The Annual Report for Applied Critical Thinking at RIT

for

2017-18

Applied CR·I·Tical Thinking
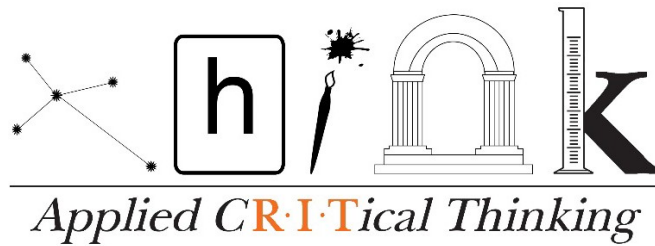
Dr. Jennifer L. Schneider, CIH

Eugene H. Fram Chair in Applied Critical Thinking

July 2018

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Executive Summary

In 2017-18, the maturation and integration of the Applied Critical Thinking (ACT) initiative at Rochester Institute of Technology (RIT) continued to evolve under the leadership of Dr. Jennifer L. Schneider. External and internal engagement accomplishments include a substantial increase of social media presence in both Facebook and Twitter, sponsorship and initial planning of an Association of Independent Technological Universities (AITU) Applied Critical Thinking summit with peer university administrators for 2019, publishing of papers related to the implementation and evaluation of applied critical thinking at RIT, and a critical thinking-centric proposal to Misk-Gates Foundation. Internal efforts include establishment of the International Fram advisory board (IFAB) that includes members from our international campus locations, the very first Provost's Learning Innovations Grants (PLIG) awards, formation of a workgroup specifically dedicated to critical thinking, continuation of Teachers on Teaching workshops, and creation of rubrics for ACT-related analysis and evaluation of creativity and innovation student learning outcomes.   Thirteen Fram events and collaborative programming created significant campus engagement and resulted in further growth of the faculty/staff ACT community of practice. The year-over-year participation increased 42% despite the ongoing challenge of capturing interest on our busy campus. Over the course of the last academic year, more than 850 participants actively engaged in specific Fram opportunities.

Introduction

The ACT initiative is lead and the report is compiled by the Eugene H. Fram Chair in Applied Critical Thinking (Fram Chair), Dr. Jennifer L. Schneider, CIH. In addition to her role as the Fram chair, Dr. Schneider is also a professor in Civil Engineering Technology, Environmental Management & Safety within the College of Applied Science & Technology at RIT, and leads the Collaboratory for Resiliency & Recovery at RIT. She specializes in HAZMAT, Risk-based Decision Making and Global Resilience. The internal Fram Advisory Board (FAB), the Fram External Advisory Board (FEAB), and the new IFAB all advise Dr. Schneider. Dr. Schneider is supported by a part-time Fram Faculty Fellow, Dr. Adrienne Decker, who specializes in computing pedagogy, and is an Associate Professor of Interactive Games and Media from the Golisano College of Computing and Information Sciences. Ms. Angela Brodie of Academic Affairs, who specializes in business management and communications, provides full-time administrative support.

History

The Eugene H. Fram Chair in Applied Critical Thinking was funded in 2011 by an anonymous RIT alumnus to honor Professor Eugene H. Fram. Gene Fram is a Professor Emeritus of Marketing who retired from RIT in 2008 after 51 years of teaching at Saunders College of Business. He is known for his expertise in the study of retail malls and shopping, Internet retailing, nonprofit and corporate governance, and advertising. Professor Fram received his Ed.D. in Higher Education from the State University of New York at Buffalo, his MS degree in retailing from the University of Pittsburgh, and served as the J. Warren McClure Research Professor of Marketing at RIT. Gene is the recipient of the 1997 Eisenhart Award for Outstanding Teaching and the RIT Presidential Medallion in 2008.

Dr. Clarence Sheffield served as the inaugural Fram Chair from 2012 to 2015, and laid the foundation for the effort, including establishing the first faculty advisory board, writing of the *Critical Thinking Across the Curriculum* report, adoption of general education student learning outcomes for critical thinking, engaging faculty and students through small group events and hosting of five speakers.

The effort was reorganized in 2015-16 with the appointment of Dr. Schneider. Major accomplishments in that year included seating of a faculty advisory board, creation of a strategic action plan, creation of a website, *Fram Focus* newsletter, examination of learning outcomes related to ACT, establishment of the Fram Award, and ten major events, including signature events over three days that featured Dr. Luis Amaral of Northwestern University. In 2015-16, Dr. Schneider was also supported part-time by Dr. Evelyn Brister of COLA, Philosophy, who created a new course in 'Responsible Knowing'. Dr. Schneider began the practice of disseminating an ACT annual report that summarized efforts and accomplishments.

In 2016-17, significant accomplishments included fourteen events with over 600 participants, including the hosting of Dr. Ann Quiroz Gates for the Signature events over two days in April 2017, offering multiple student-centered events and a culminating signature lecture, completion of the argumentation rubric, gathering of best practices, creation of the external alumni advisory board. The effort also implemented an engagement strategy including an expanded social media presence, growing the community of practice, and a student created video designed to introduce critical thinking concepts to RIT students.

Purpose

The purpose of this report is to provide a summary of the efforts and accomplishments related to ACT for the 2017-18 academic year, a list of recommendations for future efforts, and to define benchmarks for the ongoing evaluation of our progress.

Establishing the reputation of RIT as a national leader in Applied Critical Thinking relies upon a university-wide commitment coupled with a notable external contribution to the development of applied critical thinking. To ensure success, the university is (1) developing a continuous improvement process grounded in performance measures and student achievement assessment, (2) continually seeking and sharing best practices and opportunities, (3) integrating high-quality ACT learning opportunities across the student experience, general education and program curricula, and experiential education, and (4) creating and contributing scholarship.

Initiative Aims & Rationale

Our global society has higher expectations of those in positions of leadership, **simply knowing** is no longer enough. Decision makers must think critically to assess and strategize within complex, interconnected systems, continually adapt to rapidly evolving technological, aesthetic, and social environments, and manifest new ideas, both individually and collectively.

