



# CREATIVITY AND THE DOCTOR OF PHILOSOPHY: THE CASE FOR CREATIVITY EDUCATION WITHIN DOCTORAL PROGRAMS

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**Abstract.** Doctoral education is an increasingly prevalent part of the worldwide higher education landscape. Although there are variations in how programs are constructed and delivered, there is general agreement that evidence of creativity is expected in the final thesis. Despite the significant attention the supervisory process has received in the literature, students' views on creativity as it applies to their candidature have not been extensively explored. This article reports on interviews with a sample of 12 current doctoral students in the areas of the arts, social sciences, and education from the theoretical perspective of the systems model of creativity. Interview participants were invited to reflect on the concept of creativity, and the factors which support or constrain their potential to be creative. The findings reveal that on reflection, students are able to identify the creative elements of their work, however the findings also indicate that creativity education should be given greater focus in doctoral programs, in order to embed this important concept and process to support students' learning journey.

**Keywords:** creative thinking, critical thinking, creativity, doctoral education, graduate studies, risk-taking.

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## 1. Introduction

Since the turn of the 21st century, there has been ongoing growth in Doctor of Philosophy (PhD) enrolments in a number of countries, including the United Kingdom (UK), the United States, Australia, China, and many countries in mainland Europe (Carter et al., 2021; Davies et al., 2007; Liu et al., 2020). Although there are significant variations in the practice of doctoral education across nations (Brodin, 2018), there is widespread acknowledgement that evidence of creativity is expected in the research that students produce (Clarke & Lunt, 2014; Frick, 2011; Liu et al., 2020; Whitelock et al., 2008). In addition, expected learning outcomes of doctoral education include the development of both creative and critical thinking skills (Brodin & Frick, 2011). Further, although there is a general consensus regarding the goals of doctoral education, there are also arguments that it is a complex and diverse space (Brodin & Avery, 2014). Frick and Brodin (2020) recently noted that not only are the conditions required for creativity in the doctoral space rarely studied, but that links between creativity and doctoral students' academic identity development receive minimal research attention.

The concepts of creativity, originality, and risk-taking are often used interchangeably and viewed similarly in the discourse relevant to doctoral education (Thurlow et al., 2019), however there is no universally agreed definition of these terms in relation to the crafting and

subsequent examination of a thesis (Clarke & Lunt, 2014). The general consensus is that creativity involves both originality and effectiveness (Runco & Jaeger, 2012) or what Kaufman (2016) describes as novelty and appropriateness/value. Doctoral education is typically based on a studio model, where supervisors work closely with individual students, in a master-apprentice style of learning (Dominguez-Whitehead & Maringe, 2020), with students guided on how to design their project and embed an appropriate theoretical framework, engage with relevant literature and methodology theory and design. A fundamental tenet of doctoral education is the practice of research and research training, which requires that candidates shift from a didactic teaching model that is common to undergraduate teaching and move into an independent research framework, or what Cardoso et al. (2022, p. 1) refer to as “the multidimensionality of the transformation” that doctoral training promotes. Candidates must display agentic qualities and problem solve at all stages of the process; each candidate’s project is unique, thereby requiring that they show the tenacity required to structure what can be a complex project and the requirements for the particular institution where they are enrolled. Doctoral education is also seen as a fundamental part of a country’s knowledge society and economy and increasingly important for addressing the world’s challenges (Cardoso et al., 2022). There is also recognition that the majority of extant research in the area of doctoral education focuses on the role of supervisors and the supervision process, with significantly fewer studies exploring how and where creativity occurs (Brodin, 2018). Therefore, this research set out to focus on creativity and doctoral education with the following two research questions:

1. To what extent are students in the arts, social sciences, and education able to reflect on and identify creativity in their doctoral journey?
2. What implications might this have for doctoral education?

