

Term Information

Effective Term Spring 2025

General Information

Course Bulletin Listing/Subject Area Chemistry
Fiscal Unit/Academic Org Chemistry - D0628
College/Academic Group Arts and Sciences
Level/Career Graduate
Course Number/Catalog 7620
Course Title Towards a More Inclusive Higher-Education Environment: Post Qualitative and Quantitative Methods
Transcript Abbreviation PQQM
Course Description This course introduces students to the interdisciplinary field of narrative inquiry and QuantCrit methods, aiming to bridge the gap between qualitative narratives and quantitative analysis in chemistry education.
Semester Credit Hours/Units Fixed: 1.5

Offering Information

Length Of Course 7 Week
Flexibly Scheduled Course Never
Does any section of this course have a distance education component? No
Grading Basis Letter Grade
Repeatable No
Course Components Lecture
Grade Roster Component Lecture
Credit Available by Exam No
Admission Condition Course No
Off Campus Never
Campus of Offering Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites Prior completion of Learning Theories in Chemical Education and Chemical Education Methods and Methodologies is preferred
Exclusions
Electronically Enforced No

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code 40.0501
Subsidy Level Doctoral Course
Intended Rank Masters, Doctoral

Requirement/Elective Designation

Required for this unit's degrees, majors, and/or minors

Course Details

Course goals or learning objectives/outcomes

- **Understanding Narrative Inquiry:** Gain a comprehensive understanding of narrative inquiry as a research approach, including its theoretical foundations, methodologies, and applications across various disciplines.
- **QuantCrit Familiarity:** Develop familiarity with QuantCrit methods, learning to critically analyze quantitative data through a lens that considers social justice, equity, and power dynamics.
- **Integration of Qualitative and Quantitative Approaches:** Learn how to integrate qualitative narrative data with quantitative analysis, recognizing the value of combining both approaches to achieve deeper insights into complex social phenomena.
- **Research Design Skills:** Develop skills in designing research projects that incorporate both narrative inquiry and QuantCrit methods, including crafting research questions, selecting appropriate methodologies, and addressing ethical considerations.
- **Data Collection Techniques:** Acquire proficiency in a range of qualitative data collection techniques used in narrative inquiry, such as interviews, participant observation, and content analysis.
- **Critical Analysis:** Develop the ability to critically analyze narratives and quantitative data, identifying underlying assumptions, biases, and power structures that may influence research outcomes.
- **Social Justice Lens:** Understand the importance of applying a social justice lens to research, examining how narratives and quantitative data can be leveraged to address issues of inequality, discrimination, and marginalization.
- **Ethical Considerations:** Explore ethical considerations inherent in narrative inquiry and QuantCrit analysis, including issues related to informed consent, confidentiality, and the representation of research participants' voices.
- **Communication Skills:** Enhance communication skills to effectively convey research findings to diverse audiences, including academic, policy, and public stakeholders, while maintaining sensitivity to the complexities of the data.

Content Topic List

- Foundations of narrative inquiry and its applications across chemistry and STEM disciplines.
- Techniques for collecting and analyzing qualitative narratives, including interviews, participant observation, and content analysis.
- Introduction to QuantCrit methods and their relevance in addressing social justice issues within quantitative research.
- Ethical considerations and challenges in narrative inquiry and QuantCrit analysis.
- Case studies exploring the intersection of narratives, quantitative data, and social justice issues such as race, gender, and class.
- Practical skills in synthesizing narrative and quantitative data to produce rich, nuanced analyses.
- Strategies for communicating findings effectively to diverse audiences, including academic, policy, and public spheres.

Sought Concurrence

No

Attachments

- JN_Towards a More Inclusive Higher Education Environment - Post Qualitative and Quantitative Methods_New Course Syllabus_20.docx
(Syllabus. Owner: Hambach, Jennifer Lynn)

Comments

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Hambach, Jennifer Lynn	04/11/2024 12:45 PM	Submitted for Approval
Approved	Schultz, Zachary DALE	04/11/2024 02:32 PM	Unit Approval
Approved	Vankeerbergen, Bernadette Chantal	04/25/2024 03:58 PM	College Approval
Pending Approval	Jenkins, Mary Ellen Bigler Hanlin, Deborah Kay Hilty, Michael Neff, Jennifer Vankeerbergen, Bernadette Chantal Steele, Rachel Lea	04/25/2024 03:58 PM	ASCCAO Approval

Chemistry 7620: Towards a More Inclusive Higher Education Environment: Post Qualitative and Quantitative Methods (Spring 2025)