In response, RIT created the **Applied Critical Thinking (ACT at RIT)** initiative to foster the application of critical thinking – *the exercising of effective thinking in any context*. **Application of critical thinking connects this performance chain of knowing-doing-creating.** The initiative is guided by several working definitions, including:

- **RIT University Educational Goal and Essential Program Outcome: Critical Thinking** refers to those processes required to understand and evaluate complex claims of various sorts. It involves the evaluation of information, evidence, arguments, and theories, and the contexts in which these are encountered. It entails the questioning of different and competing perspectives, and challenging the (sometimes hidden) assumptions and inferences that determine what will count as evidence or argument. Critical thinking is learning to think in a disciplined and evaluative manner, to analyze and interpret the processes by which various claims are made and reliable conclusions are reached (RIT Essential Outcomes)

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- **Critical Thinking Across the Curriculum: Critical thinking is…**the ability to identify, analyze, construct, and evaluate evidence and arguments in a deliberate and rigorous way' or 'The growth of educated thinking'**.** (C. Sheffield, Critical Thinking Across the Curriculum Report, 2014)

- **Fram Advisory Board: "**At RIT, **ACT** is an active form of engagement, drawing from our diverse domains and deep expertise to address the questions and challenges that we face. As the uncertainties and the magnitude of impacts increase in our complex world, we must now consider a wider range of possible outcomes. To do this well, we need to employ thinking that draws from multiple, diverse environments to more fully inform our evaluation and resultant strategies." (Fram Advisory Board, [Fram Award at Imagine](#)).

We systematically integrate critical thinking across the student experience to develop critical thinking in diverse settings. ACT at RIT is cultivated through learning expectations of *defining* the quality information, *analyzing* and *developing* a point of view, *solving* of complex problems, and *creation*. These elements are embedded into our curriculum and practiced intentionally in ever-broadening and diverse environments of experiential learning. RIT's renowned experiential learning program, the prolific use of projects and teams, community service programs, international experiences and programs, entrepreneurship and research opportunities, and participation in student groups in and out of the classroom are all valuable to the initiative. The ACT skills students develop transfer into every other area of life and are the impetus for growth, professionalism, and creative expression, empowering our alumni to realize their unique contribution to our world through whatever path they choose or create.
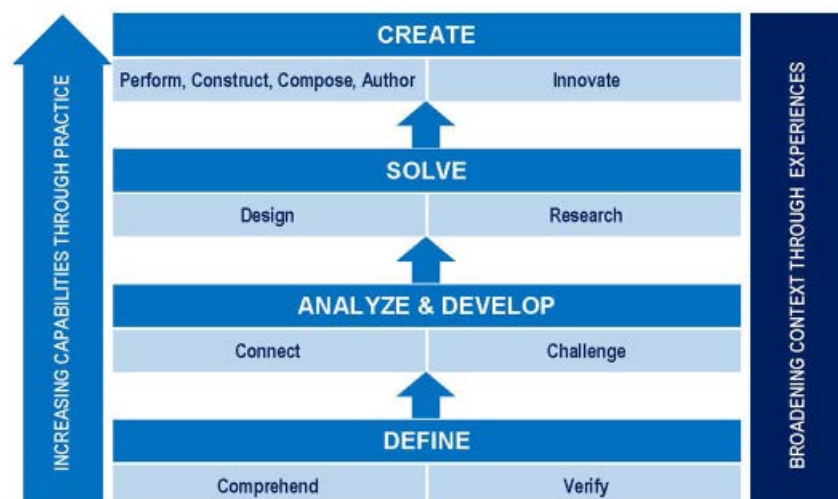
2017-2018 Management & Structure of the Initiative:

Fram Advisory Board (FAB)

In August 2016, the Fram Advisory Board (FAB) membership was again confirmed by the college deans & directors. Most members from the previous year chose to remain on the board for 2017-18 (Table 2). This board has representation from all colleges and student affairs at RIT. The duties of the board members are to guide ACT efforts and advocate for/be a conduit for ACT at RIT. This year we also added a student representative.

Table 2.

2017-18 Fram Advisory Board

- **Callie Babbitt**
  Golisano Institute for Sustainability
- **Heath Boice-Pardee**
  Student Affairs
- **Corey Crane**
  College of Health Sciences & Technology
- **Kevin Dolan**
  Undergraduate Student Representative
- **Roger Dube**
  College of Science
- **David Long**
  College of Imaging Arts & Sciences
- **Rachel Mazique**
  National Technical Institute for the Deaf

- **Les Moore**
  Saunders College of Business
- **Sylvia Perez-Hardy**
  Golisano College of Computing & Information Sciences
- **Patricia Poteat**
  College of Applied Science & Technology
- **Colette Shaw**
  Student Affairs
- **Brian Thorn**
  Kate Gleason College of Engineering
- **Larry Torcello**
  College of Liberal Arts

Fram External Advisory Board (FEAB)

The Fram External Advisory Board is selected from RIT's notable alumni (Table 3). These board members bring an external point of view and guidance to the initiative. The current members serving 2- or 3-year renewable terms are:

Table 3

2017 Fram External Advisory Board

- **Jason Edwards** (Saunders College of Business, MBA 2003)
  Vice President of Category Leadership - Total US Grocery Pinnacle Foods Group LLC

- **Robert Jacoby** (Civil Engineering Technology, B.S./Environmental Management 1977)
  Consultant to the Energy Industry
  Former Global Manager at Royal Dutch Shell

- **Ellen Moser** (Computer Technology, B.T. Software Science 1981)
  Board of Directors
  Fundraising Committee Chairperson Brentwood Library Foundation

- **Daniel Norselli** (Saunders College of Business, Executive MBA 2012)
  President & Publisher D&C Digital

- **Chris Petescia** (College of Art and Design, B.F.A. Graphic Design 2005)
  Chief Experience Officer Carrot Creative

- **William Standwill** (College of Art and Design, B.S. Graphic Communications 1988)
  General Manager, International T2 Biosystems, Inc.

- **Chris Tanski, MD, MSEd** (College of Engineering Technology, B.S. Information Technology 2000)
  Assistant Professor of Emergency Medicine SUNY Upstate Medical University

- **Krista Vardabash** (Saunders College of Business, MBA 2012)
  KV Strategies

Defining Applied Critical Thinking at RIT

**Definitions:** Currently, there are various definitions for applied critical thinking in use at RIT. Further information can be found on our website. We develop the application of **effective thinking in any context**.

