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Capturing the Nature of Teacher and Learner Agency Demonstrating Creativity: Ethical Issues and Resolutions

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Abstract: This article will focus on the ethical dilemmas and concerns related to eliciting the nature of agency in classrooms that emerges in learning contexts. Agency is a somewhat elusive phenomena to evidence because it involves capturing signs and indications of thinking involved in negotiating meanings, the capacity for initiating, and constructional decision-making. These processes are often made explicit through dialogic and actional exchanges between teachers and/or learners. This includes taking account of activities engaged in, either independently or collaboratively. It also requires evidence of earlier happenings or interactions between classroom participants that might influence and shape later events. There is also concern about the ways that teachers' and learners' demonstrable originality or creativity are recognised and communicated for scrutiny by others. Additionally, ethical approval procedures (BERA 2018) require that research protects participants' anonymity, confidentiality, and dignity; therefore, research has to be carried out with integrity. Ensuring benefits from research are maximised and that no-one is harmed or made to feel uncomfortable requires the utmost care and balance between eliciting insightful data while maintaining the appropriate duty of care for participants. To achieve these objectives, multiple research methods were used. Audio and video recordings were transcribed and analysed to make sense of teacher and learner agency. The findings include an events map, photographic images, and dialogic episodes illustrating the nature of contrasting teacher and learner agency. The conclusion considers tensions that emerge as researchers seeking to characterize agency without compromising privacy.

Keywords: agency; creativity; originality; ethics; divergent

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1. Introduction

The aim of this chapter is to elaborate on the nature of creative agency whilst also considering the ethical challenges of eliciting such an entity. Agency has been conceived of within a sociocultural context [1], and although the concept has recently become a much used one, it remains a somewhat poorly defined term [2]. Adie, Willis, Michelle, and der Kleij [3] discuss how agency concerns acknowledging that choices can be made by participants in education and that those decisions inform their actions (anticipated and unexpected). They specifically connect how, within particular 'contexts' (the educational environment), the 'actors' (the students and teachers) engage in particular 'actions' that demonstrate their choices in learning, that is, they are 'proactive, problem-oriented and attentionally focused' [4] (p. 93). As Biesta and Tedder [5] confirm, agency does not reside solely within individuals in a specific capacity, but rather as an emergent phenomenon (or enactment) that arises as a result of the ecological context within which people find themselves.

1.1. Teacher Agency

The nature of agency in teaching, contrasts somewhat with that demonstrated in learning. This is because the context for the adult includes structural influences such as national

imperatives regarding curricular programmes [6], school policies emphasising particular aspects of learning, or even the material nature and design of the classroom in which the lessons take place. This is because the process of teaching is usually enacted by experienced adults who have to take account of these structural fixtures whilst also paying attention to the process of students' learning. In contrast, learners generally follow instructions and engage in tasks or activities directed and defined by the teacher. Consequently, the juxtaposed processes of teaching and learning, although related, are not the same, and neither are the enactments of a teacher's or learner's agency.

In generating opportunities for students to learn, teachers generate the space and opportunity for learning. They employ or make available various resources or materials to scaffold and mediate engagement with learning tasks and activities. This requires them (the teachers) to make decisions about what they will *do* and *say* to engage students in learning. Determining how learning is supported and mediated in classrooms then becomes the responsibility of teachers. They subsequently enact practice/s that they believe embraces the structural influences (national curriculum, school policy, and the fabric of the classroom) and employ the social and interactive benefits of working together for their students to succeed in learning; therefore, as Priestley et al. [2] suggests, teacher agency manifests as the ways in which enactments of practice are carried out. This interplay [5] between individuals, the available resources, and structural factors, demonstrates how teachers can be both enabled and constrained by their social and material environments [2].

Consideration of opportunities to learn within a school classroom can provide rich demonstrations of the ways that various influences (such as, the National Curriculum, school policies, available materials, and the teacher's concern to guide activities to enable students to achieve particular educative outcomes) manifest in their teaching practices. Observing such opportunities in these kinds of cultural communities illustrates the ways that individuals actively engage and respond to the learning contexts and unique situations in which they find themselves. The teacher's agency can therefore be evidenced through scrutiny of various elements of their practice. This could include how their intentions and plans for learners become evident through what they do, how they generate opportunities for learning, and whether they invite learners to participate in tasks and activities. Subsequently, in turn, the ways that learners think about and choose to respond to opportunities afforded to them by teachers demonstrates the contrasting nature of their agency.

