

## The doctorate as an original contribution to knowledge: Considering relationships between originality, creativity, and innovation

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*Article received 31 January 2015 / revised 17 July 2015 / accepted 3 August 2015 / available online 12 October 2015*

### Abstract

*This article explores the meaning of originality in doctoral studies and its relationship with creativity and innovation. Doctoral theses are expected to provide an original contribution to knowledge in their field all over the world. However, originality is not well defined. Using the literature on concepts of originality as a foundation, this article shows that originality is not a concept commonly understood. Creativity introduces a focus on the production of knowledge, which is not just novel but also meaningful. Innovation is becoming of increasing importance in doctoral theses with the societal shift to knowledge-based economies and introduces the requirement of immediate relevance for economic purposes in doctoral education. While the three elements appear to be substantial building blocks of the potential contribution doctoral work can make in the 21<sup>st</sup> century, it is unclear the extent to which doctoral theses fulfil these expectations. The article discusses this problem with a focus on implications for doctoral education.*

Keywords: *doctoral education; originality; creativity; innovation*



## 1. Introduction

The role of the doctoral thesis as an original contribution to knowledge has traditionally signalled a high level of intellectual output within the academic discipline. While considered an essential component of doctoral education, the nature of originality is typically ill-defined. Commonly associated with the production of new knowledge, originality is increasingly seen as inherent to creativity and innovation (European Universities Association, 2010). However, how the three concepts of originality, creativity and innovation operate within the doctoral education process, independently and collectively, is unclear. In addition, questions remain over how and whether originality, creativity, and innovation may be facilitated in doctoral programs, even though these concepts are commonly found in policy documents and literature on doctoral education.

Nowotny, Scott and Gibbons (2001) suggest the production of knowledge within the knowledge society values creativity, application and flexibility, a process that is enhanced in the doctoral environment (Walsh, Anders & Hancock, 2013). Doctoral students form a key component of such knowledge production and are therefore directly influenced by how such notions – specifically originality, creativity and innovation – are defined and influence each other.

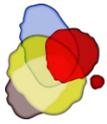
This article therefore explores the meaning of originality in doctoral studies and the relationship with innovation and creativity. The aim is to provide insights into the nature of originality in doctoral education for 21<sup>st</sup> century knowledge societies.

## 2. Originality

The debate about the originality of doctorates dates back to the 19<sup>th</sup> century (Mommsen, 1876). While originality has been a long-held requirement of doctorates, the publication of doctoral theses introduced in the 19<sup>th</sup> century helped to reduce fraud and enabled the assessment of originality by relevant disciplinary communities. For example, since the first UK doctorate was awarded in 1917, the degree has required “an output that constitutes original research as defined by the academic community into which the candidate wishes to be admitted” (QAA, 2011, p.12). This requirement places thesis examiners in a powerful brokerage position with responsibility to enact a judgement of originality on behalf of their respective academic community, although the assessment of appropriate degrees of originality differs substantially amongst examiners (Clarke & Lunt, 2014; Denicolo, 2003; Johnston, 1997).

For over a century, the quality of originality has been considered essential to the doctoral thesis (European Universities Association, 2007, 2010; Australasian Qualifications Framework Advisory Board, 2007; Hornbostel, 2009; Association of American Universities 1998, in Lovitts, 2005; New Zealand Qualifications Authority, 2001; UK Quality Assurance Agency for Higher Education, 2011) in order to achieve what is commonly now referred to as ‘doctorateness’ (Wellington, 2013). The Council for Doctoral Education of the European Universities Association (EUA), as one example, recommends as the first principle of doctoral education that “the core component of doctoral training is the advancement of knowledge through original research” (2010, p.2).

