

“This is MY PhD project... or is it?” Understanding perceived doctoral project ownership through psychological ownership mapping

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Abstract

This paper investigates PhD student's perceived feeling of project ownership and how it influences their project management. Drawing on psychological ownership (PO) theory and the PO mapping method, this study identifies distinct project ownership paths among students, revealing how project engagement can be improved. The findings demonstrate the importance of carefully considered and timely student-supervisor expectation discussions to help influence project ownership. To this end, the paper offers several routes of ownership that can influence project ownership among PhD students.

Keywords: *design methods, project-based learning, project ownership, design education*

1. Introduction

Research to date on doctoral student's research productivity and research satisfaction has recently emphasized numerous factors influencing research performance including higher education settings, doctoral supervision, institutional factors, social support, and other personal factors (Bui, 2014; Devine & Hunter, 2017; Peng, 2015). Personal factors include a student's PhD and project motivations, prior academic/industry training, time invested on research, recognition, and many others (Brew et al., 2016). Identifying and analysing the reasons why students invest their time and energy into a PhD project is important for informing both the supervisors and academic institution so that the decisions and plans they make around project-based learning objectives ensure that students do not only complete their studies on time, but also produce quality work. Moreover, this is also vital for candidates' self-reflection in terms of assessing their learning objectives and personal expectations within their PhD project (Hababbeh, 2014). Experts recommend student participation and involvement practices in their project to help student's holistic development and professional growth (Han et al. 2022). Empowering students in their projects enables them to put forward their opinion on their research direction's crucial decisions and gives them the right over their actions, laying the foundation for how the student manage their project work throughout the course of their PhD journey. Thus, a doctoral researcher's relationship towards their project within HEIS is gaining considerable attention amongst scholars to ensure quality education practices and supervision (Bui, 2014; Khuram, Wang, Khan, & Khalid, 2021; Khuram et al., 2017). For instance, in knowing a student's perceived understanding of the project topic and their overall investment of the project helps inform supervision style. It also dictates best practices for student-supervisor relations including information sharing, motivating, and helping students to become independent researchers (Halse & Malfroy, 2010).

While understanding a PhD student's relationship to their project has been explored, there is a paucity of studies that identify the underlying mechanism to recognize when and how this relationship develops over

time. What's more the processes that show what actions and strategies strengthen or relinquish this relationship among PhD students is underexplored. Given the often challenging and individual nature of the PhD journey, this study aims to better understand the mechanism that leads to a student's evolving mental or psychological state towards their PhD project. In other words, this study investigates this student project relationship through psychological ownership (PO) theory and the PO mapping method. In short, the term "psychological ownership" is defined as a state of mind in which an individual starts thinking that certain targeted object belongs to me or is "MINE". The PO mapping method developed by Cedeno et al 2021 extends this theory by helping visualise an ownership journey over time. We believe that a better understanding of student project ownership through the PO mapping method will play a substantial role in enriching students' learning journey and informing management practices.

Thus, the current study is aimed at fulfilling two main objectives: first, to investigate how ownership develops through a PhD student's journey overtime and second, to understand routes of ownership that serve as recommendations for management and engagement practices for students and supervisors alike. We do this by outlining the intricate theoretical backdrop of PO theory and the PO mapping method and apply it within a PhD project ownership context. Next, we describe how we discern doctoral student's perceived feeling of ownership toward their project through qualitative interviews and a reflexive thematic analysis. This enables us to better capture themes of PhD practices and various PhD activities that influence their perceived project ownership. Lastly, we mention the implications and theoretical contributions we make in this study by highlighting how we extend the application of PO mapping into its effect on HEI.