Instructor

Dr. Josie (she/her) Nardo
Newman and Wolfrom Laboratory of Chemistry 1104A
Nardo.11@osu.edu

Class: Tuesdays 12:45 PM – 3:25 PM; **University Hall 066**

Office Hours: [By appointment](#)

Course Mission

In our increasingly data-driven world, narratives often take a backseat to numbers and statistics. However, narratives hold immense power in shaping our understanding of complex phenomena, offering unique insights into human experiences, culture, and society. This course introduces students to the interdisciplinary field of narrative inquiry and QuantCrit methods, aiming to bridge the gap between qualitative narratives and quantitative analysis in chemistry education. Narrative inquiry is a research approach that centers on the study of stories as a means of understanding human experience. It acknowledges that individuals make sense of their lives through stories and that these narratives carry valuable information about identity, beliefs, and social interactions. Through a blend of theoretical exploration and practical application, students will delve into the various methods of collecting, analyzing, and interpreting narratives across different contexts. Complementing narrative inquiry, QuantCrit methods provide a critical lens through which to examine quantitative data, interrogating the underlying assumptions, power dynamics, and social implications embedded within numerical analyses. By integrating quantitative and critical approaches, students will learn to uncover the complexities and nuances often overlooked in traditional statistical analysis, particularly in relation to issues of social justice, equity, and power structures. Throughout the course, students will engage in hands-on activities, case studies, and collaborative projects to develop their skills in narrative analysis and QuantCrit assessment. They will learn how to craft research questions that blend qualitative and quantitative elements, design methodologies that incorporate narrative data collection alongside statistical analysis, and critically evaluate the implications of their findings within broader societal contexts. By the end of the course, students will emerge with a deeper understanding of how narratives and quantitative methods can intersect to provide comprehensive insights into complex social phenomena, empowering them to conduct research that is both rigorous and socially conscious. Whether pursuing further studies or entering professional fields such as social sciences, education, or public policy, students will be equipped with valuable tools for addressing pressing societal challenges through a narrative lens informed by QuantCrit principles.

Course Objectives

1. **Understanding Narrative Inquiry:** Gain a comprehensive understanding of narrative inquiry as a research approach, including its theoretical foundations, methodologies, and applications across various disciplines.
2. **QuantCrit Familiarity:** Develop familiarity with QuantCrit methods, learning to critically analyze quantitative data through a lens that considers social justice, equity, and power dynamics.
3. **Integration of Qualitative and Quantitative Approaches:** Learn how to integrate qualitative narrative data with quantitative analysis, recognizing the value of combining both approaches to achieve deeper insights into complex social phenomena.
4. **Research Design Skills:** Develop skills in designing research projects that incorporate both narrative inquiry and QuantCrit methods, including crafting research questions, selecting appropriate methodologies, and addressing ethical considerations.

5. Data Collection Techniques: Acquire proficiency in a range of qualitative data collection techniques used in narrative inquiry, such as interviews, participant observation, and content analysis.
6. Critical Analysis: Develop the ability to critically analyze narratives and quantitative data, identifying underlying assumptions, biases, and power structures that may influence research outcomes.
7. Social Justice Lens: Understand the importance of applying a social justice lens to research, examining how narratives and quantitative data can be leveraged to address issues of inequality, discrimination, and marginalization.
8. Ethical Considerations: Explore ethical considerations inherent in narrative inquiry and QuantCrit analysis, including issues related to informed consent, confidentiality, and the representation of research participants' voices.
9. Communication Skills: Enhance communication skills to effectively convey research findings to diverse audiences, including academic, policy, and public stakeholders, while maintaining sensitivity to the complexities of the data.

Textbooks and Other Resources (All materials will be provided; these are supplemental resources)

Patel, L. (2015). *Decolonizing educational research: From ownership to answerability*. Routledge.

Mattingly, V., Grice, S., & Goldstein, A. (2022). *Inclusalytics: How diversity, equity, and inclusion leaders use data to drive their work*. Mattingly Solutions.

Salient journals: *Journal of Chemical Education*, *Chemistry Education Research and Practice*, *Journal of Research in Science Teaching*, *Science Education*, *Qualitative Inquiry*, *Journal of the Learning Sciences*, etc.

Format and Required Materials

Lecture, small group discussion, in-class polling questions/quizzes, readings, classroom activities, student presentations, and multiple modalities in which students can participate (thinking aloud, writing thoughts down, sharing representations, enacting gestures, etc.). Please download either [Zotero](#) or [Mendeley](#) as your reference manager and **please bring your computer, a mouse, and charger for every class session**.