Moving beyond a surface-level assessment of originality requires attention to the development of original thought and original work (Clarke & Lunt, 2014). For the former, new knowledge might be generated as a result of the doctoral thesis, or existing knowledge might be applied to result in a new understanding. For the latter, developing a musical score or a painting can indicate original work. Not only are doctoral students required to assess and categorise existing bodies of knowledge through this process, but they also draw conclusions regarding knowledge and make decisions about implementation (Simpkins, 1987, cf. Lovitts, 2007). Originality may be evident in the study’s design, the knowledge synthesis, the implications, or the way in which the research is presented (Wellington, 2010).



This assessment emphasises the nuanced ways in which the outcome of originality might be achieved. Applying existing methods to new data could result in incremental additions to the knowledge base, while the application of new methods, new questions, or new ideas could generate more substantial shifts in knowledge (Lovitts, 2005). This variability underscores the emphasis on significance in doctoral research. Whilst significance is not inherently a component of originality (Johnston, 1997), it is important to note that original research within the context of doctoral education is expected to provide knowledge of significance to the field of study (Tinkler & Jackson, 2004).

These varying perspectives on originality show that it does not have a universal definition, nor does it manifest in the same way in all doctoral work. Originality is not only related to an outcome or product, but also to the overall process of producing an outcome. A doctoral student cannot achieve a product without undergoing a process that stimulates the creation of that product. What is deemed original may vary between disciplines, programmes and even individual projects. The originality of a dissertation can be expressed in a number of ways, and the kind of originality that is recognised and appreciated has traditionally been dependent on discipline (Guetzkov, Lamont & Mallard, 2004; Lamont, 2009; Lovitts, 2007).

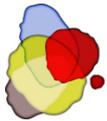
Disciplinary variation influences the assessment of originality. For example, Clarke and Lunt (2014) suggest that originality in science, technology, engineering and mathematics disciplines is defined by publishability, whilst in arts, humanities and social sciences it is related to intellectual originality. Guetzkov and colleagues (2004) argue that natural sciences define originality “as the production of new findings and new theories”, while social sciences and humanities define it “much more broadly: as using a new approach, theory, method, or data; studying a new topic, doing research in an understudied area; or producing new findings” (p.190). Disciplinary implications are evident for PhD students’ perceptions and expectations about the PhD as process and product, and also for the way students learn how to do research, and consequently what it means to be original.

Knowledge is rarely de-contextualised, and numerous factors influence the way an individual frames a question and chooses the path to answer that question. Disciplines consist of old and emerging specialisms (Kekäle, 2000), and how these different bodies of knowledge are defined and arranged determines the output (Bailin, 1985). Knowledge defined as old or emergent may intertwine to create a process or product that may be called original. Delamont, Atkinson and Parry (2000, p.174) state that: “The originality of postgraduate research is always defined in terms of the essential tension between accepted prior knowledge and new discoveries or ideas”. Disciplinary influences are evident in cultural norms including the research process (such as group projects or those led by a supervisor), the form of the thesis (such as monograph or article-based), and the long-term impact on the field (such as future publication and citation impacts).

Thus, a definition of originality in doctoral degrees assumes different nuances in different contexts. Numerous issues should be considered in addressing originality in doctoral education:

- The interplay between old and new, i.e. that originality inevitably builds on existing knowledge and practices in some way;
- Disciplinary variation in originality;
- The existence of degrees of originality, and the need for originality to be accompanied by significance;
- The need to address originality in doctoral process as well as product, with associated implications for research training.

Both Bennich-Björkman (1997) and Beghetto (2013) agree that originality can be defined as something that is new or novel, but originality does not necessarily have to be applicable or relevant. Herein lies the difference between originality and creativity, as described below.



### 3. Creativity

Along with the expectation of originality, doctoral research is strongly associated with creativity, commonly as a way in which students engage in the research process. For example, the Australian Qualifications Framework (2013) specifies that doctoral graduates are required to demonstrate “the application of knowledge and skills with initiative and creativity”. Thus creativity implies that a contribution (such as a doctoral thesis) needs to be both novel (original) and relevant (according to Bennich-Björkman, 1997) or applicable (according to Beghetto, 2013). Beghetto (2013) defines creativity as anything deemed as both original and task-appropriate within a particular socio-cultural-historical context – such as an academic discipline.