2. Background

2.1. Psychological ownership theory

Psychological ownership (PO) denotes the individual's behavior when they feel they possess an ownership stake over something. That object could be material or immaterial in nature. For example, the feeling that this is "MY project" even if there is little to no legal ownership rights over it. Included in the theory, Pierce and colleagues clearly explain the why someone would want to own (the motives) and how someone comes to own (the routes) (Pierce, Kostova & Dirks, 2003). There have been three motivations of psychological ownership identified. These include efficacy and effectance, which refers to our desire to positively effect or give rise to favorable results with objects or events we interact with, self-identity, which is how we define or express ourselves towards the external world and lastly, place is the need to ground oneself in time and space ideally in a setting that affords comfort, familiarity, and security. The routes of psychological ownership include control which refers to an individual's way to direct or influence an object in a certain way, self-investment which describes the different forms of energy an individual expends into an object which include time, money, physical and or mental energy, and finally intimate knowledge which describes how an individual comes to deeply know the object through different ways of learning. Thus, feelings of psychological ownership emerges when individuals can: (i) control the target, (ii) intimately identify with their target; and, (iii) spend their time, energy, and effort into the target (Pierce & Jussila, 2010; Pierce & Peck, 2018). Having control on a target, knowing more than others, and investing their time, energy and effort into the project encourages project owner's feelings that their project purely belongs to them (Brown et al., 2014; Peng & Pierce, 2015). What's more, PO can be observed at the individual and collective level. Pierce (2010) introduced a theory of collective psychological ownership exemplifying "this project is ours" or "this project is mine" (individual sense of possession). Collective feelings of ownership can be described as individual feelings of shared ownership toward an object (Pierce & Jussila, 2010; Pierce et al., 2018). It has its roots in social identity motive which explains that individuals who look for social identity seek ways to be recognized as members of particular teams not only by themselves but also by their social circle (Pierce & Jussila, 2010). Such ownership results in positive work consequences in-role performance, organizational citizenship behavior, satisfaction, enhanced motivation, and loyalty (Avey et al. 2009). Research has also found that the supervisors who instill active participation and give autonomy to their mentees can expect them to engage in work and demonstrate favorable behaviours due to feelings of PO (Kim and Beehr 2017). In this line, we can better understand PO theory's connection to HEIs in regard to student project ownership.

2.2. PO and its relevance in an educational context

Heath (2002) argues that the success of the PhD system heavily depends on the supervisors, who must provide the time, expertise, and support to foster the candidate's research skills and attitudes. Importantly he concludes, from analyses of PhD students' views on supervision that, although the frequency of meetings between supervisor and candidate is essential, the quality and ability to have opportunities to feel they are involved by leading and managing the project is even more important (cf. Li and Seale 2007). We can think of involvement as proposed by Avey et al. (2009), as a feeling or sensation where an individual perceives themselves as a part-owner of the project, extending beyond mere physical possession and experiencing a genuine sense of efficacy and effectance. However, this level of ownership that the student must exhibit towards their project develops throughout the course of the PhD and varies depending on the student's advent into their particular PhD project (i.e. grant based project, industry/ personal informed project). Existing research suggest common obstacles within a PhD journey including, establishing a sense of belonging to the project work, learning the intimate knowledge of the project's disciplinary field, and gaining overall ownership over the project work (Chatterjee-Padmanabhan & Nielson, 2018; Creely & Laletas, 2019; Fisher et al., 2020). These findings indicate a construct capturing the change of ownership as a mediator for the development of positive student involvement, thus showing our interest in exploring how a student's project ownership changes over time.

2.3. PO mapping method as a qualitative measure for project ownership

Previous work has shown feelings of ownership are temporal and therefore typically result in an ownership path which depends on how the motives and routes are fulfilled. Previous work on illustrating common ownership pathways has been done by Baxter et al. 2017. These paths offer several helpful and different representations of an individual's relationship towards a target of ownership. In addition to these ownership paths, Cedeno et al. 2021 introduces the PO mapping method as a tool to help denote the ownership journey of a target of ownership and better extract the routes and motivation of ownership that influence the acquisition or relinquishment of ownership over time. The method is simple and easy to use; it helps practitioners identify the target of ownership and collect a series of user states and ownership actions that are then visualised into a timeline to offer a boundary object to communicate ownership over time. The remaining artefact is an ownership map, that helps visually depict a user's ownership relationship to a target. For the purposes of this paper, the PO mapping method offers a useful guide to understanding how a PhD candidate's relationship with their project changes over time. Understanding this can provide insight into dominant ownership paths among PhD students and discern effective routes to better develop and influence project ownership. We believe PO theory and especially the PO mapping method can serve as guidance to help inform how to develop project ownership which can influence supervision styles and project management skills.