General Education & Program Student Learning Outcomes

The teaching and assessment of ACT at RIT is managed through a comprehensive general education and program strategy founded on student learning and program goals. General education outcomes have been codified by the governing committee, and adopted accordingly. The abbreviated outcomes are listed in the professional practice column of the chart below because these inform the building of a competent, professional, and capable critical thinker. The full description of ACT student learning outcomes are noted in Appendix 1. RIT measures student critical thinking at several opportunities along the student experience as follows:

1. University level Essential Program Outcomes assessed in designated general education courses
2. Program learning outcomes
3. Cooperative employer feedback
4. National Survey of Student Engagement (NSSE)
5. RIT's alumni survey (broad in scope)

Figure 1 – ACT Outcomes Map
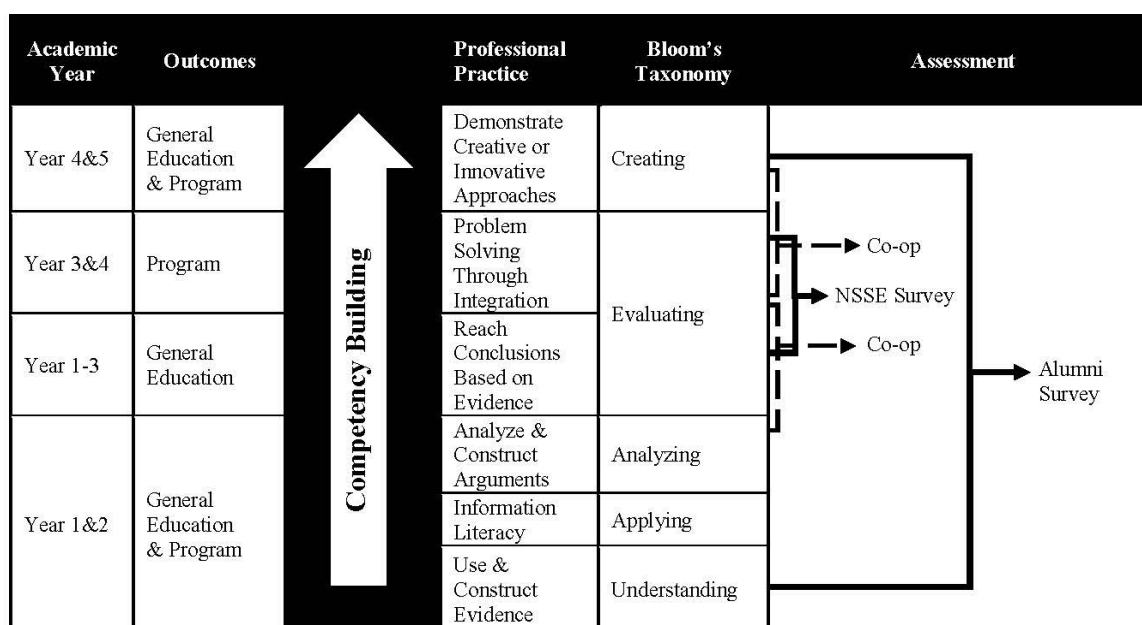
Applied Critical Thinking Strategic Action Plan (2015-18)

The major goals for 2017-18 were the continuing implementation and completion of the strategic action plan to operationalize ACT. This plan includes focus areas of creating engagement, pedagogy, scholarship and practice. 2017-18 is the third year of that three-year plan, and the new draft plan will be finalized in 2018 to coincide with the new university plan.

Highlights of Accomplishments in 2017-18

Management & Continuous Improvement (Process):

- Successfully completed the 2015-2018 Fram SAP, with all required university level and department standard operating procedures elements now implemented.

- In Fall 2017, Dr. Adrienne Decker began her part time tenure as the next Fram Faculty Fellow. Her activities were within scholarship and pedagogy, and she was responsible for leading an analysis of coop data and scholarly artifact data as well as managing Teachers on Teaching events with ILI, described in the sections below. Dr. Decker's first year was very successful, she met or exceeded all expectations. As a result, she has been asked to extend into 2018-19.

- Created and implemented an international campus Fram advisory Board to begin the ACT awareness and processes on other RIT sites.

- Drafted a new strategic action plan (SAP) with the FAB, which is currently waiting for the university SP to be finalized. When the university plan is released, the Fram SAP will be updated to reflect the university plan.

- Continued to integrate and advance the initiative, in accordance with the drafted 2018 plan.
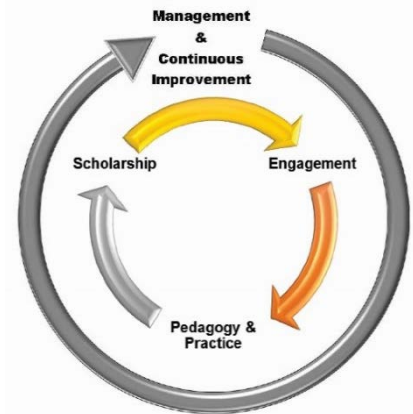
Creating Engagement:

- Communication Plan: We have had a marked increase in engagement across all communication platforms in AY 2017-18. The Fram website attracted 2,944 hits, more than doubling last year's total of 1,262 hits. This is accompanied by an equally significant increase in Facebook and Twitter activity, with Facebook activity reaching 6,413 and Twitter rising to 18,213 in the same period (see Appendix 2). In addition to increasing our social media

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presence, ten issues of the [Fram Focus](#) were published. These highlight upcoming Fram events, co-sponsored events, Community of Practice recognition for excellence in Applied Critical Thinking, and feature relevant news and scholarly articles selected by Eugene H. Fram.

We continue to place emphasis on growing both local and non-local visibility by building relationships with valuable partners such as RIT University News, and engaging others on social media.

Events:

- The Fram Speaker Series speaker welcomed RIT alumnus Jason Blythe, user experience designer for Google. Mr. Blythe graduated from RIT with an MFA in computer graphics design (now visual communication design) in 2005. He also earned his BFA in graphic design from RIT in 2002. Attendance for his eight classroom visits totaled 125, and his lecture entitled "Ignite Your Creative Spark," exceeded 250.

- Teachers on Teaching: The goal of these workshops is to support and increase faculty-driven pedagogy in Applied Critical Thinking

  - April 5, 2018 – David Simkins, Interactive Games and Media – "Using Role Play to Contextualize Critical Thinking in the Classroom" with David Simkins (8 Attendees)

  - November 28, 2017 – Paul Tymann, C-CORE and Paulette Swartzfager, English – "Faculty Assessing What We Value, Students Valuing What We Assess, Session 2" (8 Attendees)

  - September 26, 2017 – Paul Tymann, C-CORE and Paulette Swartzfager, English – "Faculty Assessing What We Value, Students Valuing What We Assess, Session 1" (10 Attendees)

Co-Sponsored Events:

The purpose of sponsoring events across RIT is to create domain-specific engagement with the university-wide initiative.