The genealogy of creativity can be traced back to the Greek word ‘kratein’, which means to fulfil. People who fulfil their potential, who express an inherent drive or capacity, can be seen as creative (Evans & Deehan, 1988). Pope (2005, p.11) consequently defines creativity as “the capability to make, do or become something fresh and valuable with respect to others as well as ourselves”, which involves “a grappling deep within the self and within one’s relations with others: an attempt to wrest from the complexities and contradictions we have internalised”. This definition goes beyond creativity in the thesis production and process, to creativity of the person, i.e., the doctoral graduate themselves. This positions creativity as including the full realisation and expression of a person’s potential (Lovitts, 2008; MacKinnon, 1970) – thus ‘becoming doctorate’, a responsible and independent scholar (Barnacle, 2005). Assessing creativity requires attention to the intellectual context, including Big C creativity, or that which brings about knowledge new to the human race, and Pro C creativity, which occurs within a professional workspace (Kaufman & Beghetto, 2007). The disciplinary context adds another important variable, underscored by the key elements of motivation, independence, and intellectual challenge (Jurisevic, 2011).

Bennich-Björkman’s (1997) classification scheme (see Table 1) offers further insights into the relationship between originality and creativity.

Table 1

*Classification of research contributions (adapted from Bennich-Björkman, 1997, p.25)*

		Is the contribution novel?	
		<i>Yes</i>	<i>No</i>
Is the contribution relevant?	<i>Yes</i>	Creative	Cumulative
	<i>No</i>	Original	Replication

The relationship between originality and creativity, according to Bennich-Björkman, is defined through novelty and relevance. In principle, relevance may be determined at individual, societal or economic levels (Steinberg & Lubart, 1999), but in the case of the doctorate, most commonly refers to the judgment of the disciplinary community in which the doctorate is produced. While creative work is expected to be relevant as well as novel, originality is expected only to be novel. By taking the focus off of immediate relevance, the pure concept of originality recalls blue skies research and an emphasis on the pursuit of knowledge for its own sake. This view of originality thus seems appropriate to the time when the expectation of original research was first introduced into the doctorate, with the rise of the modern university in the late 19<sup>th</sup> century.

In addition to counterposing creativity and originality, Bennich-Björkman’s classification attempts to define knowledge production that is not original. Cumulative research is characterised as being highly



relevant, in the sense of being valuable or useful to disciplinary communities, but not novel. This focus on relevance positions cumulative research as a valuable contribution to knowledge, but neither original nor creative. Replication of research is positioned as neither novel nor relevant, but is nonetheless an important aspect of knowledge development that increases the reliability of research findings and thus trust in the outcomes – small studies may be replicated on a larger scale or with another sample, for instance. Disciplinary differences matter, as cumulative research and replicative studies are not uncommon in many natural science doctorates. Thus, the ‘in practice’ definition of originality in doctoral theses may be made as much on pragmatic grounds as on conceptual ones.

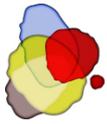
The product of a creative endeavour demonstrates an original and appropriate contribution that has purpose and can be judged by some sort of external criteria (Sternberg & Lubart, 1999). A process-product distinction exists between creativity and originality, with the idea of a creative process underpinning an original product or outcome. This distinction has implications for the design of doctoral education, suggesting that originality in research outcomes may best be achieved by encouraging creative processes during the candidature, such as a creative learning environment or peer collaborations. The notion of fit for purpose that our discussion has highlighted as a key aspect of creativity raises questions such as fit for whom or what? Such questions open the door to innovation being one of the drivers of research in the 21<sup>st</sup> century that also needs to be considered in the contributions doctoral work is expected to make.