3. Methods

This study follows a qualitative descriptive approach to understanding PhD candidate experience towards project ownership over time.

3.1. Participants

A total of thirty PhD students from two separate institutions - one in the UK and one in the Netherlands. Each university had a relevant PhD in design research program. The students had to be enrolled under the universities design PhD programme. Candidates came from various academic and industry backgrounds prior to the PhD. All held a master's degree but may or may not have had a pure design education background. The selected participants were in their third or fourth year in their PhD journey so that they could accurately recount the stages of their PhD journey, reflect on the development of their project ownership throughout the years, and state their current project ownership feelings. Prior to the research, participants were given a consent form and information sheet providing an overview of the research goals as well as the criteria for selection and rights of the interviewees.

3.2. Data collection

The data was collected through interviews of around one hour in length, which were recorded for a transcription. The semi-structured interviews allowed for flexible lines of inquiry as well as the possibility for the interviewee to guide the topics covered in a way, they found most relevant. The questions of the semi-structured interviews were targeted at understanding how project ownership developed throughout the student's PhD experience. In particular, we wanted to learn ways in which the motives and routes of ownership came up. Questions like *"How familiar do you feel with the PhD project you are working on? At what point did you start to feel comfortable with the PhD project you are working on?"* helped us discern a student's sense of self and place. In addition, questions like, *"In what ways do you feel you invest time, money, effort or anything else into the PhD project you are working on?"* helped us understand how students feel like they invested themselves into the project. All the interviewees were pseudo anonymized and given codes, which was used as reference during the data analysis as well as during the discussion of the final report.

3.3. Qualitative thematic data analysis

The interviews were transcribed and coded according to the motives and routes of the PO framework and PO mapping method. The coding was done in NVivo software, and further grouping of the codes and the quotes was done in Microsoft Excel and analysed with Reflexive Thematic Analysis–RTA method (Braun and Clarke, 2013). We followed the thematic analysis approach (Braun & Clarke, 2006; Vaismoradi, Turunen, & Bondas, 2013), and extracted themes by identifying what the participants said. We used an inductive data approach and interpreted the data with a latent strategy to explore meaning at the underlying level based on the six RTA steps. The first step involved familiarising ourselves with all the transcriptions by reading them multiple times. In the second step, we coded the transcripts in relation to our research question to identify patterns and themes in the data. For instance, we coded the following sentence 'Running alignment workshops': "where even from the kick-off for the alignment, we involve all the stakeholders, we run workshops, 1,2,3 workshops, making sure all the stakeholders are involved." For the third step, we grouped our codes to generate initial sub-themes. For example, the codes 'Running alignment workshops', 'Bringing stakeholders together through co-creation', and 'Conducting ideation sessions with stakeholders' created the sub-theme 'Facilitating stakeholders' participation'. The fourth step consisted of reviewing and gathering sub-themes into themes. For instance, the sub-themes 'Find stakeholder's evidence needs', 'Navigate complex stakeholder spaces', 'Identifying who values what evidence', 'Facilitating stakeholders' participation', and 'Creating tailored arguments' were gathered under the theme 'Stakeholder management' due to their fixation with stakeholder influences. Then, in the fifth step, we continued the process by defining each theme and refining it. For example, we went back to the transcripts to observe how the sub-themes within 'Stakeholder management' related or not to each other. This step helped us to identify challenges and strategies within themes. Finally, in the sixth step, we identified practical themes and related sub-themes. The primary coding was done by one researcher, while the grouping of codes and theme building involved all co-authors, who were familiarized with the data, theory, and supervision practices. In practice, this process was done via several iterative workshops, where one researcher's interpretations were presented and discussed with the co-authors (independent of data collection). This resulted in the refined versions of the themes, which were then confronted with the data again, strengthened and further developed to build the results. This followed general qualitative research best practice in ensuring iterative, multiple perspectives on the data, the coding, the theme development, and the final results, as outlined by Neuman (1997, pp. 512–514).