- Gray Matter

  - February 16, 2018 – "Values vs. Value$...and where does RIT fit?" (19 Attendees)

  - September 15, 2017 – "Failure, Fear & Fault: What's wrong with YOU?" (52 Attendees)

- College of Business Co-Sponsored Event

  o April 18, 2018 – "Becoming a Business Leader" (30 Attendees)

- College of Applied Science & Technology

  o April 20, 2018 – CAST Applied Critical Thinking & Learning Showcase (60 Attendees)

  o December 7, 2017 – CAST Applied Critical Thinking & Learning Showcase (100 Attendees)

- College of Science

  o April 11, 2018 – "The Seven Deadly Sins of Big Data - and How to Avoid Them" with Dr. Richard De Veaux (100 Attendees)

- School of Individualized Study

  o November 16, 2017 – SIOS and the Office of the Fram Chair present "Adam Kubert: The Narrative Art of Comics" (80 Attendees)

- Student Group Events

  o October 20-22, 2017 – Thought at Work Conference: "The Lazy Sunday Panel: Critical & Creative Thinking" – This annual event is a design conference made for students, by students, and was sponsored in collaboration with the College of Art & Design (125 Attendees)

  o March 30, 2018 – Women of Excellence Supporting STEM (WOESS): STEM Olympics (25 Attendees)

Critical Thinking Course Highlights

  o **Year One course:** Working with a team of instructors and lead by Dr. Heath Boice-Pardee of Student Affairs, RIT piloted and offered a 'Superhero' Year One course for four sections, one of which was led by Dr. Schneider. These courses are a unique set focused on the introduction and development of critical thinking, communication and collaboration. The pilot was very successful and informed Student Affairs further development of an exciting next generation year one experience. See Appendix 3 for more information about the Year One Superhero pilot.

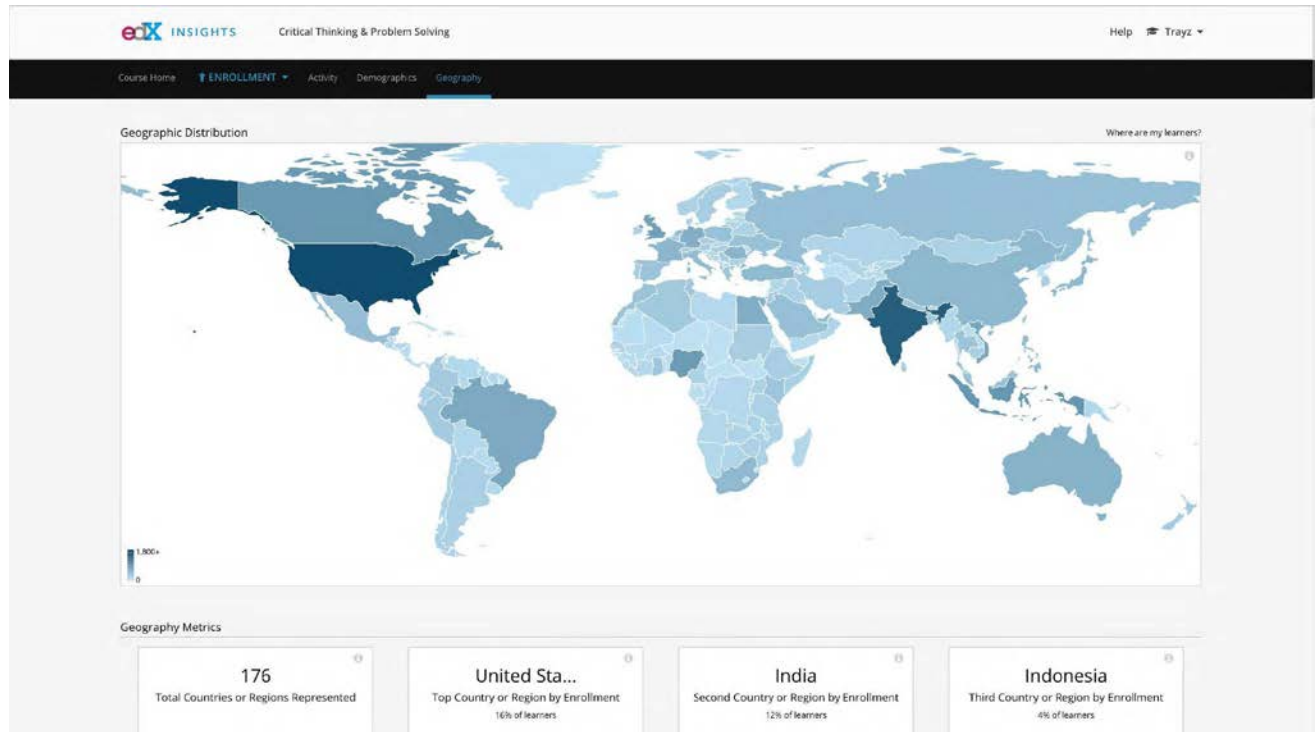o **RIT edX** (part of RITx Soft Skills Professional Certificate):

RITx Critical Thinking:

Enrollments (to date) – 46,733

Verified Enrollments – 560

Passing Learners – 1,224

The graphic below illustrates the geographic distribution of learners in this course.

2018 Fram Award at Imagine

These awards highlight student achievements in critical thinking and increase recognition of the efforts of the Fram Chair across the university. This year's annual awards given for both small group and large groups, with submissions that warranted the addition of an Honorable Mention category (see Appendix 4 for full descriptions):

- **Small Group Award:** Commercializing Pumice Roofing Tiles in Nicaragua

Team: Thomas J. Higgins III, Karina Alexandra Penaloza, Camila Mota Oliveira

- **Large Group Award:** Composting & Recycling: Imagine Sustainability & Food

Team: Stefano Alfredo Agostino, Carmella Mapong, Anak Bangkong, Sarah Brooke Bentzley, Matthew Bollinger, Scott Alexander Carlton, Ashley Casimir, Mercy Chado, Alyssa Christner, Ibrahim Cisse, Joshua Thomas Dunn, Tyler Joseph Gamble, Austin Joseph Giacomelli, Aleksandrs Huck, Eric Kelleher, Ethan J. Koval, Katherine Rose Larson, Joelle Christina Marston, Grayson Charles Morin, Alex Nieschlag, Jenny Rose Patterson, Morgan K. Rennie,

Elizabeth Ciaccia Rintels, Hannah Elizabeth Schewtschenko, Corbin Frank Shamburger, Yang Shen, Jorge Daniel Soto, Amelia Millicent Sykes, Michelle Wong, Andrew Bernard Yoder, Violet Evening Young, Elizabeth Alice Moore

- **Honorable Mention:** Molecular Glasses Consulting Project – Feasibility of the Automotive Industry

Team: David Even, Katie Green, Rebecca Searns

Pedagogy & Practice

- <u>Community of Practice & Exemplars</u>: Our current Community of Practice membership now includes fourteen RIT faculty and staff members, broadly representing the university.

