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Bridging Reasoning and Results: An Assessment Validation Perspective on the PhD in Design

Luke Feast

Abstract
This article uses assessment validation as a framework to construct a theory of how to assess a PhD in design. This also has implications for what the PhD degree should be in design. When examiners assess a PhD student’s dissertation or defense, interpretation arguments and use arguments connect the assessment to the ultimate purpose and consequence of the PhD project they assess. My conclusion is that this argument-based approach strengthens the credibility, meaningfulness, and fairness of PhD assessment. The perspective of assessment validation enhances the PhD in design by focusing validation on inferences and assumptions that connect scoring, generalization, extrapolation, and the implications of PhD assessment.
Evolution of the PhD in Design

This article proposes a new approach to investigating the PhD in design by using assessment validation as a conceptual framework. My main claim is that the assessment validation approach develops a more parsimonious and comprehensive theory of assessing the PhD in design than is now common. The effort to validate assessment delineates and appraises the assumptions and reasoning that connect scoring student performance to the implications of assessment and its ultimate interpretation and use. The design field needs a coherent theory of the PhD in design that ties the PhD to the central values of academic freedom and autonomy to reinforce the purpose of the research university. This section traces key developments in the evolution of the PhD in design.

The PhD in design is relatively new compared to the PhD in established disciplines such as law, theology, and philosophy. During the past few decades, reforms in many countries designated all higher education institutions as universities — including independent art and design schools and colleges. These were often made a part of single unified systems and funding regimes. While the first PhD degrees in design in the UK were awarded in the 1970s, the degree was uncommon until the 1990s. The tempo of PhD awards in design increased dramatically at the turn of the century. This stoked interest and debate in design literature and at design conferences. Over the last fifty years, design education has gradually broken from its association with visual and applied arts in some parts of the world. Design education and practice are increasingly occupied with complex problems at more abstract scales than in the past. Consequently, design research requires skills, knowledge, and abilities in inquiry, methodology, integration, and communication. Expectations for design research and PhD projects have shifted as well. Considering the changing landscape of design, defining rigorous criteria for PhD-level inquiry has become imperative.

Mario Bunge6 defines research as “methodical search for knowledge.” The Frascati Manual,6 published by the Organization for Economic Co-operation and Development (OECD), characterizes research and experimental development work (R&D) as “creative and systematic work undertaken to increase the stock of knowledge — including knowledge of humankind, culture and society — and to devise new applications of available knowledge.” However, David Durling and Kristina Niedderer7 argue that PhD-level research imposes stricter requirements than general research, therefore leading to a more constrained range of PhD-level research activities.

The PhD in design is a research degree that educates students through the supervised independent practice of research.8 PhD students should demonstrate systematic acquisition and understanding of the knowledge base within a discipline.9 Additionally, PhD students should demonstrate a detailed understanding of research methods, thorough justification of the methods applied, and rigorous analysis of results.10 Furthermore, the PhD must extend the discipline of design, creating substantial new knowledge. This knowledge should be of a quality that merits publication and satisfies peer review.11 The standard required for a solid PhD thesis is that of an original contribution to knowledge that expands the field in some way, great or small. Examiners are

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1 Burton R. Clark, Places of Inquiry: Research and Advanced Education in Modern Universities (Berkeley: University of California Press, 1995), 245.
5 Mario Bunge, Philosophical Dictionary (New York: Prometheus Books, 2003), 251.

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peer reviewers. They are assessing the candidate for admission to the status of independent researcher, much as craft guild masters assessed apprentices for promotion to journeyman status. A PhD thesis is a publication of a special kind, but few PhD theses measure up to the standards of peer review required for journal publications or full-scale monographs.

Typically, students exhibit PhD-level research knowledge, skills, and abilities in a written dissertation and oral defense. The PhD examination is like other assessments, except that it is an extended piece of individual work assessed in a single high-stakes summative assessment. Yet, Howard Green and Stuart Powell argue that doctoral assessment tends to avoid general assessment approaches and definitions.

While examiners often assume common standards for the PhD, Lynne Pearce cautions that there may be significant differences across institutions in procedures and conceptualizations of PhD-level work. Green and Powell argue that candidates should be familiar with the standards used to judge their PhDs. Inconsistent assessment criteria reveal a lack of clarity about the performance standards that mark the differences between master’s and PhD degrees. Weak PhD research, lacking awareness of the field and basic research skills, is, according to Nigel Cross, an indictment of the standards of current PhD education in design. Nevertheless, assessing design research for the PhD poses certain challenges.

Research Design

David Boud and Associates define assessment as “the making of judgments about how students’ work meets appropriate standards.” Cognitive learning theory suggests that providing students with clear assessment standards and criteria can motivate and direct their learning. Furthermore, assessment criteria act as a mutual point of reference for students, supervisors, and disciplinary communities. Additionally, Shepard et al. argue that internalizing the meaning of criteria in the context of their discipline facilitates students’ metacognitive awareness of how to improve the quality of their work. Hence, understanding what assessment standards and criteria mean in a particular discipline is integral to learning the discipline itself; they are not just rules for allocating grades.