Attendance

Punctual attendance is highly recommended considering the frequency and duration of this course. Nevertheless, life happens. If you miss a class session, are late, and/or must leave early, I recommend reaching out to a classmate or myself and identify what was missed. If there is a reason for repeated attendance problems, please speak with me privately. If there are extenuating circumstances that affect your ability to participate fully, please make arrangements to also speak with me privately and confidentially. Given the student-centered nature of this course, I will not be streaming and/or recording the class. Most of what you learn will be dependent on interactions with myself and your peers. Below are outlined university guidelines to help navigate your participation in the course if you need to have additional resources.

Disability Services

The university strives to maintain a healthy and accessible environment to support student learning in and out of the classroom. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. If you are isolating while waiting for a COVID-19 test result, please let me know immediately. Those testing positive for COVID-19 should refer to the [Safe and](#)

[Healthy Buckeyes site](#) for resources. Beyond five days of the required COVID-19 isolation period, I may rely on Student Life Disability Services to establish further reasonable accommodations. You can connect with them at slds@osu.edu; 614-292-3307; or slds.osu.edu.

Religious Accommodations

It is Ohio State's policy to reasonably accommodate the sincerely held religious beliefs and practices of all students. The policy permits a student to be absent for up to three days each academic semester for reasons of faith or religious or spiritual belief.

Students planning to use religious beliefs or practices accommodations for course requirements must inform the instructor in writing no later than 14 days after the course begins. The instructor is then responsible for scheduling an alternative time and date for the course requirement, which may be before or after the original time and date of the course requirement. These alternative accommodations will remain confidential. It is the student's responsibility to ensure that all course assignments are completed.

Mental Health Statement

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling [614-292-5766](tel:614-292-5766). CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at [614-292-5766](tel:614-292-5766) and 24 hour emergency help is also available 24/7 by dialing 988 to reach the Suicide and Crisis Lifeline.

Participation

Because of the student-centered nature of this course, participation is essential for your learning, your peers' learning, and my learning as well. However, I recognize that there are many ways in which one *can* participate. Contributing to discussions, posing questions, synthesizing literature, deeply reflecting, and drawing upon your lived experiences are all legitimate ways to participate. This course will emphasize students *talking, writing, organizing, and drawing* as indicators for participation. This course will challenge you to think about education research and science broadly in new and sometimes uncomfortable ways. It's important to remain openminded and respectful of your peers. **It's important to find a balance between listening and speaking as well as being mindful of how others are participating in the space.** Below are outlined university guidelines that impact participation.

Sexual Misconduct and Relationship Violence

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator at titleix@osu.edu. Please do not hesitate and report as soon as you can.

Diversity Statement

The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide

opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

Grades

Your final grade in this course will be determined by the total number of points earned, rounded to the nearest whole number percentage. For equity considerations, there will be no curve applied to this course.

Grade Component	Total Number of Opportunities	Total Number of Counted Attempts	Points Allotted (1000 points total)
Participation	30 points	20 points	140
Journals	5 journals	4 journals (100 points each)	400
Workshops	3 workshops	3 workshops (100 points each)	300
Final Project	1 project	1 attempt (110 points)	110
Final Exam	1 final exam	1 final exam	50

- 93% - 100% A
- 90% - 93% A-
- 87% - 90% B+
- 83% - 87% B
- 80% - 83% B-
- 77% - 80% C+
- 73% - 77% C
- 70% - 73% C-
- 67% - 70% D+
- 60% - 76% D
- 0% E

Late Policies on Assignments

All assignments are due at the date and time listed in the course schedule **unless you email me at minimum 12 hours beforehand that you need more time; you can only use this 3 times**. If you decide you need more time on an assignment, that is okay, but if you do not communicate this need to me beforehand, the assignment will be considered late and graded up to half-credit. For late assignments, please provide me with a new due date and time that no more than one week late. Journals are due before each class period (i.e., before Tuesdays at 11:59am) and workshops will take place every alternating week (i.e., after completing a type of method). Below are outlined university guidelines that impact assignments.