- <u>Provost's Learning Innovation Grants</u>: 2017-18 marks the first year that these grant awards included Applied Critical Thinking. Faculty were invited to participate in a yearlong, supported working group that began in the spring of 2018. ACT-related grants awarded included:

  o Jeanne Christman, Associate Professor, CAST (Maureen Valentine & Rob Garrick) "Design Thinking and Problem Based Learning"

  o Clark Hochgraf, Associate Professor, CAST "Autonomous Robot Systems as a Context for Critical Thinking"

  o Carlos Rivero, Assistant Professor, GCCIS "Why am I getting this? Helping Students Understand Unexpected Results in Big Data Databases"

  o Cory Stiehl, Senior Lecturer, KGCOE (Iris Asllani) "Development of Companion Projects for Vertical Integration of Design Experiences Through the BME Curriculum"

- o Hadi Hosseini, Assistant Professor, GCCIS "An Interactive Online Platform for Artificial Intelligence Education"
- o Daniel Worden, Visiting Assistant Professor, SOIS (Steven Galbraith & Rebekah Walker) "The History of Comics: Archive and Analysis"

- Assessment: There are approximately 600 general education courses related to ACT and many program-level courses that exemplify ACT at RIT. We continue to build our assessment strategy for ACT through these courses. Examples include:

  - o Piloting of Longitudinal Study: Fall 2017, in conjunction with the Superhero Year One (YO) course, the Fram Chair piloted a new assessment survey that gathered information on student's personal evaluation of their ACT knowledge and skill set. This pilot information will be used to inform and forward a broader longitudinal study examining the growth of student ability to apply critical thinking across their student experience.

  - o Student Learning Outcomes & Rubrics: Working with the assessment office, the rubrics for *Reach sound conclusions based on logical analysis of evidence* and *Demonstrate creative or innovative approaches to assignments or projects were created by a faculty team.* These rubrics are both ready for pilot implementation Fall 2018. This completes the ACT SLO rubrics. As part of the new Gen ED advisory, we intend to review, edit, and possibly amend the ACT SLOs in the near future. We are also considering adding an additional problem solving ACT SLO on the program side.

  - o KGCOE Pilot Assessment: Dr. Schneider worked with KGCOE to pilot the ACT assessment survey in select freshman courses

  - o CAST Pilot Assessment: Dr. Schneider also worked with CAST to pilot the ACT assessment survey across various courses within that college. The implementation in CAST aimed at measuring the impact of specific experiences and interventions within the select courses, and involved over a dozen courses and diverse programs and faculty in fall and spring semesters.

  - o ACT Assessment Survey Results: Early results are promising and analysis is still being completed.

Scholarship

- Analysis of Scholarly Artifacts: Dr. Adrienne Decker led the analysis of ACT scholarly artifacts through review of the 2014 to 2017 Provost's Scholarship report, finding less than 2% of RIT scholarship is in this domain, nevertheless, critical thinking is part of every high quality scholarly product. The report can be found in Appendix 5.

- Papers & Presentations:

    o Decker, A**.**, Schneider, J. and Margulieux, L.M. (2018) "How Engineering and Computing Students Demonstrate Critical Thinking During Required Co-op Work Experiences", *Proceedings of the 2018 Frontiers in Education Conference*, October 3-6, 2018, San Jose, CA, 9 pages. [in press]

    o Beth Carle, Jennifer Schneider, and Michael E. Long, "Mapping the development of applied critical thinking skills in engineering technology majors", 2018 ASEE Mid-Atlantic Section Spring Conference, ASEE PEER, https://peer.asee.org/29466, April 6, 2018.

External Grant Proposal

- Misk-Gates Foundation Proposal

    Title: *Misk-Gates Grand Challenges/Explorations: Development of Applied Critical Thinking for Engaged Global Citizenship Through Unique Challenge Learning*

    Introduction: We will create a model that empowers youth to engage in Applied Critical Thinking (ACT) with thinking and problem solving on the local level while they simultaneously contribute to a collaborative effort to address a global grand challenge topic. Our proposal cultivates the 21st century skillset of ACT in a collaborative context to develop global citizenship.

External Engagement Efforts

RIT continued to engage externally in many efforts. We have begun making strides in creating external partnerships and building reputation over the past year. These efforts include:

- **Possible AITU Summit**: *Building Critical Thinking Capacity for the Future of Work.*

    A possible peer university summit is in consideration for Summer 2019. Initial discussions and

planning have begun for a possible sharing and benchmarking summit led by RIT with our peer universities to further explore how technologically oriented universities answer the challenge of infusing critical thinking into our student experience.

- **Leveraging RIT's participation in a2ru**

  A2ru is a consortium collaboration that supports ongoing national efforts in the infusion of creativity and performance into STEM-oriented campuses and colleges. We have begun conversations regarding our potential contributions to future events that combine creativity and critical thinking, or explore the relationship between critical thinking and the development of design and performance skills.

Integration with RIT's major initiatives

RIT is operationalizing a new university strategic plan in which the ACT at RIT initiative is explicitly highlighted. The importance of ACT in RIT's long-term strategy is evident. Development of leaders and entrepreneurs requires fostering of complex visionary thinking that is grounded in ACT skills.

Challenges to ACT integration

The ACT at RIT initiative faces challenges that must be overcome collaboratively. We must continue to foster engagement of our own RIT community by establishing both top-down and bottom-up support. In addition, we must continue to build connections at both the general education and program level. This may be best accomplished through the fundamental problem structure and problem solving curricula that is an integral part of our academic programs. Achieving notoriety is of paramount importance. It is a simple truth that there are many priorities and distractions on a college campus that make it difficult to emerge from the crowd of opportunities, particularly without a clear connection to the disciplines that attracted students to RIT. The educational community, as well as popular media and literature, paints a somewhat negative picture of college students' ability to think and focus beyond self. This view is not lost on our students and does not make it easy to build a rapport and inspire interest in engaging in critical thinking activities. Further, learning and practicing critical thinking is difficult, takes time, and is resource-intensive for faculty, students, and classes, requiring a significant commitment on the part of all, including the university itself. In RIT's case, the next steps will require commitment at the program level, at the college level, and at the university level. To be truly integrated, it must be an expected *and* obvious part of each student experience, so that the students see and understand their role in developing their own capabilities.

Opportunities

Applied Critical Thinking is part of the evolution of the RIT education. Our foundation as a career-oriented university speaks directly to our commitment to critical thinking. RIT is a community that fosters both capability and innovation. We are doers and dreamers and ACT is a fundamental skill to ensure future success. The university is committed to providing an education that translates knowledge from theory to practice, converting dreams into real-life solutions, and building the structures, operations, and expectations for *manifesting* ACT at RIT and beyond.