## 2. The literature on creativity in higher education

The concept of creativity has become increasingly featured in the education discourse, be this at primary, secondary, or higher education (tertiary) levels (Kleiman, 2008). Although a focus on the need to embed creativity studies has been slower to emerge in relation to higher education, Livingston (2010), Das (2012), and Meng et al. (2017) all argue that study at this level should foster the development of students’ creativity. Meng et al. (2017, p. 605) go as far as to argue that “fostering and developing students’ creativity is more necessary and urgent than ever before”. However, Frick (2011, p. 123) contends that “there is often a lack of systematic and developmentally organised learning experiences that specifically encourage creativity”.

Discrepancies in the use of terms, most notably creativity, risk-taking, and originality continues in recent literature. Power (2018) replaces the notion of creativity with risk-taking, despite also arguing that the latter is equally unclear. Clarke and Lunt (2014) view originality and creativity as similar concepts or constructs, yet contend that there is no universally agreed definition of what originality actually means. They state that the concept of originality is “demonstrated differently in different disciplines” (Clarke & Lunt, 2014, p. 804), a view supported by Baptista et al. (2015).

Wisker and Robinson (2016) contend that supervisors need to encourage and reward creative approaches to doctoral research. Davies et al. (2007) and Frick (2011) however raise

the issue of how the supervisor can constrain creativity and the development of the student voice. Meng et al. (2017) even discuss how abusive supervision through verbal and non-verbal behaviours has significant potential to inhibit doctoral students' creativity. In what Bengtson (2016, p. 276) admits may not be seen as the "sanest of choices", he argues that institutions, graduate schools, and supervisors should embrace the darkness inherent in doctoral study; this concept referring to "learning approaches located in the blind spot of institutional and formalised doctoral education" (2016, p. 262). Bengtson (2016, p. 268) further describes the darkness as the

"often overlooked and shadowy parts of the PhD, where the doctoral students tinker, prowl, mess around, and experiment with extracurricular learning environments and other researchers".

Brodin (2016) makes the claim that critical and creative thinking must be highly developed in doctoral education, according to policy documents across the world. Undertaking research involving interviews with 14 doctorate students in Sweden, Brodin found that critical thinking overshadows creative thinking and was perceived as more valued. In a follow-up study with 14 doctoral students and their supervisor, Brodin (2018) found conditions that stifled creativity included scholarly traditions, supervisors' power, and that it was not explicitly requested nor required. Brodin proceeds to argue that a collaborative supervisory relationship is more likely to encourage creativity than didactic direction.

In a study based in the UK, Speers and Wilson (2018) focused on creativity in the university sector. Arguing that universities are places for "idea generation, learning, and new and valuable thinking" (Speers & Wilson, 2018, p. 523), they claim that creativity is often overlooked, underdeveloped, and under-rewarded. The authors describe a project designed to embed everyday creativity without it becoming constrained or instrumentalised; it was not specified at what year levels or programs the students were studying. After completion of workshops and interviews, the authors argue there were mixed outcomes; although the program did not successfully embed creativity in an everyday situation, they refer to some success in individual and small group situations. The authors proceed to argue that the key conditions of tolerating ambiguity, space to "play", freedom, permission, trust, and risk-taking are essential to support creativity.

In summary, the literature reveals the following:

- There is reasonable consensus regarding the definition of creativity however it continues to be used interchangeably with originality and risk-taking;
- Most published research in the doctoral education area is on the role of the supervisor and the supervision process, with significantly fewer studies that focus on creativity itself in terms of where and how it is fostered and supported in the doctoral journey;
- There is relatively little research on creativity in the context of students' reported experiences of doctoral education;
- There are significant variations in the practice of doctoral education across nations;
- There is demand for developing creativity in doctoral research across the world;
- There is recognition that social, political, or cultural forces in the academy may restrain researchers and cause them to be risk averse and conservative in their attitudes towards creativity;
- There is a need for a more developed discourse on creativity in doctoral education.