Examiners use evidence generated by assessment activities to make judgments about what a student knows and what they can do. Examiners’ judgments determine whether the student passes or fails, forming the basis for decisions such as whether the candidate qualifies for an award. Because examiners’ judgments can have significant consequences, the evidence they provide should align with the meaning they claim. Assessment should be conducted to fulfill its intended purposes effectively. The challenge of validation is to connect observations of students’ performances to the proposed interpretations and uses of the assessment. “Ultimately,” Michael T. Kane writes, “the need for validation derives from the scientific and social requirement that public claims and decisions be justified.” Our confidence in examiner judgment should be based on the plausibility of the arguments they provide.
I used validity theory as a conceptual framework to study PhD assessment. I applied this framework to the PhD in design. I did not analyze a specific PhD program, but theoretically evaluated PhD assessment in general. Behavioral and social scientists typically use validity theory to validate measurements and tests. However, since contemporary validity theory uses an argument-based approach, it provides a practical way to evaluate assessments in general.

An argument-based approach lays out the reasoning behind an assessment. It explains the reasons for the verdict of the assessment. There are two main parts to the argument. First, an interpretation and use argument explains how student work is observed and scored, how those scores are generalized and extrapolated, and how the assessment results are used. Second, a validity argument evaluates whether the interpretation and use argument is coherent by checking whether its inferences are reasonable and its assumptions are plausible.

More ambitious interpretations and uses require more supporting evidence. If the proposed interpretation and use survives serious attempts to falsify it, its plausibility increases. Within this framework, validation entails constructing a theory for evaluating the PhD in design. This goes beyond looking at examples or epistemological analysis. Argument-based approaches employ practical argumentation rather than formal deductive-nomological scientific explanation. They supply confidence but not certainty.

I integrate validity theory, the Wigmorean chart method of evidence analysis (Figure 1 in Appendix), and evidence from the literature to formulate an interpretation and use argument for the PhD in design (Table 1 in Appendix). The main claim of the argument contends that the university is justified in interpreting the results as evidence that students can conduct independent research, which in turn justifies using examination results to award PhD degrees. I substantiate this main claim with four sub-claims.

First, examination results are evidence of PhD-level achievement. Second, examination results are reliable evidence of PhD-level research capabilities. Third, examination results are valid evidence of student readiness to do independent research after graduation. Fourth, it is reasonable to use examination results to award PhD degrees. Chains of inference reinforce each sub-claim through evidentiary and inferential propositions.

The interpretation and use argument provides a clear, coherent chain of propositions. This chain enables the validity argument to evaluate the strength of the evidence, the soundness of the inferences, and the plausibility of the assumptions. I consider four counterarguments that object to the interpretation and use argument of the PhD in design.

Scoring: Careful Examination

It is essential to evaluate both examination requirements and procedures to assess whether students have demonstrated the necessary research knowledge, skills, and abilities at PhD-level.
Examination Requirements

The PhD examination assesses the dissertation and defense. The British PhD dissertation has a notional maximum word length of 80,000 to 100,000 words. However, Pearce observes that this limit has decreased in recent years. At the Delft University of Technology (TU Delft) in the Netherlands, the dissertation is a published book of 100–300 pages. At the Illinois Institute of Technology (IIT) in the United States, a dissertation comprises 100–200 pages of written work. In some institutions, for example, at Aalto University in Finland, dissertation chapters may be based on published journal articles and conference papers, with an extended introduction. There is always a written text, although a catalog of supporting non-written work may be included in appendices and annexes. Furthermore, this supporting material supplements rather than replaces the dissertation itself.

PhD candidates defend their dissertations in oral examinations, held in public or private. However, the nature and purpose of the defense are unclear—as are the assessment criteria. For example, some defenses are ceremonial rites of passage. Meanwhile, the defense can also assess candidate research training, understanding of the broader subject area, and the ability to contribute to scholarly debate.

Examination Procedure

The examination procedure should appropriately assess student dissertations. It is widely accepted that good practice is having at least two examiners, with one being external to the institution—or external to the department or college yet within the same university. According to Green and Powell, qualified examiners must possess expertise in the subject under scrutiny, hold a PhD themselves, and served as a principal supervisor to at least one successful PhD student. The examiners evaluate the dissertation and recommend a pass or fail result. However, as Pearce explains, there may be a range of pass results, such as outright pass, pass with minor corrections, or pass with major corrections.

The examination results are strong evidence of PhD-level research work. This is because the examination procedure carefully evaluates on dissertation and defense performance. Moreover, the dissertations themselves adhere to PhD-level submission requirements. Therefore, the careful application of examination requirements and procedures establishes a credible foundation for ascertaining whether students have demonstrated PhD-level knowledge, skills, and abilities in their dissertations. This leads to the next issue of judging the extent to which the examination results generalize more broadly.

Generalization: Assessing Activities and Abilities

When examiners evaluate the dissertation, they make inferences about students’ abilities based on their performance in key research activities.

Activities

According to Pam Denicolo, Dawn Duke, and Julie Reeves, a PhD student should write an abstract that succinctly states the research question and
clearly describes the purpose, methodology, and outcomes of the study. The introduction, as Chad Perry\(^\text{41}\) explains, should outline the broad field of study, identify a well-focused problem, justify why it is worthy of investigation, briefly introduce the methodology, define key terms, and describe the chapter layout.