4. Results

As a result of our qualitative analysis, we identified five project ownership journeys. The figure and tables below expand on the data found and brings a constructive view of how feelings of ownership are experienced within the PhD journey. It also goes into what ownership actions help students influence their sense of project ownership.

4.1. PO map of doctoral student's perceived project ownership

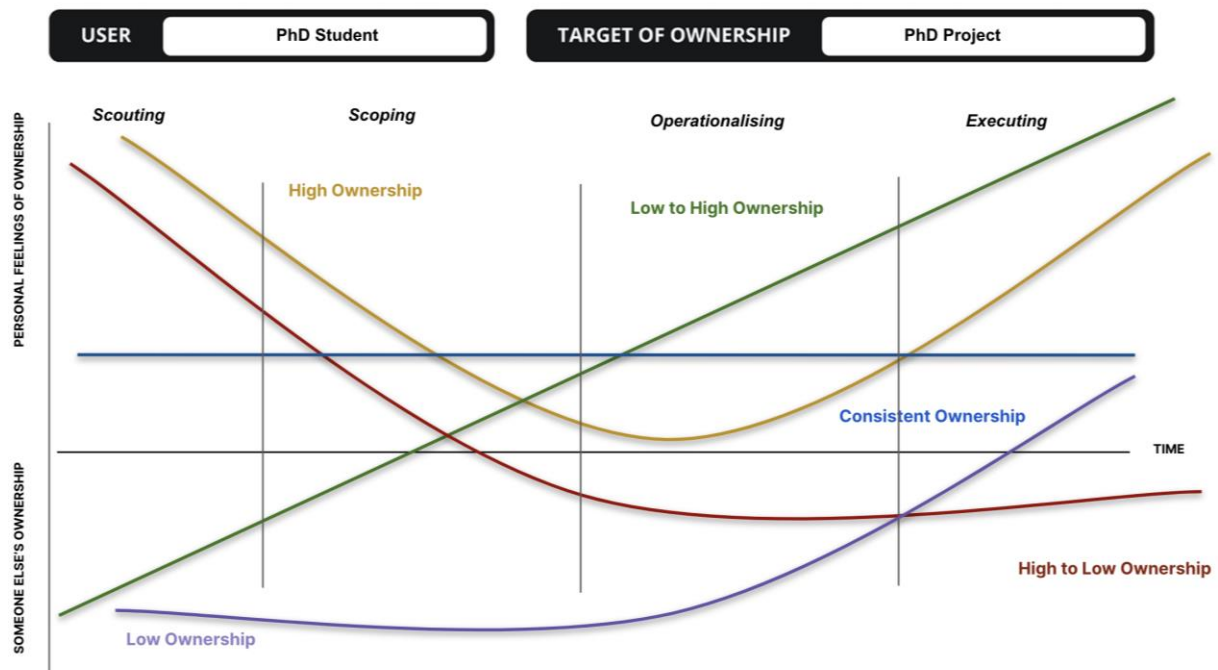


Figure 1. PO map of perceived project ownership journeys

In Figure 1, we see an ownership map that summarises project ownership journeys found based on our semi-structured interviews. After the analysis and coding of the interviews were done, we found consistent intervals of work that students described as helping mark their PhD project ownership journeys. We further synthesized these intervals into phases of project ownership. The timing of these phases are mutable as they may vary based on a student's experience. Phase 1 is, *Scouting*, in which a student sets out to explore program to gain information about the position, institution, and project mentor. This phase is successful upon admission to school and once the supervisor and student agree upon project work. Phase 2 is, *Scoping*, where the student begins to investigate their project deeper and begins to narrow and solidify their research project plan. Usually, this phase is successful and lines up close to a student's first PhD milestone, which may look like an assessment of the student's knowledge on research project and outlined plan of pursuance. Phase 3 is the *Operationalising* phase where the student is in full work mode, collecting, analysing, and synthesizing data for research outputs. This is the phase where students attend and speak at conferences, submit papers, and realize they need to work independently, make decisions, and conduct good research practice to complete their project's research agenda. The last phase is the *Executing* phase, where students are wrapping up their studies and demonstrating accomplishments through written and oral examinations as an independent researcher. In addition to the phases of project ownership, this PO map shows five project ownership journeys summarised in Table 1. To better recount what's happening in Figure 1, let's imagine Student AZ who reported *High Ownership*. Student AZ, came from industry and who additionally researched, found and agreed with her supervisor to work on a project she was bringing in from her prior work interests that she thought was hers (*Scouting Phase*). After her first PhD milestone she realises she needs to adjust her research agenda to meet the program's standards (*Scoping Phase*) which she reports, "decreased her project ownership because of the project's uncertainty", as well as "struggling to return to academia from industry." However, she reported having "positive relations with their advisor" who helped inform how to navigate the greyness of research. She reports regaining a high sense of ownership once she "collects data on her studies, receives accolades from research community, and writes it up for her paper and final thesis" (*Operationalising and Executing Phase*). We can think of similar narratives to explain each project ownership path found. Examples of the other journeys are described as follows. An *Increasing Ownership* journey may look like a student agreeing to take on a project already envisioned or upon by the supervisor,