1.2. Learner Agency

There are contrasting views about learner agency [7–9]. Bruner [4] suggests supporting the development of agency (learner agency) means providing students with opportunities to make decisions and act upon them. Demonstrable agency, according to Mercer [10], can therefore be evidenced in the form of the activity that learners actively engage in, as well as the ways in which they show initiative. He also discusses how agency might emerge differently across contexts, through various interactions with others (on both inter- and intrapersonal levels), and over time. Mercer's research focuses on language learning and suggests how complex agency is and how there are multiple pedagogic challenges to consider. Manyukhina and Wyse [11] define agency, within the context of learning, as the 'capacity to act independently and to make one's choices' (p. 223). Indeed, in a recent study, McGregor and Frodsham [12] demonstrated what learners can do when acting agentively. Within the context of a scientific inquiry, as afforded by the teacher practices, they illustrated that learners were able to practice being agentive, to think and work scientifically, and consider and argue about alternate meanings and the relevancy of data.

In this article, therefore, reporting on a classroom study, with agency in mind, the juxtaposed ways that teacher and students demonstrated unique forms of initiative is considered. The evidence, provided through transcription and analysis of the observational data of a particular lesson, focused on the use of a fictional story to engage learners in thinking about electricity and the differences between a series and parallel circuit.

1.3. Creativity and Agency

When a teacher generates a really imaginative and significantly different kind of learning activity or science lesson, an observer or even the students may recognise inherent creativity [13] but find it challenging to articulate the nature of it in the classroom. Teaching about electricity in science, for example, is often approached by providing diagrammatic illustrations on the white board, or a demonstration using wires and bulbs at the front of the classroom to show a parallel and series design. These kinds of teaching practices are relatively commonplace and could be deemed 'habitual' [14] or reproductions [15] (p. 7) of previous teaching approaches. According to Vygotksy, generating new behaviours or propositions that draw on and combine elements of previous experiences, but are future-oriented, are creative [15] (p. 9). This kind of originality is demonstrated by both the teacher and the students in the illustrative lesson considered here. Vygotsky [15] (p. 10) explains how creativity is present, " . . . not only when great historical works are born but also whenever a person imagines, combines, alters and creates something new".

Illustrations of this fresh perspective can be achieved by the teacher inviting students to 'act out' how the electrical circuit in a torch works or providing different lengths of Christmas tree light wires, various different bulbs, and differing sized batteries, and challenging the students to 'Find out what you can about how many bulbs you can light with one battery'. This approach generates quite a different kind of lesson and learning experience for students. The teacher's creativity, demonstrated through their enacted innovative practice, becomes visible. The imaginative approach they develop demonstrates initiative and a pedagogic focus to design a constructive but 'different' kind of lesson; however, capturing key features of teacher actions that demonstrate this kind of originality and afford opportunities for learners, in order to, in turn, exhibit development of their creativity in educational settings over the course of a lesson (or series of lessons), requires the collection of a significant amount of evidence. Honing the focus for research on teachers' agency or students' agency determines what kind of data is most salient, and consequently, which research instruments would be appropriate. Evidencing the enactment of agency as demonstrated through dialogic exchanges and individual or collective actions requires digital technology that will comprehensively record everything the participants in the classroom research *do* and *say*.

1.4. Two Key Illustrative Moments

As discussed earlier, teacher and learner agency are distinct, but they have related processes (see Figure 1). In this paper, the influences on, and nature of, teacher agency is considered. This is complemented by the consideration of the contrasting influences on learner agency and the nature of such, as evidenced in the science lesson.

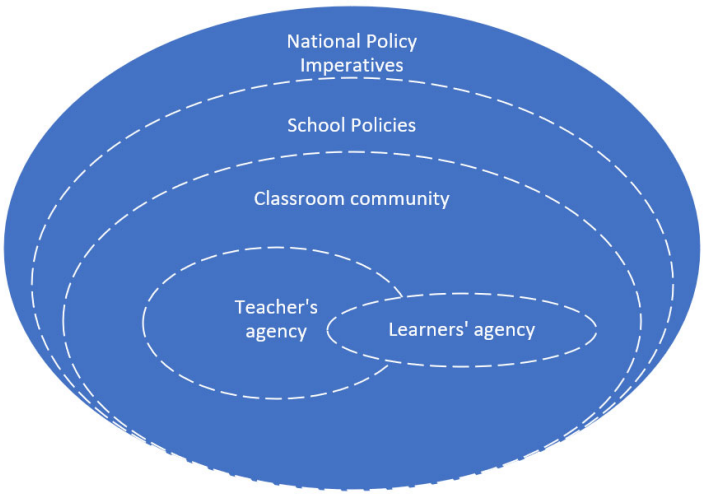

Figure 1. Relationally locating teacher and learner agency to indicate structural and others' influences.