### 3. Methodology

The theoretical framework for this research was informed by the systems model of creativity conceptualised by Csikszentmihalyi and Wolfe (2014), given that doctoral education is a system where students aim to produce novel research in collaboration with supervisors, after which examiners affirm the presence of creativity (through novelty and appropriateness). While the concepts of appropriateness and value are a significant part of the doctoral education system, these concepts were not explored in this research due to the complexity of the overall system and in order to limit scope, hence this research focussed on how the individual student is able to reflect on the novelty element of creativity inherent to their processes, methodology, or writing for example. In addition, the theoretical framework was intended to identify potential implications for the higher education sector.

Careful consideration was given to how to investigate the concept of creativity as applied to the doctoral education area. Ultimately a decision was made to interview students currently enrolled in a doctoral degree at the researcher's host institution, for relative ease of access. The overarching goal of the methodology was to investigate the student experience as they were progressing through their studies, and to centre the student voice, given the view of Brodin (2018) that most research to date focuses on supervisors and the supervision process. Semi-structured interviews were chosen given they allow for a more personalised approach and are arguably less onerous for participants, and because an additional level of detail and clarity can be sought which cannot be achieved in a questionnaire. Questions were carefully designed on the basis of key themes identified in the literature and to explore how students reflected on the concept of creativity in their doctoral work to date, including particular creative strategies, the notion of risk, critical versus creative thinking, constraints to creativity, and creativity as applied to their writing practices (see Appendix for the question guide). The interviews were also designed to offer the opportunity for students to elaborate and provide additional perspectives during the discussion, and for the researcher to seek additional clarification or detail when appropriate.

Ethics approval was subsequently sought and achieved, with the college cohort of 95 PhD students contacted in late-2020, noting several may have been on a period of leave from their studies, with a reminder sent after approximately three weeks. Those students who wished to participate were provided with the relevant information sheet and informed consent form, as well as any further clarification or information if requested. After a period of approximately eight weeks, 12 students agreed to participate in an interview and were sent the interview questions beforehand in order to allow time to reflect and consider them. Times for either a *Zoom Video Communications* or face-to-face interview were arranged in mid-2021, with two participants opting to provide written responses to the questions as they felt they could offer more thoughtful responses this way. Table 1 profiles the 12 participants, via pseudonym (alphabetical order), gender, area of study, final output, and the stage of candidature.

Although female participants dominated the sample, and seven of 12 were in the final phase of the doctoral journey, there were a range of disciplines represented. Students in the early, middle, and late stages of the doctoral journey were represented. All interviews were transcribed and checked for accuracy. Following this, the researcher applied an abductive

**Table 1.** Interview participant profiles (source: created by author)

Pseudonym	Gender	Area of study	Doctor of Philosophy output	Candidature stage
Amber	Female	Literature	Thesis	Early
Byron	Male	Creative writing	Creative work and exegesis	Middle
Delia	Female	Education	Thesis	Final
Elizabeth	Female	Creative arts	Thesis	Final
Imogen	Female	Literature	Thesis	Final
Jasmine	Female	Sociology	Thesis	Final
Jenna	Female	Education	Curriculum design and exegesis	Middle
Lissa	Female	Creative writing	Creative work and exegesis	Final
Penelope	Female	Creative arts	Thesis	Middle
Sophie	Female	Education	Thesis	Final
Sylvia	Female	Social work	Thesis	Early
Walter	Male	Literature	Thesis	Final

reasoning approach as the main method of data analysis, given inductive and deductive reasoning “stay within a domain, are self-contained, and do not lead to new findings in the conclusion” (Güss et al., 2021, p. 1190). Abductive reasoning, however, enables the researcher to move back and forth between inductive and deductive thinking and to introduce new knowledge which helps explain a given phenomenon (Güss et al., 2021). In relation to the interview data, participants’ responses were observed both individually in close readings and then considered collectively, in order to generate key themes and findings. The initial premise that those outside traditional creative arts domains may struggle to identify creativity in their work was also taken into consideration when exploring the data. Although it is clear that the views of 12 doctoral candidates could not realistically lead to definitive theories or claims, it was possible to identify findings that were of interest and in some cases, of surprise. An interpretation of the data under broad themes or issues is presented in the following sections, with some participants’ quotes included and which is standard practice in qualitative and empirical research (Hitchings & Latham, 2020).