however their increased project involvement increases their overall sense of project ownership overtime. A *Consistent Ownership* journey may look like a student continuing their master's project into a PhD thesis with the same advisor. The student knows what to expect and may have only agreed to continue because they felt like they did not have more substantial career development options. A *Decreasing Ownership* journey may describe a student who came into the program with their project idea but had to change dramatically due to unforeseen circumstances. Lastly, a *Low Ownership* journey may describe a student who was not able to achieve a sense of control on the research project's agenda or direction. In addition, this student may not have been aware of the demands of the PhD and or did not get on with their PhD advisor. All of these journeys correspond to the abstracted phases of project ownership.

Table 1. Perceived project ownership journeys described

Project Ownership Journey	Description	Starting point
Low Ownership	A PhD journey where a student feels low project ownership of their PhD because of low motivation on project and or process, poor advisor relationship, strong learning curve, wrong PhD's reasonings etc.	Low passion and dominance on PhD project and low desire/ knowledge or wrong motives in pursuing a PhD
High Ownership	A PhD journey where a student feels high project ownership because of high motivation on project and or process, good advisor relationship, and low learning curve.	High passion and dominance on PhD project and or high desire to pursue a PhD
Consistent Ownership	A PhD journey where a student has a consistent sense of project ownership throughout their PhD.	Interest and knowledge in both project and in pursuing a PhD
Decreasing Ownership (high to low)	A PhD journey where a student begins their PhD feeling like it is their project but after certain key moments, they start to feel less project ownership because of major shifts, poor advisor relationship, strong learning curve, wrong PhD's reasonings etc	High passion and dominance on PhD project but low desire/ knowledge or wrong motives in pursuing project and or PhD
Increasing Ownership (low to high)	A PhD journey where a student begins their PhD feeling low project ownership but after certain key moments, they start to feel higher project ownership process and project	Low knowledge on PhD project but high desire in pursuing a PhD

4.2. Routes of doctoral student's project ownership

Table 2 highlights ownership routes fulfilled by the PhD students that helped generate feelings of project ownership, which subsequently enhanced perceived student learning and independence. The routes have been abstracted to represent themes around which one or more behaviours occur. For instance, a behaviour that maps to the route of control may look like, "feeling like they can direct the course of the research direction through the choices they made". Another example can be acknowledgement which maps to intimate knowledge. This may look like a student, "recognising they have gained recognition" from their field. The PhD accounts revealed regular practices they did to undertake the requirements of the PhD process to help develop their skills as an independent researcher and to learn up on the PhD topic and moreover help increase their ownership toward their PhD project. The routes also showed their mediating role in developing project ownership for the student. Because of the intimate knowledge gained from, "deeply engaging in literature and research practices", the exercise of control they had to apply, "in managing research studies and stakeholders", and the self-investment they had to practice in seeing that their studies were, "executed analysed and delivered thoroughly", project ownership was built.