1.5. Ethical Concerns Related to Evidencing Agency

The visual and audio data elicited through video cameras, dictaphones, or audio recorders, enabled data capture; however, the nature of the data that reflected agency, through words or deeds, presented ethical concerns and dilemmas. Researching participants' agency (primarily that of teachers and learners) intrudes upon their personal privacy. Eliciting data that evidences dialogue and actions will reveal an individual's thinking, reasoning, decision-making, and meaning-making. This kind of evidence could therefore expose personal misinterpretations, misunderstandings, incorrectly held ideas, or even an individual's private beliefs. This article, therefore, considers researching the nature of teacher and learner agency within the context of a single science classroom. In this paper, we examine two illustrative instances of the ways that the teacher-presented learning opportunities for her students, and the ways that one individual, in particular, demonstrated notable agency during a science lesson.

The nature of the types of data required for this research, therefore, involved a further understanding of the following ethical considerations:

i. What was appropriate and ethical for researching teacher and learner agency in science classrooms?
ii. How did the institutional ethics committees support the approach (and preparation) of the educational researchers to design an effective research study, especially as there were young participants involved?
iii. Are there any thoughts regarding the research experience that could relate to a wider international context regarding ethical practice and regulation?

2. Materials and Methods

The complex nature of agency in primary school science lessons meant that attempting to capture the distinctive features of both the teacher's and pupil's practices (in word and deed) would be perceptively difficult. McGregor et al. [16] argued that because of the length of time to prepare the required documents in order to capture agency for research purposes, many projects have relied on collecting data via questionnaires [17–19]. The results from the surveys have, however, lacked the ability to capture the complexity of agentive behaviour and interactions, including the physical, social, and ongoing cultural development of the teachers' and learners' purposeful and divergent thoughts and ideas, [20] and although interviews have reportedly captured a richer level of descriptive detail, [21] it has been reported that there is little correlation between the teachers' espoused views of their practices and what was, in reality (from an observer's perspective), occurring in the classroom observations [22]. It became obvious to us that observations of the science lessons were essential to illuminate the phenomenon [23] of agency (observable and unobservable) in the everyday happenings of a science lesson. This required careful reflective consideration; however, McGregor et al. [16] demonstrated how obtaining ethical approval for observations is more challenging to obtain. This is due to having to constantly justify its necessity. It is, understandably, seen as being a more invasive data collection technique, especially when there are those involved under the age of 18.

Having been forewarned, we recognised that we would need the resolve to complete the appropriate—and what appeared to be seemingly numerous—ethical documents to ensure that the project was employing the most appropriate research methods. Additionally, when collecting this data, we were also cognizant of valuing the different voices and ages (i.e., the pupils would be under the age of 16) of all the social actors in the classroom, namely, the teacher and the students. Thus, the need to foreground BERA's five key ethical principles [24] was essential. They are:

(1) inclusivity of those with different interests, values and perspectives;
(2) respecting participants' anonymity, confidentiality and dignity;
(3) ensuring that the project was carried out with integrity, employing the most appropriate research methods;

(4) maximising benefits from the research whilst also protecting and minimising risk or likelihood of harm for participants;
(5) obtaining informed consent prior to the data gathering stage and ensuring the right to withdraw is explicit [24] (p. 4)