The literature review should, according to Durling,\(^\text{42}\) establish an understanding of previous work in the field. Sharon Poggenpohl and Keichi Sato\(^\text{43}\) state that literature reviews should demonstrate that the research question has yet to be answered. PhD students should use citations to explain the immediacy, significance, and legitimacy of the gap their study will address.\(^\text{44}\) Citations should accurately track the growth of the literature from seminal texts to recent key texts that explain the motivation and significance behind the research question. Additionally, Vernon Trafford and Shosh Leshem\(^\text{45}\) maintain that PhD students should construct a conceptual framework clarifying how key theories shape the research question and assumptions.

Research, writes Ken Friedman,\(^\text{46}\) is systematic and methodical inquiry. In this vein, Barbara Lovitts\(^\text{47}\) states that PhD students should provide a detailed description of the actual data collection and analysis process, including the methods and procedures used. In addition, according to Denicolo et al.,\(^\text{48}\) PhD students must explain how they dealt with difficulties and adjustments and provide an account of ethical conduct and procedures.

PhD students should present results in a clear, structured, and logical manner.\(^\text{49}\) Furthermore, Estelle Phillips and Derek Salman Pugh\(^\text{50}\) emphasize that PhD students must explain how the evidence garnered contributes to developing or testing the theories that align with the knowledge gap. Trafford and Leshem\(^\text{51}\) maintain that PhD students should clearly state the answer to the research question. Moreover, Malcolm Shaw and D. Howard Green\(^\text{52}\) state that PhD students should claim to have created a modest, reasonable, defendable, new contribution to knowledge. Finally, Denicolo et al.\(^\text{53}\) suggest including an impact statement that discusses outcomes and contributions and links the study to their broader context and future possibilities for research.

**Abilities**

Writing a clear abstract exhibits the ability to identify and unite research material.\(^\text{54}\) According to Perry,\(^\text{55}\) a strong introduction displays skill in formulating a problem that tests previous generalizations that go beyond simple problem-solving. Additionally, identifying a gap worthy of investigation demonstrates the ability to establish appropriate boundaries around a problem, showing that it is not trivial but holds significance on both theoretical and practical levels.

According to Rugg and Petre,\(^\text{56}\) a literature review illustrates a PhD student’s ability to position their study and its contribution to the knowledge of the field. Moreover, it shows the ability to organize cited literature into a coherent, critical structure, identify conceptual relationships, and recognize important gaps. The literature review displays mastery of the discipline’s knowledge base, and the ability to analyze, synthesize, and interpret information.\(^\text{57}\) Furthermore, Phillips and Pugh\(^\text{58}\) argue that demonstrating knowledge of the field is a defining “performance of scholarship” that indicates the
PhD student has taken their scholarship seriously and has a clear sense of their research question.

Methodology, according to Rugg and Petre, showcases a PhD student’s competence in key research methods, including data collection, record-keeping, and data analysis. Methodology should also show the student’s awareness of the advantages and limitations of different methods, and their ability to justify their selection. It demonstrates that the PhD student knows what constitutes evidence in the discipline and what is acceptable as a knowledge claim. Additionally, methodology should show how theory shapes the research question and why the answer contributes something valuable to the theoretical debate. Well-crafted methodology, according to Trafford and Leshem, shows the ability to explain why the chosen approach appropriately bridges theory and practice and balances philosophical and practical implications too.

According to Shaw and Green, PhD students must demonstrate the ability to make valid interpretations and appropriate judgments in all contexts, such as data sampling, data analysis, and data interpretation. In addition, clearly presented text and data displays show concern for reader needs. The discussion section, Trafford and Leshem explain, highlights the skills of PhD students to interpret results, advance a standpoint, and connect theoretical ideas. Similarly, Lovitts emphasizes that PhD students should exhibit the ability to fully discuss and coherently explain the meaning of the results. An effective discussion showcases the ability to link the outcomes or conclusions to the literature, reflect on the research process, and articulate a meaningful contribution to knowledge. Perry states that the conclusion should show the ability to identify a distinct contribution to knowledge based on the findings of the research, and draw implications for theory, practice, and further research.

The examination results provide reliable evidence of PhD-level knowledge, skills, and abilities. This is because examiners observe the essential research activities in the dissertation, allowing them to infer students’ research knowledge, skills, and abilities. The next step transitions from dissertation performance to drawing a conclusion about the readiness of PhD students to do independent research after graduation.

Extrapolation: Assessing Attitude and Independence

Based on evidence that students have demonstrated the requisite research knowledge, skills, and abilities, the next step is to consider what this level of performance implies about the attitude and growing autonomy of PhD students as independent researchers.

Attitude

Examiners infer research attitude from the ability of PhD students to make an original and publishable contribution to the knowledge of the field. Critically appraising the state of the art, developing a research question, and
Although the precise quantity of published material is vague — according to Friedman,\footnote{70} the key ways in which the PhD contributes new knowledge. Similarly, Hilde Heynen\footnote{71} contends that the PhD study identifies a specific problem, addresses the topic in different ways, and contributes new knowledge that marks an important advancement in the field.