ACT Recommendations

Our efforts in ACT now give us the opportunity to make a significant impact both inside and outside of RIT. We have built the structures that will allow our effort to mature and evolve as needs change. The Fram Chair is ultimately responsible for the leadership of the ACT initiative by creating community engagement. Our immediate goal is to increase faculty, staff, and student capacity to practice ACT by significantly enriching (or expanding) the student experience. We will use this student-experience focus to impact our world through scholarship and efforts that extend beyond the classroom. The major goals for 2018-19 are focused on:

- Further integration and continuous improvement of the Fram/ACT effort, through the development of data-informed continuous improvement

- Increasing connections between traditional and experiential education experiences to develop student ACT skills, including ACT as a contributor to interdisciplinary efforts, innovation and creativity, and the arts and technology, and

- Dissemination of the ACT model and methodology beyond the RIT community.

The major recommendations for the continued growth of ACT at RIT in 2018-2019 are listed below:

Management Systems & Continuous Improvement

- *Ensure goals support and integrate into RIT Strategic Plan through implementation of the Fram Strategic Action Plan (for 2018-2021)* and through building an operational, assessed, and continuous-improvement focused ACT effort

- *Focus on continuous improvement to ensure the effort remains relevant as the needs of the university expand and evolve over time.*

Engagement

- *Foster an external and internal dialogue* around ACT through an engagement and communication plan that will establish our reputation as a leader in the development of ACT skills

- *Grow the reputation of ACT at RIT through* the hosting of impactful events designed to inspire the RIT community; encourage college-level ownership and participation in planning events and creating engagement at all levels

- *Implement an external engagement strategy* to share our model and best practices, and by doing so, generate a national conversation on the application of critical thinking

- *Recognize and celebrate accomplishments of faculty, staff, and students that define* excellence in ACT at RIT to grow engagement at all levels.

Pedagogy & Practice

- *Continue to facilitate the integration and cross-pollination* of ACT into corollary efforts, developing a relationship and fostering integration with RIT colleges, faculty, and staff

- *Begin implementation of a 'problem structure and solving' program related student learning outcomes, explore the editing of ACT SLOs and determine path forward based upon findings*

- *Benchmark or create, and pilot metrics* for ACT across the student experience

- *Continue to foster a community of practice and sharing of ACT concepts in order to increase impact*

- *Broaden implementation of a longitudinal assessment of an ACT student cohort to measure our effectiveness over time and develop benchmarking of external measures of ACT skills.*

Scholarship

- *Assess and foster future growth in RIT-ACT related scholarship by continuing to pursue additional external funding in the ACT arena as available to support this growth*

- *Seek opportunities to expand dissemination of ACT-related scholarship*

Establishing a national reputation relies upon a university-level commitment coupled with notable external contributions to the development of applied critical thinking. Achievement of these objectives will require a complete understanding of how RIT shapes critical thinking capability in its students, and the resulting evidence of exceptional outcomes. To ensure success, the university must

(1) establish a continuous improvement process grounded in performance measures and student achievement assessment (2) continually seek best practices and opportunities, (3) integrate high quality ACT across general education and program-level experiences for students, and (4) demonstrate results and contribute scholarship artifacts that are recognized internally and externally.

Conclusion

The applied critical thinking initiative has the required components in place to achieve our goals for RIT students and alumni and national prominence and recognition. We intend to be both an integrative and yet forward-thinking presence at RIT and beyond. We must foster critical thinking to foster and support effective and engaged citizens that can successfully face the challenges of our evolving world and create a compelling future.

Appendix 1 – Learning Outcomes

RIT Essential Outcomes | Critical Thinking

Critical Thinking refers to those processes required to understand and evaluate complex claims of various sorts. It involves the evaluation of information, evidence, arguments, and theories, and the contexts in which these are encountered. It entails the questioning of different and competing perspectives, and challenging the (sometimes hidden) assumptions and inferences that determine what will count as evidence or argument. Critical thinking is learning to think in a disciplined and evaluative manner, to analyze and interpret the processes by which various claims are made and reliable conclusions are reached. (Source: RIT current Essential Outcome Definition)