Valuing the participants' voices, in the science classroom, meant recognising how the teacher, through their verbal interactions, facilitated their students to articulate their own ontological views and ideas, no matter how divergent. Thus, to illuminate agency (teacher and pupil) we sought to foreground the first of BERA's principles. This was a necessary provision to clarify how the teacher appropriately pitched and timed social activities and interactions, tailored to the individual child's development, which could subsequently mediate agency. To ensure we captured these emergent moments of divergence we needed to audio record the teachers' and pupils' verbal utterances throughout the entirety of the lesson, to help us understand how the spoken word or verbal exchanges could contribute and reflect the naturalistic reification of agency in both verbal and actional forms. It is with the articulation of alternative views, that the second of BERA's key principles is brought to mind. BERA [24] (p. 21) states that '[r]esearchers should recognise the entitlement of both institutions and individual participants to privacy, and should accord them their rights to confidentiality and anonymity', and this is especially true when a participant vocalises an ontological belief that, according to the scientific community, could be unfounded or untrue. With this in mind, one teacher and four pupils were invited to be audio recorded from the beginning to end of the lesson (i.e., they wore microphones and audio recording devices), and post transcription of raw data, the participants were given pseudonyms (Mrs. McCabe, Olivia, Katie, Harry, and Mark). We acknowledged that all 26 actors (one teacher and 25 pupils) within the classroom could be unintentionally audibly caught on digital recordings; therefore, voluntary consent was sought from all staff and students in the science lesson before research began, and the right to withdraw, at any time, was made explicit through a written document (the participant information sheet and vocally at the beginning of the science lesson). In addition, because of the age of the pupils (Year 6, ages 10–11) we invited the guardians to also consent to their child being part of study. Our wording here is important, because in reality, all parties involved (teacher, students, and guardians) must opt in and actively consent to take part in a study (i.e., 'opting out' and 'implied' consent are no longer accepted practice, as of 2018). Additionally, Wilson [25] (p. 137) stated that ' . . . researchers have to be on their guard to ensure that coercion or undue influence [on the participant] . . . is not present'. Thomas [26] (p. 48) also aptly stated that ' . . . those [participants] who may not understand the ins and outs of consent may be susceptible to pressure to cooperate'; therefore, we needed to give this further consideration when inviting all potential participants (adult or child) to be part of this research. To mitigate against this, the students and their guardians were given their own age-appropriate participation sheet to read on the same day. The children and guardians were afforded the time (a minimum of 48 h) to mutually discuss and consider whether or not they wished to be involved. If the pupil's parents/guardians opted into the research (by signing the consent form), their child would independently, away from the adult, be invited to complete a consent form prior to any filming or audio recording to ensure they still wished to participate. This outline for gaining consent was systematically handled, and it ensured that adult coercion was minimal for the young pupils. Fortunately, all 26 actors (and their guardians) agreed to be part of this research. Had this not occurred, then it had been agreed with the ethics review board that any pupils (or parents) who do not give consent (for their child) be videoed and/or audio recorded would have worn a blue lanyard and been placed out of the video camera's frame. This ensured that they did not miss the science being taught and that they could still take part in the classroom's ecological environment.

Ethically, we found that we had to argue that we were not the first to audio record the entirety of a lesson with school-aged children. We stated that, similarly to Mortimer et al. [27], we acknowledged that reflecting on all the sequential activities/strategies adopted through-

out a lesson, and the consecutive nature of the tasks, could help understand the mediated social actions of both the teacher and learner as they happened. Mortimer et al. [27], through a micro-ethnographic study of self-continued sequences within astronomy lessons, illustrated graphically and sequentially the key representations of the teachers' pedagogy, and their salient moves. The data we captured in this research enabled us to adopt a similar approach to capture the specific activities and movements that were undertaken during the observed science lessons (see Figure 2). Slone [28] (p. 491) stated that visual illustrations (such as these) can go further than pie charts, bar charts, and scatter plots, in that they show patterns within the data and the relationships between factors, cases, and categories, and thus, they can validate the analysis. This approach required us to take photographs of the teacher and pupils (with their faces obscured), as well as the activities and texts (or outputs) produced by the pupils; however, photographs are reified snapshots of a moment in time, and thus, we continued to argue that videoing the entirety of the lesson could enable us to gain further insights into the salient actions (or moves) between the teacher and peer groups.

Audio recording utterances, solely as they emerged, however, was not enough to illuminate spontaneous, and at times inaudible, agentive moments that arose between peers. We also argued, on our ethical application, that the transcribed audio needed to be triangulated with the visual data on the video. We were, again, not the first to use video, and we justified this by referring to the way McGregor et al. [29] and Wilson and Mant [30] used uncensored video clips on educational websites. Additionally, it is not unknown for observations of young children and adults in an educational environment to be screened publicly (i.e., on national television programmes). These types of real-life documentaries have been aired on television [31] every year since 2011. The necessity of videoing the science lesson was justified further when we continued to critically outline how creative independence expressed through agentive action can not only be examined through exploring the nature of talk, but can also be tied into: the activities undertaken; the types of actions (teacher and pupil); the social actions; the practices mediated by the teacher; and the texts produced during a science lesson [32] (pp. 125–126). This extra effort, to justify our approach through previous research, as well as seemingly slowing down the ethical process of completing the application, facilitated our own deeper level epistemological understanding of why it was necessary to collect this type of data.