The PhD in design generates new knowledge to improve design practice, design theory, or both.\footnote{72} PhD contributions help support practice in adapting to changes in culture and technology.\footnote{73} However, Harry F. Mallgrave\footnote{74} argues that while the knowledge generated by PhD research should be disseminated to practitioners, it should not set directions for future practice.

PhD research advances the collective level of knowledge.\footnote{75} In this way, as Victor Margolin\footnote{76} stresses, it creates a common heritage, reinforcing the idea that design researchers are involved in a shared enterprise. Similarly, Richard Buchanan\footnote{77} states that PhD researchers should consolidate design as a new field of inquiry. The body of knowledge that PhD students produce allows design research to choose its direction rather than being swept along in the current of change.\footnote{78}

The outcome of the PhD contributes to the development of the field. Establishing the design discipline as a new paradigm between sciences and arts, Nigel Cross\footnote{79} argues, can enhance our understanding of “designerly” ways of knowing. Similarly, Hanina Dunin-Woyseh and Liv Merete Nielsenn\footnote{80} associate PhD education with developing the design discipline. PhD education should increase the credibility of design thinking in intellectual life.\footnote{81} Furthermore, PhD education is instrumental in holding disciplines to account — to themselves, to universities, and to society.\footnote{82}

Originality is widely accepted across all disciplines as one of the key criteria distinguishing the PhD from the other degrees.\footnote{83} Despite some disciplinary variation, Gill Houston\footnote{84} argues the originality criterion represents the shared understanding of PhD standards. Moreover, originality is the true test of someone aspiring to an academic career.\footnote{85} However, originality is open to interpretation. For example, Estelle Phillips and Derek S. Pugh\footnote{86} observe fifteen ways in which the contribution to knowledge in a PhD may be original.

According to The Council of Graduate Schools of the United States,\footnote{87} original PhD research does what has not been done before. Originality implies some novel twist, fresh perspective, new hypothesis, or innovative method that makes the PhD dissertation a distinctive contribution.\footnote{88} Penny Tinkler and Carolyn Jackson\footnote{89} argue that the contribution to knowledge is deemed original when it introduces new knowledge, new theory, new connections, or revises older views. Similarly, Lovitts\footnote{90} contends original contributions are new questions, ideas, theories, methods, findings, answers, analyses, proofs, or interdisciplinary integrations.

The significance of the original contribution relates to its consequences. Typically, a new PhD contribution makes an incremental advance in the knowledge of the field.\footnote{91} Only more rarely will the contribution have significant or radical consequences that break new ground.

Shaw and Green\footnote{92} assert that whether a PhD is worthy of publication is a measure of the quality and potential of the contribution to knowledge. Although the precise quantity of published material is vague — according to...
Tinkler and Jackson\textsuperscript{93}—it may be equivalent to two peer-reviewed journal articles or enough material for a scholarly book or monograph. Encouraging PhD candidates to publish helps develop their research skills.\textsuperscript{94} Moreover, PhD training should expose students to academic realities like funding application writing, industry liaison, and peer review.\textsuperscript{95}

According to the Council of Graduate Schools of the United States,\textsuperscript{96} the likelihood of a dissertation being published is influenced by its format. The dissertation should be a source of publishable research. However, the whole dissertation itself does not need to be published. Some PhD programs take the view that the traditional dissertation format serves no useful purpose; a published book or article should be evidence of successful PhD education. Consequently, the literature review may be removed or scaled down. However, the contrary view is that a literature review is essential, because the traditional dissertation may be the only opportunity in a scholarly career to do detailed and meticulously careful research, analysis, and argument. The very features that render PhD dissertations “unpublishable” may be their greatest virtues.

**Independence**

Research attitude, or doctorateness, requires more than merely aggregating the dissertation activities and abilities because, as Trafford and Leshem\textsuperscript{97} argue, each component is mutually interconnected, which determines their collective and overall effectiveness. The PhD, according to Green and Powell,\textsuperscript{98} assesses the ability of the candidate to present an intellectual position that integrates the full range of research abilities to make an original, publishable contribution to the knowledge of the field. Likewise, the purpose of a dissertation is to put forward an argument demonstrating the ability to autonomously conduct research that makes an original, publishable contribution to knowledge.\textsuperscript{99} There should be an explicit argument linking the question, theory, methods, and results into a coherent whole.\textsuperscript{100}

Making an original contribution to knowledge, Lovitts\textsuperscript{101} argues, prepares the PhD student for a lifetime of independent inquiry through scholarship and research. Similarly, for Denicolo et al.\textsuperscript{102}

“The goal of the doctorate is much more than a report about the conduct and outcome of novel research; it is the development of a person who is capable of independently conducting novel research and then using that research to move their academic field forward and benefit society.”

Although PhD students are generally expected to carry out their research independently, there are levels of independence. The Council of Graduate Schools of the United States\textsuperscript{103} explains that independence may be when the PhD student is responsible for the conception and execution of the doctoral research project. Or the student may develop the project idea by interacting with their supervisor. Alternatively, the student may join an ongoing research project, conducting research that develops, refines, and contributes to that project.