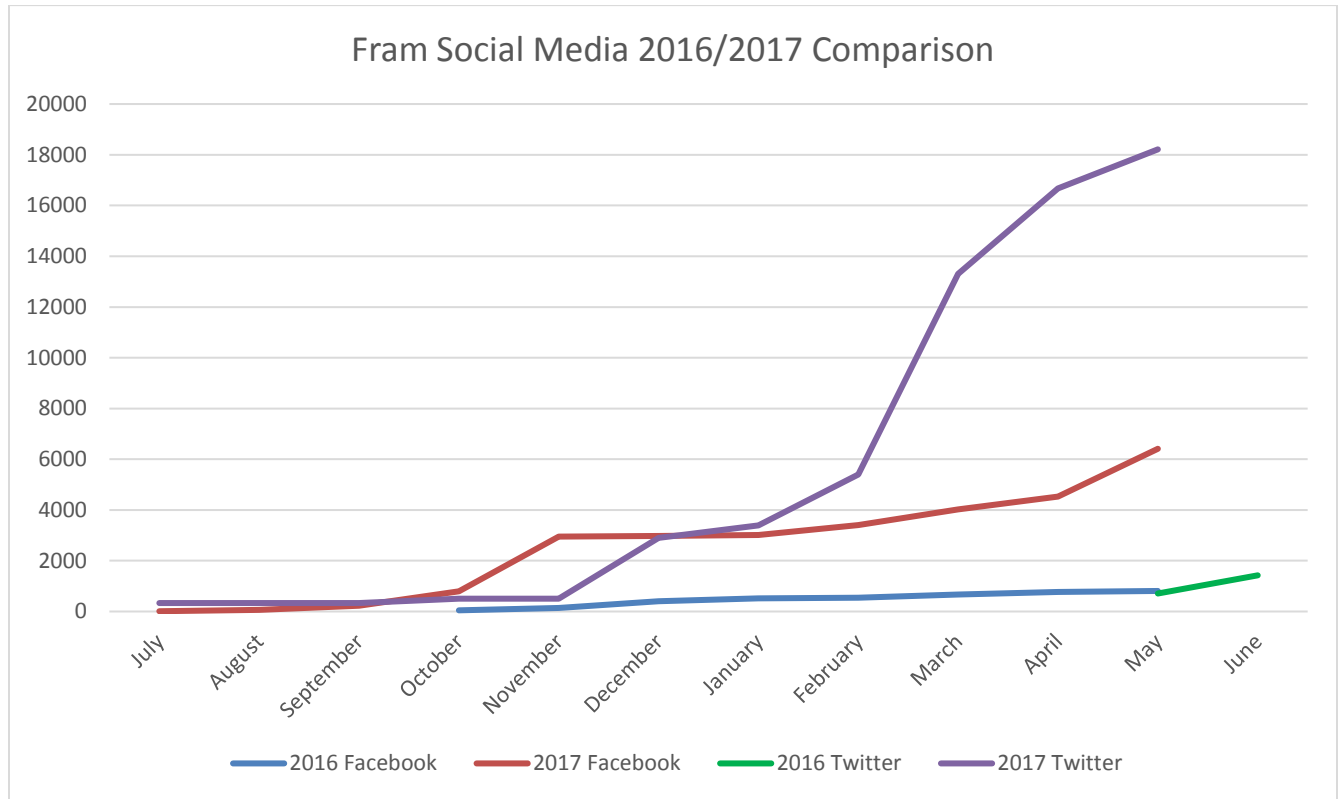| Data Sources	Academic Programs	Co-op Employer Evaluation 2013-14	NSSE 2013	Alumni Survey 2014
Measure and Results	100% of programs identified at least one program goal/slo Other: TBD	**Critical Thinking:** *Effectively solves problems by integrating a diverse body of knowledge and skills.* (n=3134) 4.1 out of 5.0 **Met** **Information Literacy:** *Accesses and synthesizes information from appropriate sources* (n=1461) 4.2 out of 5.0 **Met**	NSSE 4b *Applying facts, theories, or methods to practical problems or new solutions* Senior **Approaching** RIT 3.1, Carnegie Peer 3.2 NSSE 4c. *Analyzing an idea, experience, or line of reasoning in depth by examining its parts* Senior **Approaching** RIT 3.0, Carnegie Peer 3.1 NSSE 4d: *Evaluating a point of view, decision, or information source* Senior **Not Met** RIT 2.7, Carnegie Peer 3.0 NSSE 4e. *Forming a new idea of understanding from various pieces of information* Senior **Approaching** RIT 2.9, Carnegie Peer 3.0	**Critical Thinking** (n=~1350) Importance: 94% RIT Effective: 86% Gap Score: 8% **Problem Solving** (n=~1340) Importance: 97% RIT Effective: 90% Gap Score: 7 % Note: check to see if % are at top end of scale – see below
University Level Benchmark	100% of programs will identify at least one program goal/slo aligned to Critical Thinking	Employers will rate RIT students 4.0 or higher Scale 1(poor) - 5(excellent)	RIT Seniors will report a mean that is higher than or on par with their Carnegie Peers (n= 1500)	Needs to be determined Importance Scale: Not at All to Very Important Effective Scale: Not at all – A Great Deal
Preliminary Action Items	Develop faculty team to determine criteria, core assignment(s) and set benchmark	Review/analysis co-op student evaluation responses to qualitative questions re: CT	Review NSSE 2015 data for trends	Determine benchmark

RIT Student Learning Outcomes Assessment Office 2015

General Education Student Learning Outcomes
Assessment Schedule 2016-2022

Framework	General Education Student Learning Outcome	2016.17 Assessment		2017.18 Assessment		2018.19 Assessment		2019.2020 Assessment		2020.21 Assessment		2021.22 Assessment	
		Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Communication	Express oneself effectively in common college-level written forms using standard American English						X						X
	Revise and improve written products		X						X				
	Express oneself effectively in presentation, either in spoken standard American English or sign language			X						X			
	Demonstrate comprehension of information and ideas accessed through reading				X						X		
Critical Thinking	Use relevant evidence gathered through accepted scholarly methods and properly acknowledge sources of information				X						X		
	Analyze or construct arguments considering their premises, assumptions, contexts, and conclusions, and anticipating counterarguments	X						X					
	Reach sound conclusions based on logical analysis of evidence					X						X	
	Demonstrate creative or innovative approaches to assignments or projects						X						X
Social	Analyze similarities and differences in human experiences and consequent perspectives					X						X	
Global	Examine connections among the world's populations						X						X
Ethical	Identify contemporary ethical questions and relevant positions	X						X					
Scientific Principles	Demonstrate knowledge of basic principles and concepts of one of the natural sciences		X						X				
Natural Inquiry of Science	Apply methods of scientific inquiry and problem solving to contemporary issues and scientific questions		X						X				
Mathematical	Comprehend and evaluate mathematical or statistical information			X						X			
Mathematical	Perform college-level mathematical operations or apply statistical techniques			X						X			
Artistic	Interpret and evaluate artistic expression considering the cultural context in which it was created	X						X					

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Appendix 2 – Fram Social Media

Fram Social Media 2016/2017 Comparison

2016 Facebook   2017 Facebook   2016 Twitter   2017 Twitter

Appendix 3 – Selected CT Course: Year One

Year One: Future you: Constructing a Superhero

The skills needed for thriving in society have changed over time from the physical power of the Gladiator to the mental & social power of Mark Zuckerberg. With these changes has come an expectation from employers that college graduates demonstrate a wide range of competencies in addition to the knowledge acquired from their major. The future will require us to be even more amazing, not just to be smart or strong, but broadly capable in all facets of life. This course explores how we prepare ourselves for the society of today and tomorrow through identifying our specific strengths, grappling with our weaknesses, and understanding the importance of the broad skills of collaboration, communication, and critical thinking.

Learn how we combine our own unique talents, and use them to our best advantage to reach our full potential.

Goals of Course:

YearOne will allow students to take full advantage of the academic and co-curricular activities and programs designed to promote a successful transition. Successful completion of the YearOne course will result in:

1. Increased awareness of enhancing communication, collaboration and critical thinking skills
2. Demonstrating membership and engagement in the RIT community
3. Understanding student roles and responsibilities at RIT
4. Demonstrating understanding of effective collegiate learning and effective use of study skills
5. Increased awareness of campus resources for personal and academic success

Course Learning Outcomes

1. Students will identify and utilize campus resources that aid in personal and academic success and transition to RIT
2. Students will reflect on their experiences to enhance their development of communication, collaboration and critical thinking skills
3. Students will explore RIT communities and events and reflect on their connection to RIT and engagement with the campus culture at various levels
4. Students will reflect on and self-assess their personal goals related to their transition to RIT and describe a plan that promotes a "growth mindset" for continued academic and personal success.