It was our intention that, by examining the illustrated representations of creative practices, through the activities and also the verbal interactions taking place in the science classroom, it would become possible to draw attention to the various affordances for agency that the teacher facilitated, or pupils made explicit (or made visible). By examining two divergent moments with agency in mind (i.e., via audio, teacher and student, video, and photographs) we will begin to construe how the teacher facilitated the emergence of agency (of both teacher and student) acts.

With the fifth and last of BERA's five key principles [24] still echoing in our minds, we wanted this research to also benefit our participants and other educationalists. The findings from this research would therefore need to inform other teachers (and fellow academics) about various ways that creative opportunities augmented and developed creative thinking and informed the students agency from within the science classroom. We argued that the findings would contribute to the national and international discourse relating to ways that teachers can actively ignite and support young people's imaginations and increase their science capital [33], with the possible additional benefit of inspiring more would-be scientists.

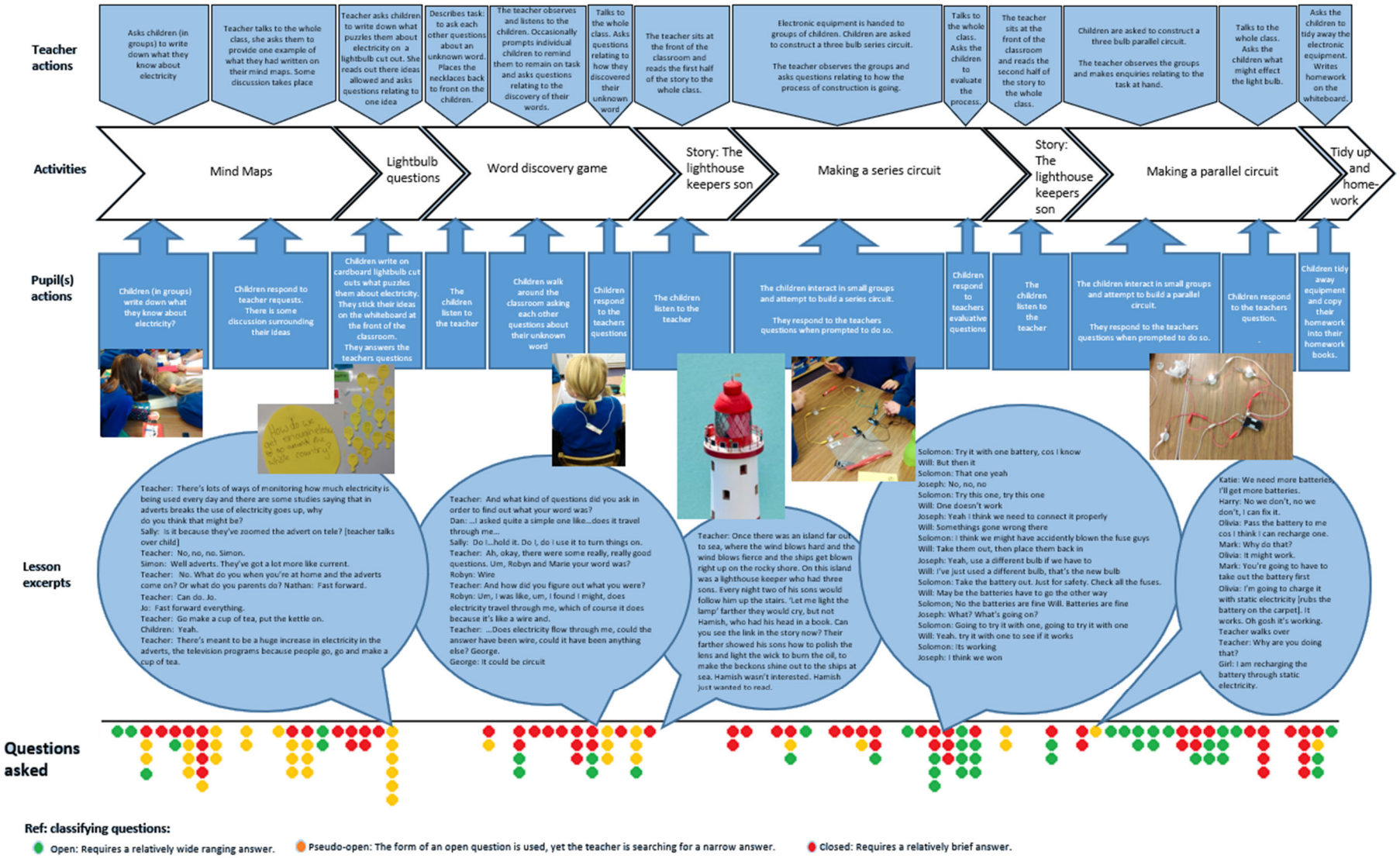

Figure 2. A map of time-lined events from a singular science lesson (adapted from Mortimer [27].

3. Results

Having outlined the appropriate research methods to exemplify creativity through agentive moments, as well as the considered ethical appraisal and approval practices to capture this data, our next consideration was how to present our findings to our intended audience, namely teachers and academics. Unlike Mortimer et al. [27], we decided to chronologically represent illustrations of agency, as they occurred, through a timespan (from start to finish) within the science lesson. This was graphically illustrated through the types of questions the teacher asked per minute in a frequency timeline (as represented by vertical strings of dots) (see Figure 2 below). We felt this was a prudent way to represent the science lesson because busy educationalists are much more likely to utilise research outcomes presented graphically [34], rather than having to wade through research data or peer reviewed articles akin to this one.

The lesson was transcribed (from beginning to end) and questions were categorised in an approach akin to Erdogan and Campbell [35], using a revised version of Wragg and Brown's [36] and Brown and Edmondson's [37] taxonomy of open (green dots), pseudo-open (orange dots), and closed (red dots) questions (see Figure 2). Through this macro level analysis, we began to recognise and appreciate how the teacher could, through their interactions, allow the children to articulate their varying scientific views and ideas. Without the teacher's and pupils' consent to record the exchanges, this