Integrating the variety of research knowledge, skills, and abilities to generate an original, publishable contribution to knowledge indicates the research attitude needed to do independent research. Consequently, it is reasonable to conclude that the examination results are evidence of student
readiness to do independent research. The next link in the argument chain considers the implications of using the PhD examination results to award PhD degrees.

**Implications: Educating Future Stewards of the Discipline**

The significance of awarding PhD degrees goes beyond the individual students and includes the stewardship of academic disciplines and, more broadly, universities.

**Nexus**

Universities should avoid focusing narrowly on vocational training, Burton R. Clark\(^{104}\) cautions, because the pressure for occupational relevance and mass higher education can undermine advanced research education. Furthermore, Clark argues that trends toward increasing specialization also threaten to turn the unified university ideal into loosely coupled multiversities followed by conglomerates.\(^{105}\) Instead, universities should focus on research, since knowledge is the primary source of nations’ competence and wealth.\(^{106}\) As Wilhelm von Humboldt recognized, universities are best at generating new knowledge in tandem with educating the next generation of inquiring minds. Universities that pursue research, Clark\(^{107}\) claims, adopt a forward-looking orientation.

Research-informed training, George Walker et al.\(^{108}\) argue, helps practitioners understand the theoretical knowledge base of a discipline to keep pace with a highly fluid professional world. The authors contend it is unfair to withhold the powerful problem-solving tools and perspectives that research engagement provides,\(^{109}\) suggesting that PhD pedagogy operates through three principles.\(^{110}\) First, progressively increasing independence and responsibility. Second, integrating scholarly work across contexts. Third, collaboration between peers and faculty throughout the process.

According to Clark,\(^{111}\) professors and students collaborating in pursuing related research problems exemplify Humboldt’s vision of research as integrating teaching and learning. Consequently, the conflict lies not between teaching and research, but between undergraduate instruction of codified knowledge and graduate education in which doing the practice of research is also a mode of learning.\(^{112}\) *Bildung,* is a German tradition of self-cultivation which Hans-Georg Gadamer\(^{113}\) argues, is the idea that research, teaching, and learning are mutually beneficial—student participation in a research environment can be an active mode of learning.

**Stewardship**

Chris M. Golde\(^{114}\) states that the PhD is a research degree that demonstrates accomplishment in knowledge generation, conservation, and transformation. Knowledge generation refers to the ability to conduct high-quality, original research that asks meaningful questions and uses rigorous methods to gain new insights and advance the field.\(^{115}\) Knowledge conservation denotes understanding the history and foundational concepts of the discipline to provide context and continuity for current work. It requires balancing the breadth
of knowledge across the field with the depth of expertise in a specialized area. Finally, knowledge transformation signifies the ability to communicate ideas within and beyond the field and apply insights to real-world issues through teaching, writing, interdisciplinary connections, and developing useful applications. Consequently, stewardship encompasses generating new knowledge, grounded in a deep appreciation of what came before while elucidating connections and applications that benefit society more broadly.

According to Golde, stewardship involves embracing a sense of purpose and responsibility that extends beyond oneself. Furthermore, stewards adopt a long-term, ethical orientation, where they see themselves as caretakers of their field, preserving its vitality and fostering renewal that advances it for future generations and society.

Educating PhD students in independent inquiry and stewardship realizes the purpose of advancing academic disciplines within a university. Therefore, there are ethical grounds for using examination results to award PhD degrees, since the PhD cultivates and educates scholars who can contribute new knowledge and integrate research, teaching, and learning.

Scrutinizing Counterarguments

An interpretation and use argument provides a framework for validation by specifying the inferences and assumptions that must be assessed by the validity argument. The assessment is valid if its interpretation and use argument can survive serious criticism. Four counterarguments deserve consideration.

Scoring: Hasty Conclusion

The first counterargument argues the PhD in design jumps to the conclusion that the dissertation and defense are sufficient evidence of PhD-level research activity. The counterargument claims that the scoring argument’s premises supply an unrepresentative sample since it ignores or overlooks evidence that artifacts or exhibitions may be substituted for the written dissertation and defense.117

Natalie Hills argues that requiring a written dissertation denies PhD students the opportunity to demonstrate an original contribution to knowledge using artifacts or performances. Similarly, Kerry Dally et al. report that Fine Art PhD examiners believe that artworks demonstrate original contributions to knowledge. Furthermore, Clive Cazeaux argues that prohibiting artworks from PhD submissions assumes verification and correspondence as the paradigm of knowledge, and so ignores artistic research as a hybrid activity associated with multiple meanings, the particularity of the senses, ambiguity, and disruption.

Kees Dorst argues that, from a constructionist perspective, designing artifacts may be described as a form of learning. For example, in framing a problem, the designer may name relevant factors to solve, which, in turn, prompts them to make moves that add features to the solution. The evaluation of those moves may prompt the designer to stop or reframe that solution to the problem, name new relevant factors, make new moves, and so on.

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116 Ibid., 13.
Through reflection-in-action, the designer learns something about the nature of the design problem and its potential solutions. Furthermore, Donald A. Schön\textsuperscript{122} argues that through reflecting on action, designers might learn about themselves.