#### 4. Innovation

Innovation has become an increasing expectation of doctoral studies as part of the global post World War II economic shift from industrial and manufacturing based economies to technological and knowledge based economies (Delanty, 2001; Marginson & Considine, 2000; Rolfe, 2013). By definition, innovation involves the process of transforming an invention into practical application, and is most commonly associated with private industry (Marsh, 2010). As the production of knowledge has come to be of increasing importance to national economies, university research is expected to better serve the needs of industry, through innovation in science and technology in particular.

The term ‘innovation’ is most often found in economic discourses on production processes or products (Marsh, 2010). Governmental higher education policies place an emphasis on stronger links between industry and universities, and development of knowledge that can be exploited for economic benefit (Delanty, 2001; Henkel, 2000), bringing the concept of innovation firmly into the 21<sup>st</sup> century doctoral education. The Lisbon Declaration on the purpose of Europe’s universities (2007) strongly links university research with innovation, emphasising the importance of universities’ “capacity for promoting cultural, social and technological innovation” (p.1) and that “to meet the challenges of the twenty-first century (...) [requires] technological and social innovation which will solve problems as they arise and ensure economic success” (p.2). Thus, innovation as part of doctoral research privileges the production of knowledge that is economically useful, either in terms of technological advances or societal use. Technological innovation is typically linked to marketable technologies, for example developing patents. Social innovation would relate to applied research aimed at improving societal conditions or solving societal problems. Examples are abundant in a variety of disciplines ranging from medicine (eg, curbing mother to child transfer of HIV/Aids) to education (eg, improving literacy rates).

In classical economic theory, innovators are considered creative entrepreneurs who successfully acquire monopoly positions with innovative products or production processes (Schumpeter, 1912). Innovation is defined as the practical application of a novel, and thus original idea, but it must be an idea with a potential application: “Innovations of any kind start with some kind of creative enterprise, and the enterprise must produce work that is not just novel, but useful. Innovation is the channelling of creativity so as to produce a creative idea and/or product that people can and wish to use” (Sternberg, Pretz & Kaufman, 2003, p.158).



The doctorate is increasingly economically positioned as an important source of skilled and innovative knowledge workers, as required by a knowledge-based economy with a strong emphasis on research and development. This position has led to an exponential growth in the number of PhDs awarded internationally, especially in the natural sciences and engineering (Cyranoski, Gilbert, Ledford, Nayar & Yahia, 2011), and a shift in expectations of employment post-PhD away from academia and towards industry, government and private enterprise (Auriol, 2010; Enders, 2005). Innovation has claimed a prominent place in defining a key purpose of the 21<sup>st</sup> century doctorate as preparing the candidate for a future career in either academe or industry, and developing skills for employability (Wellington, 2013).

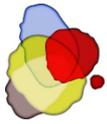
The extent to which these developments have changed the conditions under which knowledge is produced in doctoral theses and science in general is unclear (Geiger, 2004). The literature on thesis examiners shows hardly any expectation of innovation in doctoral theses in terms of developing applications for industry, though engineering is an exception here, where an application of existing methods to a problem from engineering practice is considered original, just as is the invention of new devices (Lovitts, 2007, p.173). Similarly, the conceptualisation of originality in economics, as the application of existing methods to a novel problem, is also considered original (Lovitts, 2007, p.173). Both disciplines consider practical problem solving as an original contribution.

## 5. Implications for doctoral education

Risk is intrinsically linked to originality, creativity and innovation, and is thus an unavoidable element of doctoral education (Frick, Albertyn & Bitzer, 2014). Doctoral education is inherently risky given the requirement to produce original knowledge. The Lisbon Declaration (2007) argues that universities “should encourage a culture of risk-taking (...) in order to produce an institutional milieu favourable to creativity, knowledge creation and innovation” (p.3), reinforcing the idea that an original contribution requires a certain amount of risk-taking in choosing a topic and approach, due to the novelty aspect inherent to originality. Students need to have “the courage and confidence to take risks, to make mistakes, to invent and reinvent knowledge, and to pursue critical and lifelong inquiries in the world, with the world, and with each other” (Freire, 1970, cited in Lin & Cranton, 2005, p.458). MacKinnon (1970) agrees that the courage to take risks is an important characteristic of creative endeavours – such as doctoral studies. However, balancing risk with originality, creativity and innovation may provide challenges for the supervisory relationship and the research process (Brown, 2010; Latham & Braun, 2009). Therefore, it is important not only to manage risk constructively, but also to understand how it manifests within doctoral education.

