiple perspectives. Through a "hands-on, minds-on approach", students will come to know the world through aesthetic and scientific reasoning, critical thinking, and quantitative, computational and design thinking. The Pathways curriculum will help students to effectively exchange ideas and develop a personal code of integrity through training in ethical reasoning and development of inclusive intercultural and global knowledge.

A national conversation regarding reform of general education has been ongoing for over a decade. The American Association of Colleges and Universities (AAC&U) has been at the forefront of this dialog. AAC&U publications and faculty participation at AAC&U general education workshops has greatly influenced the decision to revise Virginia Tech's general education curriculum to align with what have been identified as best practices. Without losing the breadth of exposure that characterizes the current CLE, the revised curriculum will introduce "big-picture" outcomes that transcend traditional disciplinary boundaries, integration across disciplines, and a regular practice of formative assessment to evaluate and continuously improve student learning.

GUIDING PRINCIPLES:

The Pathways to Knowing program will be:

1) Rigorous

In contrast to the "one and done" mentality that characterizes many general education programs, the Pathways curriculum will **span all four years** of a student's learning, a practice recommended by AAC&U.

Students will meet many of the learning outcomes by taking **sequenced courses** that build upon one another, adding a dimension of depth to the curriculum.

Interdisciplinary **Pathways minors** that address a significant portion of the outcomes will provide students with a rich, cohesive general education experience.

The depth of student learning will be measured by the extent to which students demonstrate **creativity and integration** of learning in their more advanced general education courses.

To facilitate student success in a rigorous general education curriculum, **pedagogies** that have been demonstrated to be **most effective for student learning** based on empirical research will be adopted for general education courses.

2) Valued

A good general education curriculum complements a student's major; an exceptional general education curriculum **synergizes with the major**. The Pathways curriculum will provide a strong foundation for undergraduates in fundamental areas of learning such as discourse and quantitative and computational thinking, which will then be applied to a student's major in more advanced courses. In turn, students from different majors will be brought together to share their diverse ways of knowing through participating in collaborative projects in advanced Pathways courses.

The Pathways curriculum will be **transparent and explicit in its goals/outcomes**, which have been developed through broad participation by faculty and are validated by employers, educators and alumni.

A **reward structure** for those who teach in general education is essential for instilling a sense of value. Pathways Scholars will be supported and celebrated as pioneers for the new curriculum. Those who subsequently teach likewise must be provided rich professional development, recognized for their contributions to general education as valuable for tenure, promotion and merit raises, and honored publicly for excellence.

Through Pathways minors and Alternative Pathways, undergraduates will have opportunities to **make higher meaning** of their general education curriculum through the integration of diverse ways of knowing such that the whole is truly greater than the sum of its parts.

3) Inclusive

Those developing and implementing the Pathways curriculum must be informed and appreciative of the diversity of our undergraduate population. **Inclusive pedagogies** that foster deep learning in all students must be adopted.

The Pathways curricular structure must meet the needs and challenges of **all populations of students** and the varied pathways they have taken to Virginia Tech (e.g. transfer students).

In turn, Pathways to Knowing must prepare all students to become contributors to the global society in which they will live and work. This will be accomplished through the integration of outcomes in inclusive, intercultural and global knowledge across the Pathways curriculum.

4) Nimble

Regular **assessment** of the Pathways curriculum at the level of the course and the program is necessary to determine program effectiveness and to identify areas for attention and improvement.

An **efficient governance structure** will be developed to facilitate timely implementation of new courses and programs and to encourage an influx of new individuals and programs as contributors to general education.

Beyond a pilot phase, the curriculum must be **scalable** so that all students can partake of the best practices that are under development. Strategies toward scalability include effective large-classroom pedagogies, flipped and hybrid classes, and team/peer-based learning. The New Classroom Building, which will expand the flexible learning capacity on campus will be leveraged to support these pedagogies for general education courses.

Discourse is the exchange of ideas adapted to specific contexts and developed through discovery, analysis, creation, presentation, and evaluation. A student who is competent in discourse builds upon a foundation of English proficiency and demonstrates the ability to reason, write, and speak effectively for academic, professional, and public purposes. 9 cr; (6 foundational + 3 advanced/applied)

1. Discover and comprehend information from a variety of written, oral, and visual sources.
2. Analyze and evaluate the content and intent of information from diverse sources.
3. Develop effective content that is appropriate to a specific context, audience, and/or purpose, and reflective of critical thinking.
4. Exchange ideas effectively with an audience.
5. Assess the product/presentation, including feedback from readers or listeners.