## 4. Results

### 4.1. Identifying creativity

In general, each of the 12 participants was able to identify specific aspects of creativity in their research, regardless of what stage they were at in the journey. Creativity was described in terms of:

- determining the research topic and focus;
- approaches to analysing data and synthesising information;
- exercising autonomy;
- constructing logically sound arguments;

- undertaking research-informed creative work;
- designing methodologies and methods; and
- establishing an effective relationship between the creative work and the accompanying exegesis for those creating artistic outputs.

It was also mentioned by one interviewee that to some extent any thesis is by definition creative, given the individual nature of PhD research and the way a candidate presents their research in a final thesis. There was, to some extent, a perception amongst those not undertaking traditional creative work (e.g., creative writing), that creativity is primarily the domain of artists, however providing interviewees with the question guide prior to the interview, thereby allowing participants the time to reflect on this issue, led to some pertinent reflections. These include the following:

- Amber felt that her approach to analysing existing literary texts was done in a creative way;
- Delia and Imogen, who were each in the final stage of their journey, specifically talked about how the interview prompted them to think about the creativity inherent to their research. Imogen proceeded to describe the literary dynamics framework she developed as creative: "I'm combining process philosophy and complexity theory with textual analysis of a number of novels";
- Elizabeth involved numerous creative artists as part of designing her website and promotional material, as well as creative problem-solving with her research participants which informed the research recommendations. She also designed an interactive portable document format as the final thesis document;
- Penelope described how creativity enabled her to bring distinct research processes into a cohesive whole;
- Jenna felt that her whole project was a creative process, for example, she identified writing a significant portion of the exegesis in first person as being a creative strategy;
- Jasmine embedded the history of creation and the concept of creativity as a philosophical underpinning, specifically through including such artefacts as poems, and paintings. She also described how she used the act of painting theoretical ideas as a specifically creative approach;
- Lissa described her creative process where she would put all her creative aspects together, let them "percolate", in order to see what the best approach was to her research;
- Walter referred to how he would take a range of sources and "construct a new narrative by assembling this information in novel ways".

## 4.2. Fostering creativity

In the process of close reading and analysis of the data, the broad factors relevant to fostering creativity were identified as: practical strategies, life experiences, place, mindset, and relationships. These are discussed in the following sections.

### 4.2.1. Practical strategies

Participants adopted a range of practical strategies, such as using whiteboards, mind maps, lists, sketching out ideas, using charts, or creating tables. A pertinent example was provided by Elizabeth:

"I spent a lot of time with my colored whiteboard markers, scribbling down mind maps and lists and sketches while brainstorming ways that I could add value to the in-depth data my participants had given me. It was an exciting and challenging creative moment for me because I felt like I was stepping into less-explored areas of mixed methods research while attempting to visualize a richer story out of numbers and words".

#### **4.2.2. Life experiences**

Several participants felt their previous experiences influenced their capacity to be creative in their research and writing. For example, Amber referred to the influence of her experience of society's expected gender roles as having an impact on her ontology and the way she approached the analysis of literary texts. Imogen had submitted a paper to a journal, which was accepted for publication and which gave her "a real boost". Byron also referred to the stimulus of everyday life experiences or influences as having an impact on the way he approached his creative writing and exegetical writing.

##### **4.2.2.1. Place**

Place became important for some interviewees as a way to foster creativity. Byron talked about his preference for a clear division between study and home, describing how working in the postgraduate centre on campus suited him well, with home the place to unwind and relax. Others referred to using music, smells and the environment to inspire their creativity. Sylvia did not have a particular place but felt that she just needed to "sit down and write". She further explained that:

"For me creativity can happen anywhere. I think I need to be in a good space myself to be creative. I need to be in a positive space. I need to be in a relaxed space. I can be productive under pressure, but I most certainly cannot be creative under pressure".

Nature also had an influence for some of the participants. Penelope described how they would go for long walks to process and to think. Sophie referred to nature walks as important for stimulating her creative thinking and Imogen preferred to work on her outside deck at home to experience the feeling of being outdoors.