Table 2. Routes of project ownership described

Routes	Actions	Ownership statement
Control	Choice	I have the ability to choose my day-to-day schedule.
	Management (personal, supervisor, stakeholder)	I make decisions on who and how my work is carried out.
	Organise	I design the programme of my study.
	Posture	I defend my position on the work I am doing.
Intimate knowledge	Access	I know where and how to look up resources for my research.
	Acknowledgement	I know my advisor, colleagues, and research communities support me and see me as contributing to the field.
	Evaluate	I know I have the mental capability to assess topics and think as an independent researcher.
	Agility	I know I can transfer my knowledge to other disciplines and issues effectively.
Self Investment	Incentive	I have the passion to pursue my research and execute it effectively.
	Iterance	I ardently repeat research tasks so that I master the methodological process.
	Assurance	I build a positive relationship with myself knowing I can fulfill all that is required of me for the programme of my work in the PhD.
	Executing	I perform research activities and operationalise them so I can retrieve data that I can then analyze and synthesize.
	Reading	I actively engage with literature to help me build my knowledge base for my work.
	Writing	I work to communicate my programme of work.
	Analysis	I develop my critical thinking skills to look at data from various perspectives.
	Synthesis	I devote time to sense make and build hypothesis around my work.

5. Discussion

5.1. Discussion on the findings

The present study investigated how the PO mapping method was able to qualitatively measure how strongly a PhD candidate felt ownership over their PhD project. Our semi-structured interview used the PO mapping method as a foundation to generate a comprehensive and chronological narrative of a project ownership journeys and helped extract high level project ownership stages, dominant project ownership journeys, and processes that influence project ownership. We believe instilling project

ownership to a PhD student can lead to overall empowerment that influences academic and experiential outcomes. Below we will discuss each finding and its implications for HEI.

5.1.1. Project ownership journeys and its effect on the PhD journey

The project ownership stages found, and the varying levels of project ownership were synthesized into a PO map which captured the student's evolving thinking, feeling, and actions towards their PhD project overtime. We believe the project ownership journeys found paired with the abstracted phases of project ownership are important because they show how project ownership is temporal and changes based on key student involvement and engagement practices throughout the PhD. Students who reported a higher sense of project ownership also reported higher learning and satisfaction levels because they were enabled to take control of their PhD work. Students who reported a lower sense of perceived project ownership admitted to only doing, "the bare minimum to get by" and did not show as much enthusiasm or passion that other students who reported higher sense of perceived ownership did. Because of this, we also believe understanding project ownership will help students manage their project effectively because they feel higher attachment and responsibilities towards their work and can control when and how things get done. For instance, students reported, "feeling a sense of freedom because they can make their own schedule and make their own timetable". It is further posited that project ownership journeys can better equip supervisors and broader research communities by helping educators understand the most appropriate supervision styles for students based on their perceived project ownership. For instance, knowing the journey a student is on, let's say for instance, an increasing ownership journey, the supervisors then knows that the student may need to gain more intimate knowledge in the beginning of the project and more control later in the project to feel as if they have a say in the research direction. Supervisors can then know how to foster, build, and enable a student's sense of ownership to their PhD project, thus empowering the student. This can be enacted through the routes of ownership found.

5.1.2. Routes of project ownership and its effect on the PhD journey

While we found much variation in individual journeys, what remained consistent were the actions done by students to help influence their project ownership. These actions could all be easily mapped to the routes of ownership: control, intimate knowledge, and self-investment. The findings demonstrate the importance of carefully considered description of the project's responsibilities. As well as timely student-supervisor expectation discussions and involvement practices to help better understand the PhD journey and process. Doing this will help students feel a greater sense of empowerment and are able to act upon the routes of ownership found. For instance, students will have the intimate knowledge and assurance that their supervisors will help guide them and feel prepared to execute their research plan and research decisions. Overall, we believe that these actions can build perceived project ownership among PhD students which builds learning, satisfaction, and empowerment. All of these routes could potentially serve as a playbook to inform instructors, administrators, and doctoral students alike on bespoke involvement and engagement activities.