macro level of analysis would not have been possible; however, Hardman [38] suggested opening up classroom talk through provocative, open-ended statements rather than questions. Hardman suggested that this could facilitate an explorative conversation [38] between teacher and students, or indeed, between peers [39]. According to Wegerif [40], these exchanges would illuminate different perspectives and provide pupils and adults the opportunity to express their agentive ideas. Thus, in Figure 2, the question frequency timespan was also used to visually highlight when five verbal exchanges, or semi-agentive creative moments, took place (see speech bubbles in Figure 2). Associated pictures which represented specific mapped activities, and outcomes of the tasks set, were used to join the five excerpts to the associated activities employed by the teacher. Descriptions of the key/salient actions of the teacher and child(ren) during these activities are found above and below each activity.

It is the third and fifth activities (i.e., story: *The Lighthouse Keeper's Son*, as read by the teacher, thus making a parallel series circuit) that we will examine through excerpts 1 and 2 below. This is not to ignore the activities that the teacher facilitated prior to these (or indeed later). We recognise the way in which the teacher took purposeful action, through these initial activities, to orient the pupils to think about the lesson's learning objectives. That is, to learn about series and parallel circuits and to associate the brightness of a lamp with the number of batteries as stipulated in the National Curriculum programme of study [6]. This orientation was achieved through engagement in the curation of mind maps to find out, in Mrs. McCabe's own words, 'what the students already know about Electricity' and the generation of questions, by students, to encourage them to consider what they would like to know about electricity. As seen in Figure 2, a pupil is curious to know, 'How do we get enough electricity to go around the whole world?' Other examples include 'Why do birds stand on wires?' and 'How much electricity is needed to power New York for 5 years?'. Moreover, also depicted on the events map, prior to the third activity, was a 'word discovery game'. Here, the students were invited to ask each other open-ended questions to discover what words had been placed on their back (see photograph, Figure 2); however, the transcript of the teacher's audio highlighted how the majority of the questions were, in actuality, closed. For example, they asked each other 'Does it travel through me?' and 'Do I use it to turn things on?' Nevertheless, these activities were still created and facilitated by Mrs. McCabe to engage the pupils in a purposeful act, namely, to ultimately to begin to focus upon the overall learning objectives of the science lesson. These activities led to the teacher introducing the story of *The Lighthouse Keeper's Son*.