##### **4.2.2.2. Mindset**

Amber identified a time where her senses were heightened via food and wine, and which she recalled led to some significant writing. Similarly to Sylvia, she felt that being creative was about cultivating the right mindset rather than being in a particular place. Lissa and Elizabeth both referred to how finding the right mental state as important to their work. Byron would ask himself questions, let them sit in his mind, think about them, and then have answers emerge in time. Walter referred to the practice of talking to himself in the car as a creative strategy. Delia needed to exercise by running hard and pushing herself physically as a metaphor for the mindset required to do the research, whereas Imogen commented that she is "driven by looking for things that are different".

##### **4.2.2.3. Relationships**

Relationships were deemed as very important by some of the participants as a means to foster creativity. Amber referred to a colleague who had undertaken undergraduate studies

at the same time as her, and although they were diametrically opposed in outlook this led to a “wonderfully symbiotic relationship”. Similarly, Penelope described how being around other people was important for being creative, and Sophie explained that her very positive working relationship with her primary supervisor empowered her to engage in creative thinking. Walter specifically referred to the idea of a doctoral student cohort and how group meetings with other postgrads was important to his thinking.

### 4.3. Constraints to creativity

Participants described a diverse range of factors that were arguably constraining their creativity, including personality factors, life experiences that a candidate brings to their studies, returning to study after a long break, mental health pressures, digital literacy, the recent impact of the COVID-19 pandemic and resultant loss of in-person collegiality, family and caring responsibilities, the requirements of the PhD model, and at times working with supervisors. In terms of working with supervisors, Jasmine referred to a constraint as convincing her supervisors to trust her research structure, given she felt her project was quite complex and creative. Sophie similarly felt that at times her supervisors could be a constraint when each of them had different opinions. Walter lamented the COVID-19 pandemic and how lockdowns prevented typical activities on the university campus.

Some of the participants who were producing creative artefacts found the requirements of the PhD model to be challenging. Byron, who was writing a novel with highly sensitive themes, referred to struggling with the creative writing and also felt there was little scope for creativity in the exegetical part of the research, arguing the two styles of writing were “unhappy bedfellows”. Similarly, Lissa referred to the challenge of moving iteratively between creative and academic writing while Jenna argued that the need to follow the standard PhD criteria was a constraint given “creativity means thinking outside of that box”, and she was writing significant parts of her thesis in first person language. Penelope also found the standard format of a PhD thesis as potentially constraining and went on to refer specifically to the “shadow” side of creativity:

“The process of achieving something truly creative [in a PhD] involves boring, frustrating or difficult elements and there’s this enduring myth of the creative person being totally immersed in the joy of their work, unimpeded by responsibility and the boring elements of life”.

Other comments included Amber’s view that her personality and the fear of failure was a constraint, with her supervision team urging her to be free of this feeling. Elizabeth referred to imposter syndrome and Penelope raised the fact that life experiences can influence the capacity to be creative. Imogen identified several practical issues as constraints, including personal finances, resources in the library, and the requirement to undertake a range of compulsory professional development workshops.

### 4.4. The notion of risk

Participants’ responses reflected the individual nature of how students determine the level of risk they are prepared to take in their research and writing. Some leant towards a safer



approach in their research or writing, yet with elements of creativity (Lissa, Sylvia, and Walter). Others were more adventurous given they were older than during their undergraduate study (Amber) or in the latter stage of life (Byron). Others also chose to adopt what they believed was higher level of risk (*e.g.*, Delia and Elizabeth) such as writing parts of the thesis in first person (*e.g.*, Elizabeth and Sam). Some were prepared to take on high levels of risk, including Irene, Jenna, and Penelope. Jasmine was very direct about her choice to take on risk to avoid being “a straight up bland academic”.

Supervisors also played a role in determining the level of risk associated with the research and writing process. Sylvia referred to the influence of her supervisor in choosing to write in first person, stating that she would have been unlikely to do this without the support of her supervisors. Sylvia and Walter also referred to the importance of working collaboratively with their supervisors to determine what was the appropriate level of risk in both their research and writing.

