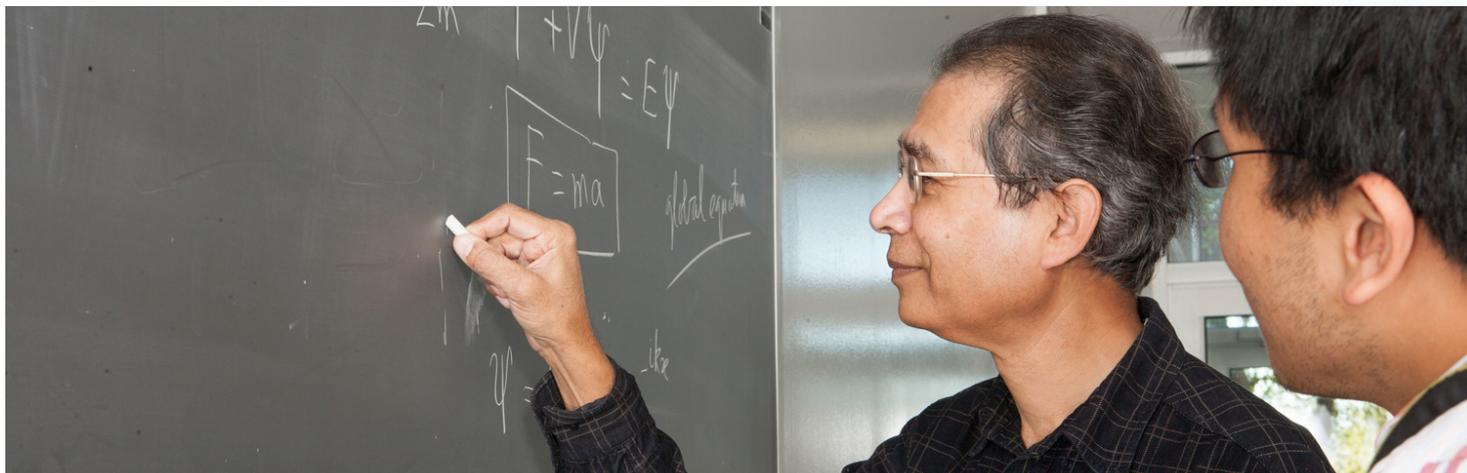


DOCTORAL CANDIDACY AND QUALIFYING EXAMS: A GUIDE TO CONTEXTS, COSTS FOR EQUITY, AND POSSIBILITIES OF TRANSFORMATION

Julie Posselt, University of Southern California
Román Liera, Montclair State University



DOCTORAL CANDIDACY AND QUALIFYING EXAMS: A GUIDE TO CONTEXTS, COSTS FOR EQUITY, AND POSSIBILITIES OF TRANSFORMATION



INTRODUCTION

Imagine awarding PhDs without requiring courses or exams — only apprenticeship in research and a dissertation. Imagine students wearing a top hat and sword to their dissertation defenses. These traditions are far from typical in the United States, but they are perfectly normal for doctoral education in England and Finland, respectively. Educational requirements and traditions around the world emerge for what seem like good reasons to people at the time. Some requirements stick, others fade away, and others are purposely changed to evolve with the times.

Just as many US graduate programs have been rethinking how they admit students, more PhD programs are revisiting exams required for candidacy. Variously called comprehensive, qualifying, and preliminary exams, these assessments emerged for specific reasons, but are increasingly recognized as inequitable, unnecessary, or saddled with, as one participant in our research put it, “enormous psychological cost.”

In this brief, we offer context about qualifying exams, raise awareness of how they can compromise equity and student wellbeing, and offer recommendations for structural and cultural change. We synthesize published research and findings from the IGEN Research Hub's studies in this area, including survey data and case studies of transformational change. Our hope is to help community members assess their current model and begin to imagine alternatives. PhD programs have an opportunity to protect key learning goals that these exams have served, while making equity-minded changes that enhance student wellbeing and inclusion.