5.2. Theoretical implications

In grounding our work in the PO mapping method, we paid particular attention to dominant trends of PhD student's feeling of ownership toward their project. We are also able to capture enablers and actions that promoted or hindered the feeling of ownership throughout the temporal aspects of a PhD student's project journey. The PO mapping method thus helped us record and draw out key moments and routes, that not only demonstrate but also influence the dynamic temporal aspects of project ownership. HEI's can also use the PO mapping method to help better understand how students' well-being and satisfaction are fluctuating in regard to their perceived feeling of project ownership. If a student is feeling low and unsatisfied with their project, the identified project ownership journeys can pinpoint what type of ownership the student is experiencing and help identify what they can do to change ownership course. Although this study was descriptive in nature, it has practical implications for both student and supervisor. Situating oneself on such a journey is itself a useful endeavour to help understand where and how one is progressing through work and ease feelings of frustrations. Of course, journeys are not predetermined. The routes offer practical ways for students to engage differently in the work as they

progress. This may be changes in the curvature of a journey but also the duration of various phases. For instance, attention to supporting students early on can increase the rate at which they take ownership of work (represented by the slope of the line) and more quickly arrive in a place where the relationship they have with the work is meaningful.

5.3. Recommendations

Key moments that influenced project ownership often aligned with the milestones of the doctoral programme at the university. This poses both an opportunity and a risk for supervisors and HEIs. The opportunity lies in using the milestone progress as a means of ensuring that not only the work is progressing but also ensuring that the relationship to the work is progressing. The risk is in managing the relationship with the work when the milestone is not going as well as hoped. In addition, the data revealed that the confusion that resulted from discrepancies between supervisor and student expectations generated barriers to greater feelings of ownership. Students were ignorant of the PhD process and sometimes even the dynamic of their supervision style. For example, students were expecting their supervisor to lead or advise in moments of decision or project planning, this led to miscommunication, project delays, and overall missed milestones and poor knowledge transfer. After trial and error, student were either able to adapt and move forward in their research pursuits, or they stuck with the status quo, pivoted research directions, or all together changed supervisors. This is also true, though less so, for other members of the supervisory team. This emphasises the auxiliary role that supervisors have in moderating feelings of ownership and tells us that effective communication in the beginning of the PhD must be established, ideally in the scouting and scoping phases, so that the student knows what the expectations of the PhD are, when and how to manage research direction and project planning, and for them to know that they have the autonomy to speak up when things become unclear and to ask for additional support either from their supervisor or from their school department. It thus reveals moments that influenced the candidate's journey which they can talk through and have a better sense of how to improve their working relationship and build psychological safety. In addition, the routes discovered can help HEI's and supervisors better describe the role expectations, associated responsibilities, and overall criteria needed to fulfil the requirements of a research project and the skills required to become an independent researcher. This can help students understand what to expect in a PhD position and better negotiate the working relationship they have with their supervisor. Overall, these skills can translate to the future career aspirations for the students and the successful delivery of a PhD project thesis and research project for supervisor and associated school department.

6. Conclusion

A PhD student's relationship to their project is complex and multifaceted, and although aspects of this relationship are increasingly examined in, HE research, there is still much to explore and understand about the topic. HEI focus on project based learning and best supervision practices can benefit from a deeper understanding of project ownership. To help build a PhDs candidates feeling of project ownership, PO theory and the PO mapping method offers a framework for HEIs, supervisors and students alike to help navigate skills to improve confidence and management skills towards the PhD project. The qualitative methodologies utilized to date have provided much-needed, student-centered insight into the issues affecting the doctoral experience and have allowed for a notably deeper and nuanced understanding of the lives of PhD journey as situated within their relationship towards PhD project. Future research employing various alternative methodologies and analytical methods (e.g., observational, questionnaire, experimental, quantitative sampling) are similarly expected to yield valuable knowledge aimed at improving feelings of project ownership which can benefit both the personal and professional pursuits of PhD students internationally.

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