3.1. The Lighthouse Keeper's Son: Introducing a Series Circuit

In Excerpt 1, Mrs. McCabe recites the fictional tale of *The Lighthouse Keeper's Son* [41].

> Mrs. McCabe [reading from *The Lighthouse Keeper's Son*]: Once there was an island far out to sea, where the wind blows hard and the wind blows fierce and the ships get blown right up on the rocky shore. On this island was a lighthouse keeper who had three sons. Every night two of his sons would follow him up the stairs. 'Let me light the lamp' farther they would cry, but not Hamish, who had his head in a book . . . Their father showed his sons how to polish the lens and light the wick to burn the oil, to make the beckons shine out to the ships at sea. Hamish wasn't interested. Hamish just wanted to read.

Excerpt 1

This fictional tale was a readily available resource, which is, according to McCallagh et al. [42] 'relevant and accessible' to Year 6 pupils and National Curriculum (Electronics). McCallagh et al., continue to argue that these kinds of stories put young students at ease, and if effectively employed, in conjunction with other creative teaching approaches, could stimulate child-initiated dialogue, the generation of new ideas [42], questioning skills, and problem solving [43]. This provides opportunities for the pupils to become the active agents of their own learning [44]. Indeed, there is much evidence to support the use of stories as a method of engaging children in STEM learning within the educational environment [42–44]; therefore, despite the teacher seemingly positioning herself as the authoritative other, passively transferring the tale to her pupils, as they sit attentively at their desks, this fictional story has been purposefully chosen by the teacher to frame and engage the students in a subsequent learning activity (creating circuits). That is, after reading some of the story about Hamish creating an electrical circuit to light up a single Lighthouse from the comfort of his own armchair, Mrs. McCabe then invited the students to create a series circuit in groups of four. After the single circuits were created by the Year 6 pupils, the story was read further. During this second part, Hamish was given the responsibility to light up two further lighthouses. With this in mind, Mrs. McCabe asked the students to create a parallel circuit in the same groups.

3.2. The Lighthouse Keeper's Son: Creating the Parallel Circuit to Light Two Bulbs

The way in which a teacher positions the learners offers opportunities for them to have more or less agency [45]. By setting up the student-led group activity, to create a parallel circuit to help Hamish, Mrs. McCabe afforded the students the opportunity to respond to the task through a storied narrative, independently; however, as noted in Figure 2, she is still observing the pupils and making enquiries relating to the task at hand. Excerpt 2, below (also in Figure 2, fifth excerpt), illustrates how one pupil, out of a group of four, acted proactively and independently of the tutor when trying to make a parallel circuit.

> **Katie:** We need more batteries, I'll get more batteries.
>
> **Harry:** No we don't, no we don't, I can fix it.
>
> **Olivia:** Pass the battery to me cos I think I can recharge one.
>
> **Mark:** Why do that?
>
> **Olivia:** It might work.
>
> **Mark:** You're going to have to take out the battery first.
>
> **Olivia:** I'm going to charge it with static electricity [rubs the battery on the carpet]. It works. Oh gosh it's working.
>
> Mrs. McCabe walks over
>
> **Mrs. McCabe:** Why are you doing that?
>
> **Olivia:** I am recharging the battery through static electricity.

Excerpt 2

In Excerpt 2, Olivia has opted to recharge the battery with static electricity by rubbing it on the carpet. Although this is not directly linked to the learning objective, this student-initiated response, indirectly related to the task, enabled her to freely enact an alternate view of her own (ontologically believing that she could recharge a chemical battery through increasing its static electricity). That is, it appeared she had decided that as there was insufficient energy in the battery to light the bulb, she applied what she thought was appropriate action to solve a problem. It would appear that this solution was informed through a previous earlier experience when learning about static electricity. Her conceptual understanding of the difference between static electricity and the chemical energy supplied by a battery appeared to be lacking. Nevertheless, whether the recharging of the battery had resolved the problem or not, the teacher's telling of Hamish's tale had helped Olivia to express and act on her creative and innovative idea. This is exemplifies how the student is able to describe and proactively engage with problem solving in her world [3,46]; therefore, these two particular moments, within one science lesson, illustrate, a. how the teacher demonstrated agency through 'setting-up' an activity [47], affording a range of opportunities for the students to think about ways they might solve the lighthouse circuit problem; and b. how the teacher enabled Oliva to make her own decisions about what to *say* and *do* when a problem arose [48], even though the circuit did not work.