HISTORICAL ROOTS

The doctoral candidacy examination has been a milestone in PhD programs in the United States for nearly a century. They were invented due to worry that the dissertation defense was becoming little more than a rubber-stamping exercise. Faculty thought an unabashedly difficult exam would help manage the number and rigor of doctoral degrees conferred (Estrem & Lucas, 2003; Schafer & Giblin, 2008; Stanford, 1976). That legacy persists: Faculty often justify the continued use of doctoral candidacy examinations for their gatekeeping and quality control functions (Guloy et al., 2020; Herzig, 2002).

The doctoral candidacy examination has been a milestone in PhD programs in the United States for nearly a century.

PURPOSES TODAY

Progress through a doctoral program requires meeting a series of benchmarks including admission, coursework, candidacy examinations, dissertation proposal, and dissertation writing and defense (Gardner, 2009; Walker et al., 2008). Variation exists within and across fields, but qualifying exams have at least three purposes:

SUBJECT MATTER ASSESSMENT: To assess content knowledge and embodiment of key scholarly qualities (Furstenberg & Nichols-Casebolt, 2001; Kostohryz, 2016)

DEVELOPMENTAL: To help graduate students transition into independent scholars (Baker & Pifer, 2011; Manus et al., 1992; McAdams et al., 2012)

GATEKEEPING: To determine who should be allowed to continue to the dissertation stage (Guloy et al., 2020; Riviere, 2016; Walker et al., 2008)

The IGEN Research Hub administered a survey in 2019 to explore variation in the structures and purposes of doctoral candidacy examinations in the physical sciences. The American Chemical Society (ACS) and the American Physical Society (APS) invited PhD programs to participate in the survey.¹ The survey contained 32 items, including open-ended, close-ended, and Likert scale items.² A total of 82 chemistry and physics PhD programs ($n_{\text{chem}}=40$, $n_{\text{phys}}=42$) completed the survey.

¹ Although the survey was also distributed to geoscience programs via the American Geophysical Union, response rates were too low to include in this report.

² We reviewed previous research on doctoral candidacy examinations and existing surveys conducted by Brady et al. (2001), Kostohryz (2016), Manus et al. (1992), and Ponder et al. (2004) to design survey items.



We found clear patterns in the perceived purposes of these exams:

- Assessing students' readiness for future activities was the most important perceived purpose. 85% of respondents in chemistry and 79% in physics named this as the first purpose.
- In both fields, 50-54% of programs named ensuring a rigorous PhD program as the second most important purpose.
- Respondents from chemistry were significantly more likely to strongly agree and somewhat agree that the candidacy examination is a mechanism to screen out under-performing or otherwise difficult students ($p=0.02$).

Programs that are engaged in discussions about change in the structure or format of the qualifying exam should keep in mind two things: there is variation in the perceived purposes of these exams among faculty and that the gatekeeping function is prominent among them. Our survey data suggest that there is a real opportunity for programs to better integrate student development goals into the transition to candidacy. Programs can use the process to build specific scholarly and professional skills and competencies and/or to make active progress toward the dissertation.

STRUCTURES

The timing of comprehensive, qualifying, and/or preliminary exams varies within and across fields; however, in physics, it is not uncommon to require a preliminary exam shortly before defending the dissertation, in addition to a comprehensive exam following coursework. Our survey found that 75% of chemistry programs use a common exam format but test each student on different content, whereas, within physics, only 28% of programs had this structure. In physics, it is much more common for all students to be tested on the same material using the same format.

Criteria are an important structural feature of any assessment. Depending on the format, candidacy exams may ask students to solve problems, synthesize large bodies of disciplinary content, and/or link prior coursework to their research interests (Nolan, 2002). Faculty assess students' cognitive skills, including the ability to apply, analyze, synthesize, and evaluate research (Estrem & Lucas, 2003; Herzig, 2002; Kostohryz, 2016; McAdams et al., 2012; Pelfrey & Hague, 2000; Ponder et al., 2004). They may even use performance during the exam period to infer a student's ability to complete dissertation research (Riviere, 2016).

WHAT DOES RACE HAVE TO DO WITH QUALIFYING EXAMS?