However, this constructionist learning process does not necessarily mean that design processes produce original contributions to the knowledge of the field. Designing as learning is driven by the subjective interest of a practitioner in understanding and changing a unique situation.\textsuperscript{123} Although the designer may develop a new understanding through designing an artifact, this new understanding does not automatically translate into a contribution that increases the stock of knowledge in society. The learning process lacks mechanisms to aggregate, synthesize, or extend the designer’s contextual understanding across time or to different problems.

Generalization: Fallacy of Composition
A second counterargument contends that the PhD in design falsely assumes that only research activities may demonstrate the entirety of research abilities. They argue that other activities, such as a student’s design activities, could provide evidence relevant to concluding that the student shows PhD-level research abilities. The frequent tendency to generalize from components to a whole concept is fallacious.\textsuperscript{124} According to Graeme Sullivan,\textsuperscript{125} art and design practice is a form of inquiry where imagination and visualization play a role in creating and constructing knowledge. Artistic mediums and modalities have performative and expressive properties that, James Haywood Rolling\textsuperscript{126} argues, both diversify the methods available to researchers and align with naturalistic investigation standards. Making artworks and artifacts is a research method to gather, analyze, and communicate research insights.\textsuperscript{127} Design practices, such as making sketches, models, and prototypes, may be used to collect qualitative and quantitative data.\textsuperscript{128} Furthermore, Kristina Niedderer and Seymour Roworth-Stokes\textsuperscript{129} contend that excluding tacit knowledge within art and design practice from research is unjustified. They argue that practice can generate research questions, provide context, serve as a method of investigation for gaining new knowledge, or provide illustrative or demonstrative evidence for theory building.

The counterargument that design activities can also demonstrate research abilities should not be excluded. However, the variety of research activities outlined in the PhD in design interpretation and use argument remains necessary to assess the full range of PhD-level research knowledge, skills, and abilities. While incorporating design activities into the dissertation can enrich the research process when complementing research activities, solely substituting them risks oversimplifying the complexity required at PhD-level.

A viable PhD dissertation should incorporate multiple forms of systematic inquiry. This includes establishing a theoretical framework through a literature review, identifying a significant research gap, detailing rigorous data collection and analysis procedures aligned to that framework, logically presenting findings, and discussing implications and future directions. Relying entirely on design activities risks creating a research project that lacks


\textsuperscript{126} James Haywood Rolling, Jr., Arts-Based Research Primer (New York: Peter Lang, 2013), 30–31.


the necessary complexity. Such a project may fail to fully demonstrate the required variety of research knowledge, skills, and abilities that PhD dissertations aim to assess.

### Extrapolation: Questionable Cause

A third counterargument claims there are valid alternative ways to demonstrate the capability to do independent research after graduation. According to this counterargument, generating an original, publishable contribution to knowledge may help develop the ability to do independent research, but it is not the only way. Alternative paths to independent research include demonstrating individual development, social use, or critique. The argument that the original, publishable contribution to knowledge is the only way to develop the skills and attitude needed for independent research, completes the fallacy of questionable cause.\(^{130}\)

According to Stephen Scrivener and Peter Chapman,\(^{131}\) PhDs employing reflective practice in making artworks and artifacts supports individual learning and self-learning. Similarly, Tom Bourner and Penny Simpson\(^{132}\) suggest that practitioner-centered PhDs align with personal and professional development and direct contributions to professional practice. Furthermore, Kathleen Coessens et al.\(^{133}\) state that artistic research PhDs develop art-making skills, expressive abilities, and critical reflection on art practice. PhD students achieve self-reflection and self-emancipation, Klaus Jung\(^{134}\) claims, by taking chances, opening themselves up to their limits, and being challenged by the effort to externalize tacit artistic knowledge. According to Leon van Schaik,\(^{135}\) a PhD in design should give practitioners the ability to surface their intuitions, access their internalized knowledge and motivations, improve communication, and target suitable projects. Moreover, Rolf Hughes\(^{136}\) believes that artistic research PhD students should expose habits and implicit assumptions through critical self-reflection, articulate a way of looking at their artwork and the world, and challenge conventional research.

Reflection-in-action is useful to professional design practice, because it immediately transforms the practice situation.\(^{137}\) Similarly, Ben Spatz\(^{138}\) values the ability of a practitioner researcher to generate new techniques through practice. Moreover, some scholars maintain that artistic research should tackle social issues with participation and collaboration,\(^{139}\) allowing PhD students to develop collaborative, transdisciplinary skills to address complex issues.\(^{140}\)

Some authors locate artistic research PhD value in their capacity to critique. For example, Natalie Loveless\(^{141}\) wants artistic research to generate hybrid, defamiliarizing, and uncanny forms that challenge traditional academic outputs and traditional artistic outputs. Similarly, Tom Holert\(^{142}\) values the ability of artistic research to critique institutional and academic infrastructures as well as artistic research itself.

However, this counterargument conflicts with the core values of academic freedom and disciplinary advancement that underpin PhD research. The PhD degree strives to push boundaries and assumptions within academic disciplines, not simply train specialists to apply research findings to professional practice.
Academic freedom and intellectual autonomy have been crucial for progress in design research, as the field moves beyond commercial priorities to address complex societal problems. For example, human-centered design exemplifies advances made possible by integrating research from cognitive science.\(^\text{143}\)

The PhD plays a vital role in questioning prevailing assumptions and expanding disciplinary knowledge. While professional development and practical impact matter, upholding academic freedom takes priority in nurturing independent research skills at the core of doctoral training. The counterargument risks conflating the complementary roles of practice-oriented degrees and research-driven PhDs. Preserving this distinction allows design programs the freedom to evolve in both applied and theoretical directions.