Appendix 4 – Fram Award for Excellence in Applied Critical Thinking at Imagine

Since applied critical thinking at RIT is an active process, awards are based upon the applicant's ability in their response to show evidence of the quality of the critical thinking process used to arrive at the final outcome of the exhibit. Responses are evaluated to the degree with which they demonstrate excellence in applied critical thinking. https://www.rit.edu/academicaffairs/applied-critical-thinking/awards.

2018 Winners

2018 Small Group

2018 Small Group Award: Commercializing Pumice Roofing Tiles in Nicaragua

Team: Thomas J. Higgins III, Karina Alexandra Penaloza, Camila Mota Oliveira

Abstract: This exhibit features the capstone project of three MS Management students trying to help an engineering team from KGCOE commercialize their pumice roofing tile design in Nicaragua. The students are trying to formulate accurate statistical projections to support recommendations for a go-to-market strategy for a new business in El Sauce, Nicaragua. The students are using statistical agency reports on key economic factors (i.e. GDP per capita growth projections, etc.) coupled with local vendor quotations and estimates to try and extrapolate potential market penetration, growth and success factors based on chosen business operation strategies for this new product.

2018 Large Group

2018 Large Group Award: Composting & Recycling: Imagine Sustainability & Food

Team: Stefano Alfredo Agostino, Carmella Mapong Anak Bangkong, Sarah Brooke Bentzley, Matthew Bollinger, Scott Alexander Carlton, Ashley Casimir, Mercy Chado, Alyssa Christner, Ibrahim Cisse, Joshua Thomas Dunn, Tyler Joseph Gamble, Austin Joseph Giacomelli, Aleksandrs Huck, Eric Kelleher, Ethan J. Koval, Katherine Rose Larson, Joelle Christina Marston, Grayson Charles Morin, Alex Nieschlag, Jenny Rose Patterson, Morgan K. Rennie, Elizabeth Ciaccia Rintels, Hannah Elizabeth Schewtschenko, Corbin Frank Shamburger, Yang Shen, Jorge Daniel Soto, Amelia Millicent Sykes, Michelle Wong, Andrew Bernard Yoder, Violet Evening Young, Elizabeth Alice Moore

Abstract: With increasing global challenges such as climate change and inequality, integrated solutions are needed. The United Nations Sustainable Development Goals (SDGs) including quality education, clean water, and no poverty challenge everyone to achieve the goals by 2030. Our Sustainable Development class has researched the sustainability pillars and identified a local sustainable development challenge in the context of the SDGs. Our exhibit highlights multiple solutions to educate the local community on the role they can play in helping to achieve the SDGs through proper composting and recycling practices to reduce waste, lower greenhouse gas emissions, and increase responsible consumption.

2018 Honorable Mention

2018 Honorable Mention: Molecular Glasses Consulting Project - Feasibility of the Automotive Industry

Team: David Even, Katie Green, Rebecca Searns

Abstract: Our project shows our team's findings and recommendations on whether or not Molecular Glasses, an OLED materials company, should enter the automotive industry. We took this broad question and did extensive primary and secondary research to answer it. We then applied further critical thinking to take the wide breadth of knowledge we discovered and turn it into actionable data. Some examples of business concepts we applied and developed were a condensed value chain, which included a detailed channel analysis, a competitor analysis including a SWOT and Porter's Five Forces Diagram as well as a market analysis with extensive research.

Appendix 5 – ACT Scholarly Artifacts

Applied Critical Thinking Scholarship Report
Adrienne Decker, Fram Faculty Fellow

Executive Summary:
Using the Provost's Scholarship report data, the submitted scholarly artifacts were examined to determine if the artifact was a scholarly work related to critical thinking. In 2014, approximately 3% of the scholarship of RIT was about critical thinking. In 2016, that amount was 2%.

Purpose: To determine how much faculty scholarship as captured in the Provost's Scholarship Report can be considered scholarship on applied critical thinking

Methodology: Using the CSV version of the scholarship reports from 2014 and 2016, the titles of the scholarly works were examined to determine if they directly dealt with or could be reasonably assumed to deal with applied critical thinking. Works were classified by a single coder as *critical thinking* if the words critical thinking were in the title, or if they were concerned with any of the following ideas: critical response theory, scholarship on the nature of research or learning, investigating how critical processes or infrastructure works or fails, or thought pieces on solutions to large or global problems. The list presented here is not exhaustive, but rather representative of the types of works that would have been classified as *critical thinking* in this analysis.

Results:
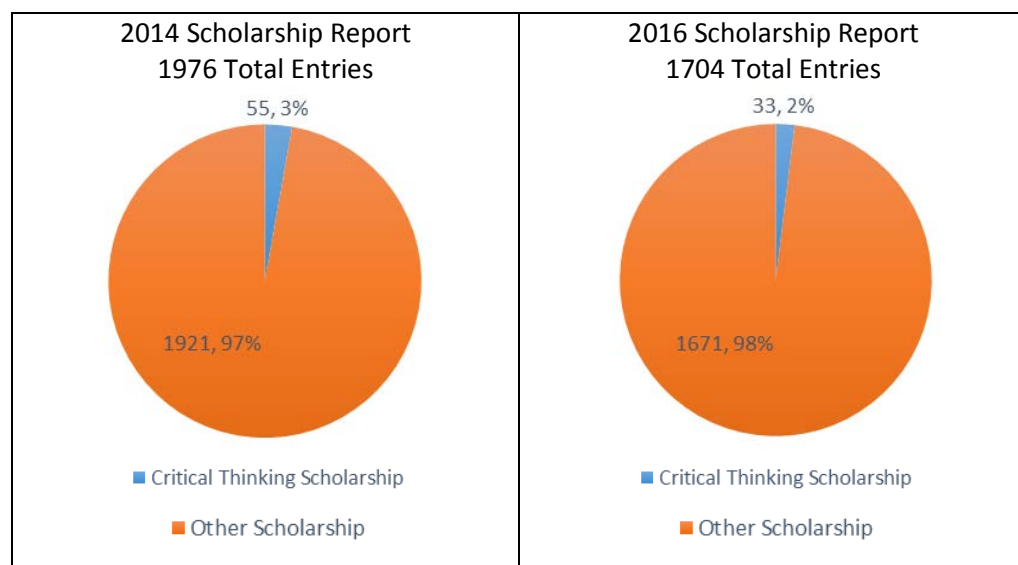
For 2014, there were 1976 works listed in the scholarship report. Of these, 55 were labeled as *critical thinking* in this analysis, encompassing 2.8% of the scholarly works.

In 2016, there were 1704 works listed in the scholarship report. Of these, 33 were labeled as *critical thinking* in this analysis, encompassing 1.9% of the scholarly works.