Like many gatekeeping situations, the apparently race-neutral criteria assessed in qualifying exams may have disparate impact, and may be laced with unexamined racial biases. It is not that the exams do not test important subject matter. The problem is that the design and implementation of exams may carry cultural baggage that creates disproportionate barriers for minoritized students. We focus on race here given IGEN's vision to advance racial equity in the physical sciences; yet especially as we consider exam elements like timed tests and oral defenses, equity with respect to identities including gender, disabilities, neurodiversity, and national origin also merit attention.

In the US, white men continue to dominate the community and the culture of STEM disciplines. They earned 65.9% of US doctoral degrees in physical and earth sciences in 2016 (NSF, 2017). The standard PhD training model that originated in 19th century Europe drives faculty today to implicitly – and in some cases explicitly – privilege “individual prowess, stoicism in the face of adversity, dominance in competition, and personal sacrifice” (McAdams & Robertson, 2008, p. 180). That a top hat and sword remain symbols today in Finland is telling! It is a cultural cue that white masculinity is part of the fabric of doctoral education.

Doctoral student learning involves both developing advanced subject matter and developing the knowledge, perspectives, dispositions, and practices of one's field. It is a process of cultural socialization, and milestones like qualifying exams are means through which socialization occurs. Through them, faculty make judgments about the legitimacy of students as emerging scholars. As students learn to act in ways that their advisors, committee, program, or discipline value, socialization involves some assimilation. In a theoretical paper with co-authors Aireale Rodgers and Lauren Irwin, we write:

Becoming perceived as a legitimate member involves the performance of established repertoires of practice that includes a host of behavioral expectations, some of which are racialized either by racial/ethnic bias or by preferences for whiteness. Appropriate dress, styles of participation in class, patterns of communication, help seeking, or the lack thereof, are just a few types of behavioral expectations that may be racialized— and which new members must practice and perform to advance.

Just like evaluations that affect admissions and faculty hiring, judgments of whether a person is qualified to become a doctoral candidate can therefore be racially biased. It takes critical thinking to recognize and accept the responsibility for maintaining racialized ideas about legitimacy that show up in how we train and assess early career scholars. Programs should consider that

- Evaluation criteria may privilege some populations, either in how they are measured or in how concepts underlying the criteria are understood
- Implicit and explicit biases may taint assessments of how students meet key criteria
- Minoritized students may underperform relative to their ability in high-stakes testing environments due to stereotype threat.

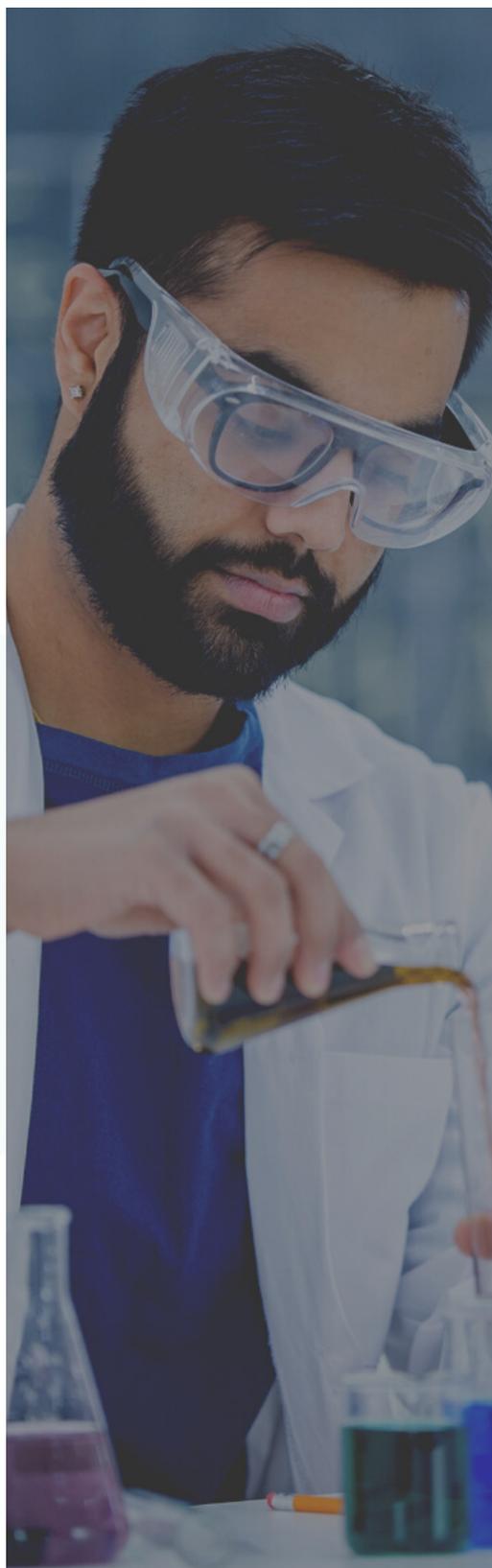
In short, what we assess and how we assess requires attention, as do the experiences of students who are navigating assessments. To learn how programs are transforming their processes, we have conducted in-depth case studies. We present short summaries here to provide insight into possible futures for candidacy exams.