#### 4.5. Critical and creative thinking

Participants presented various thoughts when asked to consider the relationship between critical and creative thinking. There was a general view that critical thinking involved looking at existing work and writing, whereas creativity thinking emerged when determining how to best synthesise and present ideas or concepts. As Sylvia explained, with creative thinking you have great freedom while Byron described how putting individual facts together is a form of creative thinking. Imogen saw the relationship between the two as close, arguing critical thinking is a form of creative thinking but she needed to be creative to work around the typical conventions associated with a PhD thesis. Jasmine, Walter, Sylvia, and Jenna also felt they were close in styles of thinking. Delia also felt that they were not discrete constructs, arguing that critical thinking involves “looking at things from multiple angles” and applying creative thinking in order to look for “strengths, limitations, and implications”.

Penelope described how in contrast to critical thinking, creative thinking requires building on the work of others; she also described critical thinking as more cognitive and creative thinking as more emotional. Elizabeth described how she viewed critical and creative thinking as:

“Two anchor points at each end of a spectrum. On one end, I would consider critical thinking as a logical and structured approach that can be familiar and safe. Creative thinking, on the other end of the spectrum, involves raw and sometimes surprising experiences from a less-structured approach. Creativity isn't really safe and often not reliable (for me), but it's good and it can lead to very effective outcomes”.

### 5. Discussion

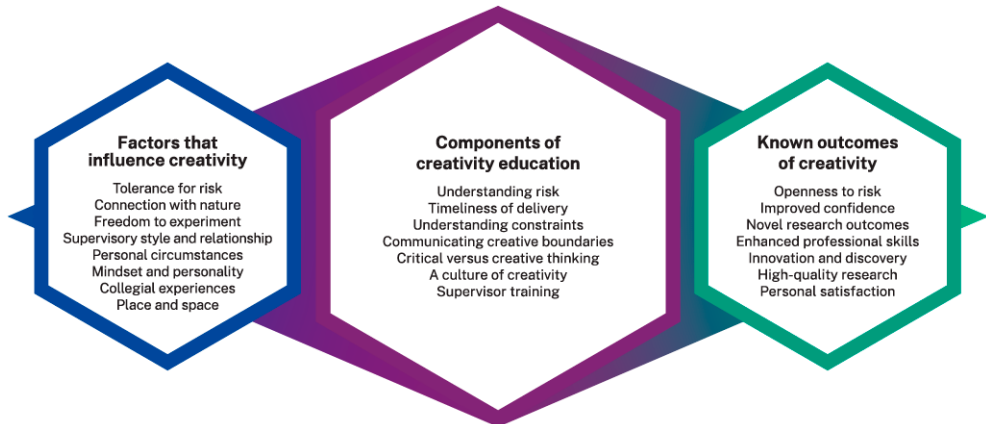
Although this study only involved a small sample from one institution, which can be seen as a limitation, the findings are indicative of how doctoral students reflect on creativity in their research. In addition, the interview data were carefully analysed on several occasions in order to achieve trustworthiness and to identify the key themes referred to in the results section above. In terms of the interview data, all interviewees were able to identify creative

elements within their research and writing, reflecting the view of Frick and Brodin (2020) who see creativity as critical in doctoral education. This offers insights in response to the first research question (to what extent are students in the arts, social sciences, and education able to reflect on and identify creativity in their doctoral journey?). This research also suggests that creativity potentially remains more implicit than explicit in doctoral studies, with some participants commenting that it required the interview for them to consider what the specific creative elements were in their research and writing. This finding was not specific to any particular discipline, but is an important insight and suggests that the doctoral journey should include a greater focus on the concept of creativity. This research therefore offers a much-needed contribution to the literature, and affirms the need for further research and inquiry with larger cohorts of students from disciplines not included in this study. In addition, deeper exploration of doctoral education from the perspective of the systems model of creativity is clearly needed to better understand what is typically the final stage of a student's learning and preparation for the work of an independent researcher.