4. Discussion

The two contrasting moments, discussed above, have been specifically highlighted to illustrate how both a teacher and a student demonstrated agency differently. As is common ethical practice, the teacher's identity is protected, and she has been afforded a pseudonym [49] (p. 528). This ensures the nature of her enactment remains anonymised. Adopting the fictional text, *The Lighthouse Keeper's Son*, illustrates her decision-making about how she could imaginatively introduce not only the topic of electrical circuits, a curricular policy imperative, but directly relate it to the fictional character, Hamish, to parallel the challenge that she wished her students to engage with. She clearly demonstrates agency in the way she presents an intriguing and unique problem to be solved, and she provided a range of resources that could relate to thinking about electrical circuits and the various ways they could be connected to light up a bulb. The way that the teacher 'sets up' the classroom environment, as well as expectations about there being alternate ways to solve a problem, demonstrates agency in her practice. Several students asked very thoughtful (and arguably creative) questions about electricity, as demonstrated in Figure 2. Student agency is also demonstrated by the student, Olivia, who responds most ingeniously to the issue of the circuit not working; however, without the carefully justified arguments to ethically seek out such detailed data about practice and the relational connection to learning in classrooms, it would not be possible to demonstrate how the teacher enacted and facilitated agency. In this case, the teacher's agency was shown in a science classroom setting, drawing on particular resources, promoting interactive ways of students working together to achieve specific educational objectives. The evidence presented, therefore, suggests that agency is an emergent phenomenon, that does not simply reside in the individual, but arises out of ecological influences from the classroom environment [2]. The detailed illustrations (presented in Figure 2), of both teacher and student originality in terms of the ways they think about and enact their solutions to their different challenges; this includes the teacher offering a range of ways in which students could engage in thinking about electricity, and the students (in particular Olivia) proposing alternate ways to generate a working electrical circuit. Agency in the science lesson studied highlighted how it is the 'interplay' [4] between individuals, their use of available resources, and their efforts in collaboratively working together that achieved a particular outcome.

5. Conclusions

In concluding this paper, we return to the three ethical research foci of the study, as introduced at the end of the introduction (see sub-headings below).

5.1. Appropriate and Ethical Approaches for Researching Agency

In seeking to elicit clarity about a complex entity—agency—it became clear in the planning of the research that we needed to ensure that an ethical approach to collecting appropriate evidence was a priority. Gathering information about multi-faceted human decision-making and resultant actions that were evident in the moment when teaching and learning arose was challenging. Capturing teacher agency, which also involved preparatory decision-making and choice-informed enactments, needed to be considered, as did the alternate ways that learners responded to learning opportunities. The complexity, spontaneity, and personal nature of this kind of verbal and actional data could only be accurately captured through video and audio recordings. It was a precedent to ensure that participatory engagement was sensitively handled and that the resultant detailed conversations and interactions were meticulously captured, but presented anonymously.

5.2. Ethical Approval Processes Augmenting the Research Design

Engaging with the ethical approval committee ensured that appropriate preparatory steps were taken to ensure that the actors (young pupils, teacher, and guardians) were able to consider their voluntary individual participation during all phases of the research. This methodical approach of giving a robust justification, by using the previous literature, to the ethics review board, served to gain a deeper level understanding of the necessity of the seemingly invasive method of data collection, especially when illustrating agency. Without this kind of rigorous and external review, researchers keen to collect data and synthesise findings may overlook sensitivities and cause uncomfortable feelings from the participants' perspectives.

5.3. Final Reflections for a Wider International Context Regarding Ethical Practice and Regulation

Without the careful and conscientious consideration of the ethics of each data gathering and analysis step, the convergent data methods approach would not have contributed to the construction of the events map. This combined teacher and learner mapping of the seesawing of interactions in different phases of the lesson enabled clarity about how the teacher and students responded to each other, and it also demonstrated agency differently. This has meant that it has been possible to distinguish between teacher and learner agency as demonstrated in a classroom environment. This is also a significant contribution to ethical research methodology as most studies (national and international) focus either on the teacher's agency or the learner's agency through either questionnaires or interviews. In this case, we have rigorously elicited how the interdependent nature of the phenomena is distinct, but ecologically connected, for both the teacher and the student within the same classroom community.

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