Byrnes, Miller and Schafer (1999) refer to four aspects that need consideration when defining risk that could be applied to doctoral education. Firstly, risk is closely associated with goals, values and outcomes. Hence, the importance of current debates about the purpose of a doctorate in a risk society full of uncertainties and changes (Park, 2005, 2007), as well as the definition of supervisory and research responsibilities and roles that characterise doctoral students and supervisors. Secondly, risk involves interplay between an individual’s subjective perception of risk and the perceptions of the larger community. Different students and different supervisors may interpret risk differently, which may influence how they negotiate their relationship and study focus. Thirdly, individual characteristics determine the extent of possible risk. For instance, a study may be less risky if the doctoral student has particular research and/or subject expertise. Finally, context determines “who can take what risks and how” (Hood, Jones, Pidgeon, Turner, Gibson & Bevan-Davies, 1992, p.136). For example, certain projects may become less risky if expert supervision and other resources are readily available.

This conceptualisation of risk reflects significant forces that relate to elements in the context, relationships in the supervisory process, and individual characteristics of doctoral students. These forces are reflected in the broader literature on doctoral education, which highlights several factors that may affect the overall success of a doctorate, including: (i) characteristics of the doctoral candidate themselves; (ii) nature



of the doctoral supervision experienced; and (iii) institutional, departmental, disciplinary and external cultures. Each of these factors is explored in more detail below.

Individual student characteristics can strongly impact on the originality of their work. For instance, doctoral education requires that students at times work independently in an uncertain environment. Within this environment, healthy program cultures encourage risk-taking by students within the context of the field. The interpretation of risk is a process fraught with possible complications, particularly in terms of the expert-apprentice relationship still prevalent between the supervisor and student. However, students who have been socialised in an undergraduate academic culture or a professional environment that promote novel ways of knowing will have a stronger foundation for originality.

In addition to student characteristics, doctoral supervision is one of the most important influences on research student outcomes (Latona & Browne, 2001; Seagram, Gould & Pyke, 1998). Evans (2004) conceptualizes the role of the supervisor as that of risk manager and risk mitigator, acting as an intermediary between the demands of society, the discipline(s) involved, the institution and the doctoral candidate. Frick, Albertyn and Bitzer (2014) report various strategies that supervisors use at different stages during the doctorate to support students and mitigate risk, including formulating clear expectations; determining and developing student capability, independence, analytical thinking skills, problem solving skills, integrative thinking skills, creativity, and expectations during the student selection phase; encouraging wide reading, critical debate, benchmarking, time for incubation of ideas, and challenging students during conceptualisation of the study; developing academic writing and methodological skills through incorporating expert input; supporting networking, colloquia, regular contact, communication, co-supervision and mentoring practices; and promoting peer review and writing for publication during the doctorate. They encourage further research that explores ways of balancing rather than controlling risk, while encouraging innovation in the doctoral education process. Increased awareness of risk could lead supervisors to contain risk in a responsible manner. Of course, it is not only the student who assumes the risk in terms of research, but also the supervisor.

Institutional, departmental, disciplinary and external cultures influence how faculty and students engage with a doctoral curriculum. Backhouse (2009), Frick (2012) and Holligan (2005) point to cultural factors (including bureaucratic institutional systems, ethics and funding policies) as determinants of the extent to which risk-taking is possible in doctoral studies. For instance, a danger of the current emphasis on doctoral throughput in the minimum allocated time is that it may lead to avoiding the risk of choosing a complex and less defined problem. Not all research that may be considered original requires lengthy periods of time, but nor can all research be contained within minimum, finite time periods. Ultimately, the process of doctoral education is influenced by the various cultures in which such work takes place. In particular, how such cultures define novel knowledge outcomes is highly relevant.