Academic Misconduct

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/csc/>

Course Schedule

Week	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
1	3/4	3/5 Activity 1	3/6	3/7	3/8	3/9	3/10
2	Spring Break (No Class)						
3	3/18	3/19* Activity 2 Journal 1 (Due 3/26)	3/20	3/21	3/22	3/23	3/24
4	3/25	3/26 Workshop 1 Journal 2 (Due 4/2)	3/27	3/28	3/29	3/30	3/31
5	4/1	4/2 Activity 3 Journal 3 (Due 4/9)	4/3	4/4	4/5	4/6	4/7
6	4/8	4/9 Workshop 2 Journal 4 (Due 4/16)	4/10	4/11	4/12	4/13	4/14
7	4/15	4/16 Activity 4 Journal 5 (Due 4/23)	4/17	4/18	4/19	4/20	4/21
8	4/22	4/23 Workshop 3 Final project (Due 4/30)	4/24	4/25	4/26	4/27	4/28
9	4/30 (Final given Tuesday 12:45-3:25)						
*I will be at ACS that week and will conduct the course asynchronously, meaning I will record and upload my presentation along with the in-class participation.							

Course Sessions

Unit	Class Dates	Class Schedule	Classwork	Homework
Introduction	Week 1 3/5	Start Time 12:45 45 minutes Overview and Class Norms -Break (10 minutes)- 45 minutes Activity -Break (10 minutes)- 45 minutes Reflection (3-2-1) End Time 3:25	Activity 1: Writing research questions	Readings (Due 3/19) 1. Patel, L. (2015). Decolonizing educational research: From ownership to answerability. Routledge.
	Week 3 3/19	Remote Session Overview of Qualitative Methods	Activity 2: Selecting a Theoretical Framework	Readings (Due 3/26) 1. Polkinghorne, D. E. (2007). Validity issues in narrative research. Qualitative Inquiry, 13(4), 471-486. 2. Denzin, N. K. (2006). Analytic autoethnography, or déjà vu all over again. Journal of Contemporary Ethnography, 35(4), 419-428. Journal 1 (Due 3/26)
Narrative Inquiry	Week 4 3/26	Start Time 12:45 45 minutes Jigsaw Paper Discussion -Break (10 minutes)- 45 minutes Workshop -Break (10 minutes)- 45 minutes Write-up End Time 3:25	Workshop 1: Applying a Theoretical Framework	Readings (Due 4/2) 1. Riessman, C. K. (2008). Narrative methods for the human sciences. Sage Publications. 2. Sparkes, A. C. (2002). Narrative analysis and performance enhancement. Sport Psychologist, 16(2), 172-191. Journal 2 (Due 4/2)

QuantCrit	Week 5 4/2	Start Time 12:45 45 minutes Overview of Quantitative Research -Break (10 minutes)- 45 minutes Activity -Break (10 minutes)- 45 minutes Reflection (3-2-1) End Time 3:25	Activity 3: Selecting a Methodology	Readings (Due 4/9) <ol style="list-style-type: none"> 1. Mattingly, V., Grice, S., & Goldstein, A. (2022). <i>Inclusalytics: How diversity, equity, and inclusion leaders use data to drive their work</i>. Mattingly Solutions 2. Van Dusen, B., Nissen, J., Talbot, R. M., Huvard, H., & Shultz, M. (2021). A QuantCrit investigation of society's educational debts due to racism and sexism in chemistry student learning. <i>Journal of Chemical Education</i>, 99(1), 25-34. Journal 3 (Due 4/9)
	Week 6 4/9	Start Time 12:45 45 minutes Jigsaw Paper Discussion -Break (10 minutes)- 45 minutes Workshop -Break (10 minutes)- 45 minutes Write-up End Time 3:25	Workshop 2: Applying a Methodology	Readings (Due 4/16) <ol style="list-style-type: none"> 1. Journell, W., & Kubinak, B. (2020). Applying Quantitative Critical Race Theory to Education Research. <i>Educational Researcher</i>, 49(4), 279-288. 2. Bicchieri, M., & Diminescu, D. (Eds.). (2018). <i>Quantcrit: A new toolkit for research in critical security studies</i>. ECPR Press. 3. Asencio, E. K., & Waheed, M. (2020). <i>QuantCrit: An Introduction and Framework for Critical Quantitative Literacy</i>. <i>Digital Humanities Quarterly</i>, 14(4). Journal 4 (Due 4/16)
Final Project (Mixed-Methods)	Week 7 4/16	Start Time 12:45 45 minutes Overview of Mixed-Methods Research -Break (10 minutes)- 45 minutes Activity -Break (10 minutes)- 45 minutes Reflection (3-2-1) End Time 3:25	Activity 4: Analysis of Data	Readings (Due 4/23) <ol style="list-style-type: none"> 1. Dumas, M. J., & Ross, K. M. (2016). <i>QuantCrit: Jump-starting the dialogue on race and policy analysis</i>. <i>Critical Sociology</i>, 42(5), 737-746. courses?. 2. Grzanka, P. R., & Mann, E. S. (2014). Queering heteronormativity: Theorizing straight normalization with QuantCrit approaches. <i>Journal of Homosexuality</i>, 61(5), 727-748. 3. Ladson-Billings, G. (2006). From the Achievement Gap to the Education Debt: Understanding Achievement in US Schools. <i>Educational Researcher</i>, 35(7), 3-12. Journal 5 (Due 4/23)
	Week 8 4/23	Start Time 12:45 45 minutes Jigsaw Paper Discussion -Break (10 minutes)- 45 minutes Workshop -Break (10 minutes)- 45 minutes Write-up End Time 3:25	Workshop 3: Writing up the project	Loveless, T. (2016). <i>The 2016 Brown Center report on American education: Trends in NAEP math, reading, and civics scores</i> . Brookings Institution. Study for Final Exam Finalize final project
Final	Week 9 4/30	Start Time 12:45 45 minutes Individual, closed notes -Break (10 minutes)- 45 minutes Group, open notes -Break (10 minutes)- 45 minutes Group, reflection End Time 3:25	Final exam and project	Celebrate!