Quantitative and Computational Thinking is creative engagement with the world by the manipulation of precisely defined symbolic representations. ***Quantitative Thinking*** is the formulation of questions that can be addressed using mathematical principles, leading to answers that include reliable and usable measures of accuracy. ***Computational Thinking*** is the ability to conceive meaningful, information-based representations of the world that can be effectively manipulated using a computer. 9 cr; (6 foundational + 3 advanced/applied)

1. Explain the application of computational or quantitative thinking across multiple knowledge domains.
2. Identify the social or political impacts of computing and information technology.
3. Apply the foundational principles of computational or quantitative thinking to frame a question and devise a solution in a particular field of study.
4. Draw valid quantitative inferences about situations characterized by inherent uncertainty.
5. Construct a model based on computational methods to analyze complex or large scale phenomenon.
6. Evaluate conclusions drawn from or decisions based on quantitative data.

Scientific Reasoning involves the acquisition of the detailed knowledge of one or more of the natural/social sciences, hands-on experience with how science is conducted, what science can and cannot tell us about the universe, and the relationship between science and society. (6 cr; may be sequenced)

1. Explain the foundational knowledge of a particular scientific discipline.
2. Demonstrate the iterative nature of science.
3. Evaluate the credibility and the use/misuse of scientific information.
4. Analyze the reciprocal impact of science and society.

Critique and Practice in Design and the Arts involves a hands-on, minds-on approach by which students acquire the intellectual tools for a richer understanding and appreciation of the fine, applied and performing arts, and the built environment through hands-on production and/or interpretation. (6 cr)

1. Identify the formal elements of and professional language in design and the arts.
2. Explain the historical context in design and the arts.
3. Apply interpretive strategies or methodologies in design and the arts.
4. Employ the skills, tools, and methods of working in design and the arts.
5. Produce a fully developed work through the iterative processes of design and the arts.

Critical Thinking in the Humanities and Social Sciences: Meaningful participation in the world requires Virginia Tech students to understand that they are a small part of a much larger global community and to engage with diverse individuals, groups, and ideas that have changed and will be changing over time. (12 cr; at least 6 must be sequenced)

1. Interpret texts and other human material creations, and the cultural contexts within which they were created.
2. Analyze human behavior using the theories and methods of the social sciences within the context of the development of humans, cultures, and institutions.
3. Recognize and challenge individual, social, and cultural notions of difference.
4. Analyze the contextual factors that help explain past and present events and behaviors as globally and historically situated.
5. Synthesize conceptual understandings of cultural or intellectual factors that may catalyze change as they relate to human behavior, social relationships, and traditions of thought.

COMPREHENSIVE OUTCOMES

Students must take at least one course each approved as meeting outcomes in (tagged as):

- **ethical reasoning** and
- **inclusive, intercultural and global knowledge**.

These Pathways courses will also meet one or more of the core outcomes and thus, will not add additional credit hours to the curriculum. These outcomes and their indicators will continue to be developed by teams in the coming semester.

PATHWAYS TO GENERAL EDUCATION

Also, students may elect to pursue a **Pathways Minor** or **Alternative Pathway** to complement their major and meet many of the requirements for their General Education program. Guidelines for Alternative Pathways are under development. For more information about Pathways Minor Proposals, please go to our website to register for an information session.

Proposed Governance Timeline

SUMMER 2014

- meet with academic associate deans

FALL 2014

- meet with Faculty Senate, SGA, Diversity and Inclusion, others
- share draft proposal with UCCLE
- develop approval process for courses, minors and checksheets
- collaborate with UCC and CUSP to streamline approval process
- present proposal to CUSP
- present proposal to University Council
- engage with academic advisors

SPRING 2015 – SUMMER 2016

- offer workshops and one-on-one consulting for courses and minors
- conduct course approvals starting with Pathways Scholars pilot courses

~~~ *(Maintain CLE curriculum through fall 2016)* ~~~

FALL 2016

- implement Pathways curriculum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