CASE STUDIES OF TRANSFORMATION

Equity is always a work in progress, but we identified two Ph.D. programs through the survey that made significant changes to their candidacy processes.



Equity is always a work in progress, but we identified two Ph.D. programs through the survey that made significant changes to their candidacy processes. We conducted case studies about how and why programs replaced conventional exams in favor of more developmental assessments that would not come with unnecessary pressure. In both cases, they viewed costs to equity and well-being associated with their original model as outweighing benefits for assessment or learning, and in both cases, they took into account their status in their respective disciplines when making change.



PHYSICS

In a top-ranked physics program that had recently transformed its admissions process, confidence in the rigor of their admissions evaluations and dissertation prospectus defense gave the faculty confidence in altogether eliminating their high-stakes candidacy exam. Its passage rate had been marked by a stubborn gender gap that was related to how women were experiencing the exam. As one student described to us,

This was already a hard program to get into, and I think the reason they cut the superhard candidacy exam was that they were letting most kids through, but it was just an enormous psychological cost. It was totally unnecessary. Why have two bottlenecks where the second one isn't a good bottleneck, but it's extremely stressful?

In its place, they implemented diagnostic exams in core content areas that students would take upon entering. Students who passed the diagnostic exams could move directly to candidacy and independent research. Those who did not would earn candidacy by passing core courses in the first two years of their degree program. This set of changes has effectively reduced the core problems of gender inequity and mental health crises that induced reform, but like most organizational changes, is taking some time for all in the department to grow accustomed to and see as advantageous overall.

CHEMISTRY

The middle-ranked chemistry program that we studied relies upon its training, partially assessed through the qualifying exam, to signal that they offer high-quality training and graduate well-prepared scientists. With these concerns in mind, and interested in using the candidacy process to begin designing their dissertation research, faculty transformed the exam to require the development of a dissertation proposal in the format of an NSF or NIH grant proposal. This change would develop an essential skill, whatever career path they would pursue. One professor explained

when you get to be a PhD chemist, in many cases, you're gonna be writing a proposal. If you're academic, certainly, you're gonna be writing a proposal. Even if you're in industry, you're probably gonna be pitching something to your boss....

And it might not be as formal as an NSF 15-page limit, but it's gonna have some of the same features—you've gotta be persuasive in your writing... This is a way for you to practice those skills because you're gonna need them as a PhD chemist in the future.

Students in our study spoke positively of the new process. The scientific writing course created a supportive space where students presented research proposals to classmates and faculty and received feedback. It transformed a one-time, individual performance of expertise into a collective capacity-building process. The examples and feedback of their peers provided scaffolding. As one student put it: "what did other people do to be successful and how can I follow that format?" Faculty, too, were satisfied, especially with evidence that students were developing science communication skills and moving more quickly to quality dissertation proposals.

Our case studies illustrate that changes can be made that maintain a role for assessment in the first half of one's PhD program, enhance student development toward diverse careers, and reduce undue stress on students. Some models even reduce faculty workload. In short, high-stakes conventional exams may simply not be necessary to achieve the goals for which they were designed.