Additional Readings [for additional enrichment]

Week 1

- Wright, C. E. (2023). Methods Matter: Learning from Institutional Ethnography and Intersectionality to Inform Interview Research Methods for Social Justice in STEM Education. *Journal of Women and Minorities in Science and Engineering*, 29(4).
- Marsh, D., & Furlong, P. (2002). A skin not a sweater: Ontology and epistemology in political science. *Theory and methods in political science*, 2(1), 17-41.

Week 2

- Azizova, Z. T., & Felder, P. P. (2017). Understanding racial/ethnic meaning making: Narrative analysis of STE [A] M doctoral student experiences. *Studies in Graduate and Postdoctoral Education*, 8(2), 144-168.
- Bosman, L., Chelberg, K., & Duval-Couetil, N. (2019). Using photovoice to enhance mentoring for underrepresented pre-engineering students. *International Journal of Engineering Education*, 35(1), 323-332.

Week 3

- Tan, E., & Barton, A. C. (2017, October). Designing for rightful presence in STEM-rich making: Community ethnography as pedagogy. In *Proceedings of the 7th Annual Conference on Creativity and Fabrication in Education* (pp. 1-8).
- Lucht, P. (2016). De-Gendering STEM—Lessons Learned From an Ethnographic Study of a Physics Laboratory. *International Journal of Gender, Science and Technology*, 8(1), 67-81.

Week 4

- Strunk, K. K., & Simpfenderfer, A. D. (2024). Queer Quantitative Methodologies in Educational Studies: Introduction to the Special Issue. *Educational Studies*, 60(1), 1-4.
- Pearson, M. I., Castle, S. D., Matz, R. L., Koester, B. P., & Byrd, W. C. (2022). Integrating critical approaches into quantitative STEM equity work. *CBE—Life Sciences Education*, 21(1), es1.

Week 5

- Guan, N. H., Bunyamin, M. A. H., & Khamis, N. (2020). Perspectives of STEM education from physics teachers' points of view: A quantitative study. *Universal Journal of Educational Research*, 8(11).
- Ralph, V. R., Scharlott, L. J., Schafer, A. G., Deshayre, M. Y., Becker, N. M., & Stowe, R. L. (2022). Advancing equity in STEM: The impact assessment design has on who succeeds in undergraduate introductory chemistry. *JACS Au*, 2(8), 1869-1880.

Week 6

- Nasri, N., Rahimi, N. M., Nasri, N. M., & Talib, M. A. A. (2021). A comparison study between universal design for learning-multiple intelligence (Udl-mi) oriented stem program and traditional stem program for inclusive education. *Sustainability*, 13(2), 554.
- Hanssens, J., Langie, G., & Van Soom, C. (2023). Students' perceptions of low stakes positioning tests at the start of higher STEM education: A mixed methods approach. *International Journal of Education in Mathematics, Science and Technology*, 11(5), 1094-1112.

Week 7

- Morgan, A., Smaldone, D., Selin, S., Deng, J., & Holmes, M. (2022). Adding relevancy to STEM interest through adventure education: A mixed methods study. *Interdisciplinary Journal of Environmental and Science Education*, 18(4), e2294.
- Bieri Buschor, C., Berweger, S., Keck Frei, A., & Kappler, C. (2014). Majoring in STEM—What accounts for women's career decision making? A mixed methods study. *The Journal of Educational Research*, 107(3), 167-176.