

An example of what a PhD defense should look like and why

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1 Initial comments

This brief essay is aimed at offering a partial answer to a question raised by Douglas Jerolmack in reaction to a recent tweet I posted (11 February 2022). Here is my tweet:

“This week I participated in what I consider to be a model PhD defense: a full 50 minute presentation in which the candidate excitedly showcased five years of effort followed by 20 minutes of open questioning from the general audience without committee members saying a word followed by a rigorous, continuing discussion started years ago involving just the candidate and committee members having great fun talking deep science centered on the candidate’s work.”

Jerolmack asked, “What can we do to encourage and enforce this kind of model?” I am unsure how to meaningfully address the “enforce” part of this question. With respect to the “encourage” part, I suggest that this involves “showing by example” in concert with open, frank discussions on the matter amongst faculty and students within individual programs as well as sharing of ideas across programs.

To be sure, the brief description above represents a version of what occurs in many programs, and I know numerous individuals whose PhD defenses were very positive experiences. Nonetheless, based on conversations with colleagues the manner in which programs conduct their PhD defenses varies, and in some cases what students experience can be problematic if not shameful.

The next section focuses on elements of what I refer to as a model PhD defense, noting that this is just one possible example. In the subsequent section I briefly address key items contributing to the success of such a model. One takeaway message is this: In the 21st century let us treat our students with the dignity and respect they deserve — they are our talented colleagues — and not imagine that the PhD defense is intended to be an adversarial rite of passage.

2 Elements of the defense

The PhD defense (a misnomer) should be a celebration. In the 21st century the PhD “defense” has two parts. The first part is aimed at providing an opportunity for the student to present a scholarly body of work that previously has been carefully and fully vetted by the student, their principal advisor(s), collaborators, possibly independent reviewers of manuscripts, and advisory committee members. The second part involves a discussion between the student and the advisory committee members only; it occurs behind closed doors.

The presentation should be a full 40-50 minutes, just like a seminar. It represents years of work. Immediately following the presentation, the general audience should be invited to ask as many questions as they want to ask, for as long as they need. This includes faculty members who do not serve on the advisory committee. If appropriate, these faculty can ask follow-up questions to those asked by the general audience — thus offering a gesture of gratitude to the general audience members for taking interest in the candidate and their work, for making the effort to attend the defense, and for most likely having

contributed in many ways (unbeknownst to the faculty) to the wellbeing and accomplishments of the candidate. Advisory committee members say nothing. The one situation in which a committee member should speak up is when there is a need to diplomatically discourage any unproductive adversarial exchanges — an unlikely event in an intellectually healthy program.

The second part — a closed door discussion — is aimed at finalizing the body of work with consideration of what this requires. This is where the student and advisory committee members address any specific problems or points of concern in the work, including gaps that need filling to finalize the thesis, and suggestions for strengthening those parts that are not yet published, and maybe even those parts that have been published. To be sure, any such points of concern should come as no surprise to the student during this discussion. This is a *continuing discussion* of the student’s work — a discussion that should have been occurring throughout the course of the student’s program of studies.¹ PhD work is not pursued in a vacuum. The outcome of the “defense” is absolutely known before it is ever scheduled. If this is not the case then the program needs to carefully examine its mentoring process.

Here it is worth reminding ourselves that we are not in the early 20th century when individual faculty members had a reasonable grasp of salient knowledge in a particular field. Now each of our PhD students together with their principal advisor(s) and collaborators typically know far more about the elements and details of the PhD work than most if not all faculty members in a program, perhaps including one or more members of the advisory committee, and more than most scientists around the world, even those with expertise in the candidate’s specific area of study. For this reason there is no reason to have a de-

fense format, for example a public “examination,” whose effect is to invite faculty to say things merely to offer the impression to an audience that the faculty are fully qualified to judge the candidate’s work. This does not constitute a meaningful examination.

A PhD defense does not need to last more than two hours. There is nothing wrong with a short discussion between the candidate and members of the advisory committee. There is nothing wrong about a faculty member saying: “This is solid, interesting work. I have no questions.” Or perhaps: “These are the items that need further attention for the reasons we have previously discussed, and now I have no further questions. Congratulations on completing this body of work.” That a faculty member experienced for themselves a grueling unfocused defense born of faculty hubris from a different time does *not* justify perpetuating this ritual merely because “I had to go through it and our students also should experience it,” or because “This is what we’ve always done,” or because “This is what [name a program] does.” On the other hand, this continuing (defense) discussion can be an ideal time to exchange interesting ideas inspired by the candidate’s work, as alluded to in my tweet above. Indeed, fresh PhD work represents an edge of the science, and I have as a committee member often learned interesting things about pressing questions in fields far from my own expertise.

3 The continuing discussion

The PhD defense is the finale of a scholarly adventure punctuated by a series of milestones with names such as “preliminary exam,” “comprehensive exam”² and “qualifying exam.” The design and implementation of these milestones are cen-

¹One possible arrangement is to have a committee member who is not the principle advisor conduct the discussion. It is the role of this individual, with support from others, to diplomatically discourage any adversarial exchanges and silly or demeaning questioning unrelated to the candidate’s research. Indeed, if the mentoring and advisement process has been as it should be throughout the student’s tenure, then there should be no reason nor room for such exchanges or questioning. Note that this does not exclude the possibility of serious discussion that is of a philosophical or epistemological nature.

²For the record, I hold the strong view that the so-called comprehensive exam should be entirely abandoned. It is a starving dinosaur stumbling in darkness following a bolide impact. But this is the topic of a separate essay.

tered on ensuring that students continue to grow their scholarship and progress toward completion of the PhD adventure as independent thinkers. And if the finale — the defense — is indeed viewed as a celebration, then the effort to get to this point must be a genuine collaboration between the student, their principal advisor(s), and advisory committee members, who engage in a continuing discussion regarding the student's program of studies and efforts, starting the first semester that a student enters the program.³ Advisory committee members — including faculty from other programs — must commit to an open door policy for students, particularly those students whose advisory committees we serve on, in order to encourage the deepening of discussions outside formal venues. Students recognize the value of purposefully engaging with numerous individuals beyond their principal advisor(s). And this is a particularly important element of

what I mean by a continuing discussion.

Returning to the PhD defense, a key item is this. It must start with a faculty that collectively rejects any vestiges of the notion that the defense is to be a 20th century hazing exercise excused by reasons of legacy or because “that’s what I experienced” or because it’s somehow “good for the student.” Such excuses merely reveal the sentiment that students are not viewed as colleagues. Indeed, if the mentoring process leading to the defense is collectively purposeful and thorough — at all times what I refer to as a healthy intellectual co-conspiracy — then the defense need be nothing more than a celebratory presentation by the candidate.

Acknowledgments. I appreciate thoughtful discussions with numerous student and faculty colleagues regarding the topic of this essay.

³In our program these continuing discussions include open-ended meetings, each semester, involving the student and advisory committee members. Topics covered include all aspects of a student's program of studies and endeavors: course selection; the conceptualization, design and trajectory of the PhD research, with critical assessments at all stages; the student's experience in engaging with undergraduate students in relation to teaching responsibilities; the student's activities centered on engaging with the larger science community; the process of pondering and planning for a future after the PhD; and so on. Any differences in points of view on the elements and trajectory of the student's research are openly and fully addressed.