Clearly, approaches to doctoral education that might encourage originality are patchy, making it difficult to design an educational agenda for the future when there are so many uncertainties and unpredictable changes embedded in doctoral (research) education and supervision, and when concepts that characterise this challenging high-level process overlap and seem somewhat blurred. But perhaps operating in a state of uncertainty, unpredictability and blurred boundaries is what the future of higher education is all about.

## **6. Conclusions: insights into the nature of originality in doctoral research**

We can see from this examination of originality, creativity and innovation the extent to which all three concepts are often defined with reference to each other. Clearly, these concepts share a focus on novelty in research. Where the concepts differ is in the underlying purpose or intention for seeking novelty – with creativity it is disciplinary relevance or value, with innovation it is useful economic outcomes, whilst



with originality it is more blue skies knowledge seeking – but all three of these concepts may influence the way in which the potential contribution of doctoral work is seen. But whilst originality may be free of instrumental connotations, a doctorate is not. Doctoral theses are expected to make not just an original but also significant contribution to the field, the implication being that there is little value in originality if it is not also significant. However, the determination of significance is context-dependent. What would be considered significant in the 19<sup>th</sup> century would likely be different to the 21<sup>st</sup> century, and in one discipline or sub-specialisation different to another, for instance.

It could be argued that creativity and innovation all incorporate originality, in the form of novelty in research. Hence, it may be possible to have originality without creativity or innovation, but not vice versa. Meanwhile, all three concepts can contribute to the development of the doctoral contribution in overlapping but different ways. Conceptually, the links between these concepts can be displayed as follows:

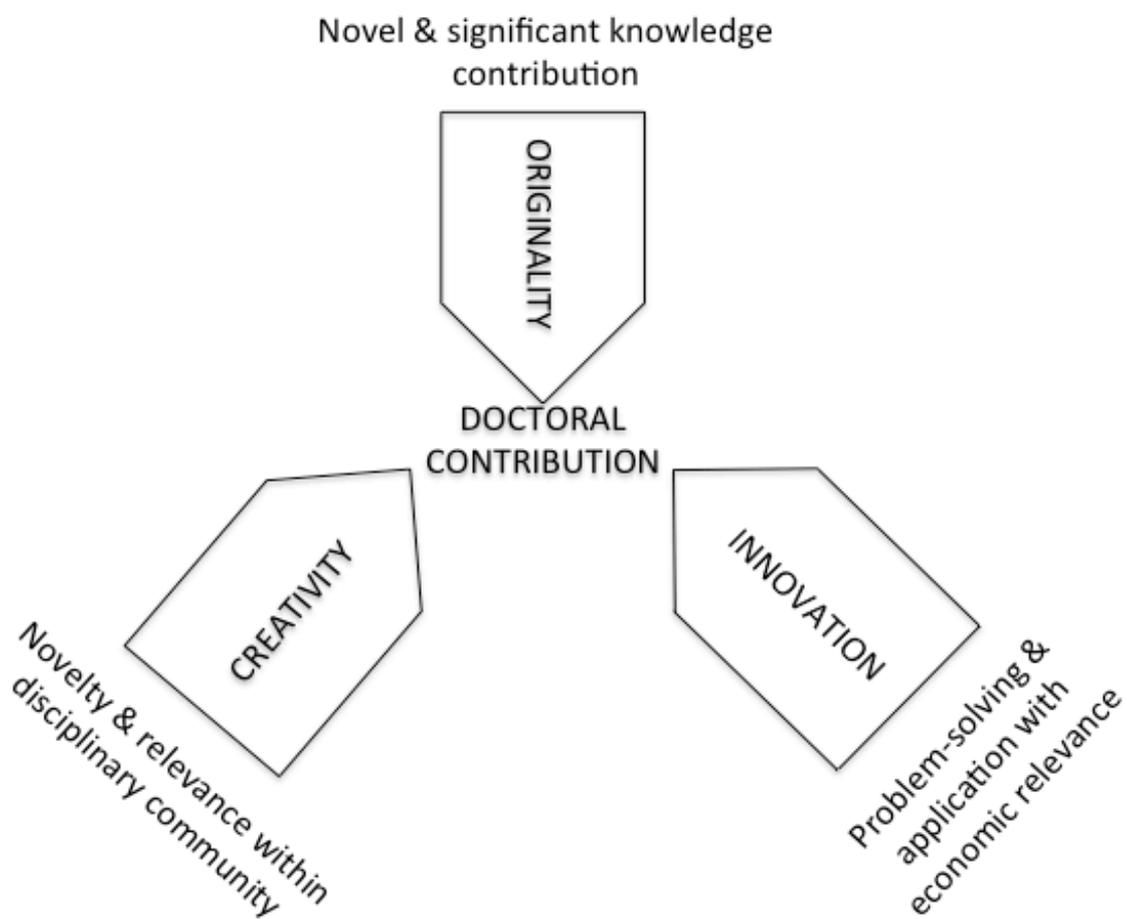
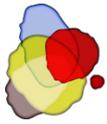