A CHECKLIST FOR REFLECTION AND DISCUSSION

- Think of a successful doctoral candidate who was on a real learning curve from when they started to when they became a candidate. What enabled their learning?
- What does it mean, and require, to be an independent researcher in our field? How are we preparing students for this, and assessing it?
- Are there underlying ideas about "success" we hold that we have not named? When we think about readiness for the dissertation, what do we mean? Readiness for what? Readiness by what and whose standards?
- What resources do we – and could we – offer to enhance student preparation for the qualifying exam?
- How might our own paths as scholars shape our beliefs about what readiness for research is, or how we are assessing it?
- How much do we care about the candidacy process as a signal to the field of our program's rigor? Is that concern necessary?
- Under what conditions might we consider passing courses and a dissertation proposal defense sufficient for candidacy?
- How do the rates of passage on your qualifying exam compare when disaggregated by student race/ethnicity and gender? How do experiences of the qualifying exam vary by race/ethnicity and gender? How might the first two questions be related?
- Culture change often means changing mentalities. To critically analyze whether your program's mindsets about being "qualified" or "ready" are racially, gender, or otherwise coded, you may find the following process helpful:
 - Have a recorded zoom conversation about the questions above and download the transcript.
 - Identify a small group to read the transcript with an eye for language that seems racially or gender coded. The goal of this exercise is not to call out individuals, but to recognize how the thinking that underlies our assessments needs to change, along with policies and practices.



RECOMMENDATIONS FOR STRUCTURAL CHANGES

- **(Re)define learning outcomes.** Organizational change efforts are often more focused on problems to get rid of than goals to pursue – but both are needed. Change efforts associated with exams and the transition to candidacy should be rooted in specific student learning and career outcomes that are aligned to your program's mission and distinctive strengths.
- **Make explicit the purposes of any screening, qualifying, or preliminary exam; then, ensure your criteria for quality are linked to these purposes.** Whether it is because assessments in existing coursework and dissertation proposal process provides this assessment or because a new exam model protects this purpose.
- **Strive for individualized pathways to and through candidacy.** Students enter with different needs and strengths. Equity means eschewing the assumption that all students should progress lock-step through a program with the same curriculum and the same supports (or lack thereof).
- **Assess your resources and support structures.** What resources do you offer to ensure that students have what they need to make steady progress? To be assessed as ready for dissertation research? To write an excellent dissertation? Coordinate with your school/college, graduate school, and disciplinary society to strengthen the support structures so every student has what they need to successfully complete the PhD.
- **Include students in your self-assessment.** Students can provide valuable feedback and ideas about learning outcomes, resources that would be helpful, and how equity could be enhanced in the qualifying exam process.

CONCLUSION

It can be hard for organizations to rethink, release, or transform gatekeeping traditions when people feel they are needed to protect a standard of quality or rigor. Whether described as a rite of passage (Estrem & Lucas, 2003), "an obstacle course and ritual gauntlet" (North, 2000, p. 30), a "hurdle," or an ambiguous terrain in which one must find one's way (Gelmez Burakgazi & Yildirim, 2017), the intense, immersive experience of high-stakes exams leads seemingly all who write about them to turn to metaphor in capturing their essence.

Regardless of what specific changes to policy and practice follow from a reconsideration of established systems, keeping an eye on equity means attending to individual experiences, organizational outcomes, as well as the assumptions about merit, rigor, and support that we bring to doctoral education.