The interviewees each reflected on the notion of risk-taking (Power, 2018), with views ranging from students feeling it was minimal through to those arguing it to be extensive. Risk-taking appears to be very much driven by the individual's outlook and their work with supervisors. It is also worth considering at what point in the doctoral journey risk-taking should receive significant focus. Is it the responsibility of supervisors, graduate schools, or the candidates themselves? Is there a particular point at which risk should receive attention or is it an ongoing part of the doctoral journey? The findings also propose that overly prescribed doctoral programs have the potential to be problematic if students wish to take risks. Educating students about risk is therefore pertinent for those involved in administering doctoral programs and for supervisors who guide candidates in a close working relationship.

Other factors influencing creativity were place and mindset, with the interviewees identifying the most optimal place for their work and the ways in which they can enhance their creative thinking. Collegiality between students and supervisors and within student cohorts was also identified as important to both fostering and recognising creativity. One interviewee identified the impact of the pandemic on these opportunities for collegial interaction, an issue which would appear to be ongoing given in 2022 the COVID-19 pandemic remains a major global disaster. Although various constraints to creativity were identified, ranging from personality factors to practical considerations, paradoxically, constraints may in fact encourage creative thinking and risk-taking. This is an area worthy of additional research in terms of doctoral education, particularly in relation to whether candidates are educated about the potential positives and negatives of constraints. Other areas for further research could include interviews with students and supervisors together, supervisors as individuals as well as leaders of graduate schools, not in terms of the process of supervision – which has received significant research attention to date (Brodin, 2018) – but in order to explore their views on the concept of creativity (or originality), particularly in terms of where and how it should be embedded in a doctoral student's journey.

This research therefore proposes that graduate schools and supervisors consider a new approach to the training of doctoral students, where creativity education becomes a key



**Figure 1.** Identified factors that influence creativity for Doctor of Philosophy candidates, proposed components of creativity education in doctoral programs, and known outcomes of creativity in the research process (source: created by author)

element of the research journey for candidates, and which offers a response to the second research question (what implications might this have for doctoral education?). Figure 1 visualizes how the factors that influence creativity as identified in this study inform the key elements of a possible creativity education (middle hexagon), with the hexagon on the far right identifying the potential benefits.

## 6. Conclusions

Doctoral programs are now firmly entrenched in global education, with a PhD or equivalent seen as increasingly critical for an academic career and advantageous for those who seek to work in industry or with government. Developing a stronger understanding of doctoral education from a systems perspective is clearly of significant importance to the key stakeholders involved, including students, supervisors, graduate schools, examiners, and end users such as industry bodies and government. This research provides an insight into the perspectives of one group of individuals involved in the system – namely, the students – however additional knowledge could be gained from others who participate in the same system such as those in the natural and physical sciences, business and law for example. Age and also experience could also be investigated for their influence on creativity in this particular system. Further insights can therefore be gained by exploring the doctoral education system in much greater detail. Given the recognised importance of creativity for the successful completion of a PhD or equivalent, it is incumbent on those responsible for doctoral education to continue to revise and refine programs in order that students' creativity is encouraged, fostered, and promoted. An intentional approach to creativity education therefore has the potential to maximise the benefits of creativity for graduates of doctoral programs, and to prepare graduates for an increasingly complex world.

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## Appendix

### Interview guide

- Could you please describe your PhD project as much as you wish?
- Where are you currently in the PhD journey in terms of milestones, etc.?
- What do you understand creativity to mean in the context of your Doctor of Philosophy research project?
- What would you say has been your most creative strategy in carrying out your research and thesis writing?
- Would you rather take risks in your writing practices or play it safe? A risk is using the personal pronoun *I* for example, or using metaphors.
- What constraints have you faced in terms of having the capacity to fully pursue creativity or originality in your research?
- What do you see as the difference between critical and creative thinking?
- How would you describe the balance of these two thinking approaches in your research?
- How do you tap into your creativity in terms of your writing practices?