Figure 1. The relationship between originality, creativity and innovation.

In Figure 1 we show that originality, creativity and innovation are related elements that can all contribute to the doctoral contribution, but that the emphasis shifts depending on the concept. As doctorateness seems to be a multi-faceted concept itself (Wellington, 2013) this fluid emphasis may be useful to allow for (trans)disciplinary, programme and individual differences in what it means to be doctorate.



Meanwhile, in the current economic and socio-political climate, the question of whether doctoral studies can or should be safe-guarded from instrumental requirements for applied relevance must be considered. Doctoral theses call not just for originality, but originality that advances the field in a substantial way. Just as the internal characteristics of the field change over a period of time, so does the external context which helps give shape to (and ultimately, contribute to a definition of) knowledge production. While this demand need not include the focus on economic benefits or relevance attached to innovation or creativity, it still places constraints on the type of originality considered appropriate for a doctoral thesis.

Appropriate approaches to developing originality as part of doctoral education need to be considered. Although expectations of originality in doctoral work seem ubiquitous, there is little literature on design of curricula or pedagogical processes for supporting the development of originality. As described above, the concept remains vague to examiners and supervisors (Clarke & Lunt, 2014; Lovitts, 2007). Meanwhile, a common assumption seems to exist that the process of engaging in doctoral research will in and of itself lead to originality, as if through some magical process: “The goal of doctoral education is to cultivate the research mindset, to nurture flexibility of thought, creativity and intellectual autonomy through an original, concrete research project. It is the practice of research that creates this mindset” (European Universities Association, 2010, p.2). The unanswered question from this statement is how the practice of research cultivates these attributes, and in what ways doctoral education might intentionally foster these outcomes.

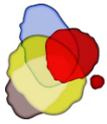
Such vague notions for ensuring the development of such a central expectation of doctoral education seem inappropriate in the context of the 21<sup>st</sup> century focus on higher education efficiency, accountability and quality assurance. Considering the ways in which doctoral education can facilitate originality requires attention to the doctoral curriculum, i.e. process, as well as the thesis outcomes, i.e. product.

## 7. Outlook

In exploring the nature of originality, this article has linked different conceptualisations of novelty as applied to doctoral theses, showing that while originality appears to be the basic requirement, other expectations such as creativity and innovation, and associated criteria of usefulness and economic advancement have recently appeared on the agenda. This association suggests a new differentiation in the requirements for doctoral theses. However, the relation between these concepts is not yet fully clear. The question remains as to whether the differentiation of requirements for a doctoral thesis is just a mirror of changes affecting research and knowledge creation in general, or whether there are more nuanced issues to consider related to doctoral education specifically.