REFERENCES

- Baker, V. I., & Pifer, M. J. (2011). The role of relationships in the transition from doctoral student to independent scholar, *Studies in Continuing Education*, 33(1), 5-17.
- Brady, D., Milkie, M. A., Hostetter, C., & Pescosolido, B. A. (2001). The structure and substance of preparing sociologists: The nature of qualifying examinations in graduate education. *Teaching Sociology*, 265-285.
- Burakgazi, S. G., & Yıldırım, A. (2017). Journey into doctoral candidacy: A grounded theory study of doctoral qualification exam process. *Croatian Journal of Education* 19, 63-92.
- Estrem, H., & Lucas, B. E. (2003). Embedded traditions, uneven reform: The place of the comprehensive exam in composition and rhetoric PhD programs, *Rhetoric Review*, 22(4), 396-416.
- Furstenberg, A. L., & Nichols-Casebolt, A. (2001). Hurdle or building block, *Journal of Teaching in Social Work*, 21(1-2), 19-37.
- Gardner, S. K. (2009). *The development of doctoral students: Phases of challenge and support*. Wiley InterScience.
- Guloy, S., Hum, G., & O'Neill, D. K. (2020). Voices at the gate: Faculty members' and students' differing perspectives on the purposes of the Ph.D. comprehensive examination. *Assessment & Evaluation in Higher Education*, 45(2), 279-291.
- Herzig, A. H. (2002). Where have all the students gone? Participation of doctoral students in authentic mathematical activity as a necessary condition for persistence toward the Ph.D. *Educational Studies in Mathematics*, 50, 177-212.
- Kostohryz, K. (2016). The doctoral comprehensive examination in counselor education: Faculty members' perception of its purposes, *The Journal of Counselor Preparation and Supervision*, 8(3), 1-23.
- Manus, M. B., Bowden, M. G., & Dowd, E. T. (1992). The purpose, philosophy, content, and structure of doctoral comprehensive/qualifying exams: A survey of counseling psychology training programs, *The Counseling Psychologist*, 20(4), 677-688.
- McAdams, C. R., & Robertson, D. L. (2008). An informed look at doctoral vitas (oral examinations) in the preparation of counselor educators, *Counselor Education & Supervision*, 51(3), 176-188.
- McAdams, C. R., Robertson, D. L., & Foster, V. A. (2012). Doctoral oral examinations and contemporary counselor education: Are they compatible? *Counselor Education & Supervision*, 52, 270-283.
- National Science Foundation. (2017). *Women, minorities, and persons with disabilities in science and engineering*. Retrieved from www.nsf.gov/statistics/wmpd/.
- North, S. M. (2000). *Refiguring the PhD in English Studies: Writing, doctoral education, and the fusion based curriculum*. Urbana, IL: NCTE.

REFERENCES

Pelfrey, W. V., & Hague, J. L. (2000). Examining the comprehensive examination: Meeting educational program objectives. *Journal of Criminal Justice Education*, 11(1), 167-177.

Ponder, N., & Beatty, S. E., & Foxx, W. (2004). Doctoral comprehensive exams in marketing: Current practices and emerging perspectives, *Journal of Marketing Education*, 26(3), 226-235.

Riviere, J. L. (2016). Qualified...for what? The potential for qualifying exams to become meaningful professional milestones. *Emerging Directions in Doctoral Education*, 6, 243-258.

Schafer, J. A., & Giblin, M. J. (2008). Doctoral comprehensive exams: Standardization, customization, and everywhere in between. *Journal of Criminal Justice Education*, 19(2), 275-289.

Stanford, N. (1976). Graduate education, then and now. In J. Katz, & R. T. Hartnett (Eds.), *Scholars in the making: The development of graduate and professional students* (pp. 243-258). Cambridge: Ballinger.

Walker, G. E., Golde, C. M., Jones, L., Bueschel, A. C., & Hutchings, P. (2008). *The formation of scholars: Rethinking doctoral education for the twenty-first century*. San Francisco, CA: Jessey-Bass.

AUTHORS



Julie Posselt is an Associate Professor of Education at the University of Southern California



Román Liera is an Assistant Professor of Higher Education at Montclair State University

ABOUT THE IGEN RESEARCH HUB

The Inclusive Graduate Education Network Research Hub conducts and translates rigorous research that is theoretically informed, community-inspired, with a focus on issues concerning equity in graduate education. Our goals are to contribute to the literature while also informing the community and supporting them in movement toward more equitable, inclusive practices for selecting and serving students. Our work is supported by the National Science Foundation through INCLUDES Grants No. 1834528. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.



<http://www.EquityGradEd.org>



[@InclusiveGradEd](https://twitter.com/InclusiveGradEd)

IGEN is supported by the National Science Foundation through INCLUDES Alliance Grants Nos. 1834540, 1834545, 1834528 and 1834516. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.