**Implications: Improper Appeal to Authority**

The fourth counterargument considers the appropriate role of traditional PhD education versus inclusive approaches that account for diverse epistemologies. From this view, the traditional PhD in design, focused on generating new knowledge through research, risks completing the improper appeal to authority fallacy by relying on tradition rather than substantive reasons.\(^\text{144}\) This counterargument’s perspective resonates with Donald T. Campbell’s claim that “the more any quantitative social indicator is used for social decision-making, the more subject it will be to corruption pressures and the more apt it will be to distort and corrupt the social processes it is intended to monitor.”\(^\text{145}\) Arguably, focusing the PhD in design on such easily quantified research metrics as publications potentially distorts the PhD by marginalizing non-traditional forms of research which are more difficult to quantify.

Anne Solberg\(^\text{146}\) argues that the standardized Dublin Descriptors, developed by the Bologna Process in Europe, suppressed the inclusive definition of research in the original proposal, excluding artistic and creative approaches. Solberg suggests this links to government economic aims for higher education reform, including outcome-based financing models and increased competition for research funding. Such regimes of benchmarking and reporting increase pressure to publish or perish; consequently, the traditional PhD in design may not adequately capture the full range of valuable research abilities cultivated in artistic research PhD education.

Organizing PhD education around traditional research outputs may exclude special sub-groups, and local contextualization of the PhD may be preferable to a one-size-fits-all model. For example, Halina Dunin-Woyseth and Fredrik Nilsson\(^\text{147}\) assert that assessing practitioner-researcher work requires a special approach — connoisseurship and criticism — because practitioner-researchers’ skills do not align with traditional research standards. Moreover, the authors claim practitioner-researchers’ PhDs employ field-specific research using design approaches that demonstrate doctorateness through criteria and evidence aligned with interdisciplinary and transdisciplinary research that does not fit neatly within traditional research structures.\(^\text{148}\)

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147 Ibid., 30.
However, there are substantive reasons to uphold the knowledge stewardship characteristic of traditional PhD education as the intended consequence. The capabilities the traditional PhD cultivates enable the generation, conservation, and transformation of knowledge that genuinely expands understanding of society. For example, Ezio Manzini\(^\text{149}\) argues that university design schools are important agents of change that generate original ideas and trigger new initiatives within networks contributing to the transition toward sustainability.

**Advancing Collective Knowledge**

The original, publishable contribution to knowledge is a key feature of the PhD. However, it is a misunderstanding to depict the knowledge contribution by using a metaphor such as filling an empty space in a bookshelf with a new book. A better metaphor would be that of amplifying the energy in a network.

Advancing knowledge is a collective effort. The PhD nurtures future researchers to steer the advancement of their discipline. For example, methodological awareness is an asset for future research leaders because it enables them to make informed decisions and provide guidance.

The PhD also cultivates researchers with an inquiring attitude. For example, sharing findings and peer review instills in students an open, transparent, collaborative growth of knowledge. Forming questions to expand the state of the art propels ongoing investigation and progress. This inquiring attitude nurtures curiosity as an inclination towards open, critical, questioning, and interdisciplinary study.

Conceptual and theoretical work builds on previous efforts, and fosters shared progress rather than guarding proprietary ideas. The PhD champions independent research aligned with academic freedom to investigate unorthodox ideas that expand disciplinary knowledge. It also spotlights the role of universities in open knowledge-building, which is essential in democracies.

The debate surrounding the PhD in design also relates to assessments of the value of PhD programs as research education or expertise training.\(^\text{150}\) In his discussion of the idea of the university, Gadamer\(^\text{151}\) differentiates the concepts of Bildung and Fachmann. In research education, Bildung is the capacity for independent, purposive thought.\(^\text{152}\) Fachmann denotes specialized knowledge and practical expertise in a particular field or profession. Gadamer posits that research is not simply a training ground for professionals who will apply science in their work, but a way to achieve Bildung.

Susan Jane Rowley\(^\text{153}\) observes autonomy is a crucial value in doctoral education. It bolsters academic freedom and resonates with Friedman,\(^\text{154}\) arguing that the PhD should provide a metanarrative of research that allows others to reach decisions independently. A persuasive argument by Joseph Raz\(^\text{155}\) is that the value of autonomy also engenders duties to help others create their inner capacities to be successfully autonomous.

Amy Gutmann\(^\text{156}\) contends that Lehrfreiheit, or academic freedom, protects universities against democratic tyranny and allows scholars to follow their autonomous judgment as long as they observe scholarly standards of


\(^{150}\) Gadamer, “Idea of the University,” 124.

\(^{151}\) Ibid.


\(^{154}\) Ken Friedman, “Unflattening by Nick Sousanis,” JISC mail, October 9, 2015, https://www.jiscmail.ac.uk/cgi-bin/websadmin?A2=PHD-DESIGN;19304b82.1510.