As the doctorate is seen as the initial process in becoming a researcher, changing requirements for the doctorate will most likely affect the way knowledge creation operates in the future. Higher education has experienced these changes before. As one example, the publication of doctoral theses is now commonplace, and many institutions offer open public access to theses produced by doctoral graduates. Another example involves the development of the group dissertation for certain disciplines. These so-called ‘capstone projects’ not only encourage students to work collaboratively, but they often involve external stakeholders. The challenge of defining original research has implications for the nature of doctoral training, and specifically for the internal function of disciplines and for the relation between academic disciplines and society. Future research should examine the extent to which these new requirements are part of institutional guidelines, supervisors’ expectations and doctoral students’ identity conceptualisations.

An even more fundamental question is about the determination or assessment of originality. A troubling reality underscores the consideration of originality in doctoral education – to what extent have doctoral theses ever been shown to fulfil the requirement of an original and significant contribution to knowledge, apart from via the subjective judgments of examiners? With theses by publication becoming more widespread, new pathways for intra-individual replicability of originality and in depth analysis



emerge, for example through the application of bibliometric tools and content analysis of citations. However, the question of which stakeholders should be involved in this assessment and what bibliometric indicators might be utilised are unresolved issues.

Another almost unquestioned theme in the extant literature is that originality arises out of the doctoral training process, be it an intensive supervisor-mentee relationship or more structured doctoral training conditions. This assumption is particularly noteworthy given that no valid database exists that can be used to demonstrate whether a doctoral thesis can be considered original, much less which experiences contribute to a doctoral student being able to perform such work. Future research should take steps towards unpacking the relationship between doctoral training conditions and outcomes, in the sense of fulfilling the requirement of originality. The following questions offer ideas for future research:

- What are doctoral program designers' conceptualisations of originality?
- How do these relate to conceptualisations of originality by supervisors, examiners and students?
- Which requirements can be achieved through better training, and which are dependent on individual characteristics of doctoral students, such as propensity for risk-taking?

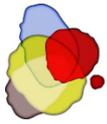
Cross country and international comparisons could be valuable here; although the doctorate shares commonalities in the international context, the degree to which the doctorate is organised as a training process varies from country to country.

This article has considered how originality builds on existing knowledge and practices by stimulating an interplay between old and new. How should doctoral curricula and the supervisory relationship explicitly develop students' originality skills? It is incorrect to assume that all doctoral supervisors and those who design curricula at doctoral level at all higher education institutions possess originality skills themselves. Additionally, formal structures at contextual and institutional levels, where doctoral education and supervision take place, as well as in national contexts stimulate both the definition of originality as well as the attitude towards research and knowledge.

To tackle these questions, the research agenda for the future should open spaces for discussions about the place of originality in the supervisory relationship, curricula design, and the cultural environment that an institution and even a research group has to offer. Disciplines should strengthen dialogues about the requirements for a doctoral thesis in their field, and research should supply these discussions with evidence based knowledge. Simultaneously, a critical approach to the different discourses at different levels should be reviewed in the light of the most relevant and updated literature. These dialogic interactions between practices, perceptions and research may be a way of improving the overall experience students and supervisors will have in doctoral programs.

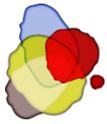
## Keypoints

-  In exploring the nature of originality, this article has linked different conceptualisations of novelty as applied to doctoral theses, showing that while originality appears to be the basic requirement, other expectations such as creativity and innovation, and associated criteria of usefulness and economic advancement have recently appeared on the agenda.
-  The challenge of defining original research has implications for the nature of doctoral training, and specifically for the internal function of disciplines and for the relation between academic disciplines and society.
-  Further research must be carried out in order to shed light on possibly diverse ways of determining or assessing originality

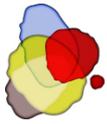


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