\(^{157}\) Ibid., 179.
inquiry. Consequently, academic freedom is more demanding than more general freedoms. Academic freedom buttresses new and unorthodox ideas by judging their scholarly merits. Gutmann elucidates that the value of autonomy generates normative reasons for researchers to observe scholarly standards of inquiry and to avoid being drawn away from working on serious problems to investigate unserious but financially profitable ones or from problems that afflict people who cannot afford to hire consultants.

The Idea of the PhD in Design

This article contends that the assessment validation approach constructs a more robust, coherent theory for evaluating the PhD in design than the status quo because it explains and evaluates the reasoning linking scoring PhD students’ performance to the implications of PhD assessment.

The value of this perspective is that it provides both boundaries and flexibility, keeping the focus narrowed on the PhD specifically while drawing connections to broader concepts like research attitude and autonomy. The issues discussed in this article also contribute to our understanding of the PhD as integrating research, teaching, and learning. Furthermore, it links the PhD to the broader ethical duties of universities and researchers as stewards contributing to collective knowledge.

The contribution of this article has been to highlight assessment validation as a useful but underutilized approach to contribution to the discourses surrounding the PhD in design. An empirical examination of the interpretation-use arguments would be a valuable extension or complement to the work presented here. However, I hope that this article strengthens the conceptual clarity regarding the purpose and promise of the PhD in design.

Declaration of Interest

There are no conflicts of interest involved in this article.

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Appendix

Table 1  Key list for the PhD in design interpretation and use argument.

<table>
<thead>
<tr>
<th>Proposition</th>
<th>Attribute</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpretation and Use</td>
<td>1. The university is justified to interpret the results as evidence that the students can conduct independent research and use the examination results to award PhD degrees.</td>
<td>14. Improper appeal to authority</td>
</tr>
<tr>
<td></td>
<td>2. It is fair to use the examination results to award PhD degrees.</td>
<td>15. Stewardship</td>
</tr>
<tr>
<td></td>
<td>3. Educating scholars fulfils the university’s purpose of stewardship of the disciplines.</td>
<td>16. Nexus</td>
</tr>
</tbody>
</table>
| | 4. The PhD aims to educate scholars who integrate research, teaching, and learning. | 17. Questionable cause | Bournerv, Coessens et al., Hannula et al., Hawkins, Holert, Hughes, Jung, Loveless, Schön, Scrivener and Chapman, Spatav, van Schai 

Extrapolation

| 5. The examination results are valid evidence of students’ readiness to do independent research. | 17. Questionable cause | Denicolo et al., Green and Powell, Lovitts, Pearce, The Council of Graduate Schools of the U.S., Trafford and Leshem |
| 6. Integrating the variety of abilities indicates readiness to do independent research. | 18. Independence | Denicolo et al., Davis et al., Doordan, Downton, Dunin-Woseth and Nielsen, Foth and Rittenbruch, Friedman, Heynen, Houston, Leach, Lima, and Denis, Lovitts, Malgrave, Margolin, Peer et al., Phillips and Pugh, Sato, Shaw and Green, The Council of Graduate Schools of the U.S., Tinkler and Jackson |
| 7. The students integrate the variety of abilities. | 19. Attitude | Buchanan, Cross, Davis et al., Doordan, Downton, Dunin-Woseth and Nielsen, Foth and Rittenbruch, Friedman, Heynen, Houston, Leach, Lima, and Denis, Lovitts, Malgrave, Margolin, Peer et al., Phillips and Pugh, Sato, Shaw and Green, The Council of Graduate Schools of the U.S., Tinkler and Jackson |

Generalization

| 8. The examination results are reliable evidence of students’ PhD-level abilities. | 20. Fallacy of composition | Evans, Gray and Malins, Niedderer and Roworth-Stokes, Rippel, Sullivan |
| 9. The examiners infer students’ abilities from the essential research activities. | 21. Abilities | Denicolo et al., Lovitts, Pearce, Perry, Phillips and Pugh, Rugg and Petre, Shaw and Green, Trafford and Leshem |
| 10. Examiners observe the essential research activities in the dissertation. | 22. Activities | Denicolo et al., Durling, Friedman, Lovitts, Perry, Phillips and Pugh, Poggenpohl and Sato, Rugg and Petre, Shaw and Green, Trafford and Leshem |

Scoring

| 11. The examination results are evidence of PhD-level research activity. | 23. Hasty conclusion | Cazeaux, Dally et al., Davis et al., Dorst, Hills, Schön |
| 12. The examination procedure carefully evaluates the submissions. | 24. Examination procedure | Durling, Green and Powell, Pearce |
| 13. The submission aligns with PhD-level examination requirements. | 25. Examination requirements | Archer, Green and Powell, Hill, Kroeling, Mattinson, Pearce, Stappers and van Boeijen |
Durling, “Fostering a Research Culture,” 10.
Master, “27.”
Davis et al., “Making Sense of Design Research,” 142.
Discipline,” 97.
Cross, “Editorial,” 2; Also, see Cross, “Design As a
Role and
Pearce, “How to Examine a Thesis,” 52.
Perry, How to Get a PhD, 59.
Perry, How to Examine a Thesis, 56.
Perry, How to Get a PhD, 59.
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