Art-making as a site for education:

a case study of *The Imagineerium* project

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Several publications make use of data gathered for this research study.

- Trowsdale, J. with Challis, S. (2014) The Imagineerium School Pilot Project Report https://warwick.ac.uk/fac/soc/ces/research/current/pastprojects/imagineerium
- Trowsdale, J. (2016). Imagineering: Recreating Spaces through Collaborative Art-making. *Creativity! Theories, Research, Applications*, 3(2), 274-291.
- *The Imagineerium* project also features in Colucci-Gray, L., Burnard, P., Cooke, C., Davies, R., Gray, D. and Trowsdale, J. (2017) BERA Research Commission Report Reviewing the Potential and Challenges of Developing STEAM Education through Creative Pedagogies for 21st Century Learning: how can school curricula be broadened towards a more responsive, dynamic and inclusive form of education? British Educational Research Association

and in

- Davies, R. and Trowsdale, J. 2017. The value of instability: lessons from reviewing how and why creativity and the arts might interact with STEM education. European Journal of Curriculum Studies, 4(1), 584-600

Declaration

I declare that this thesis is all my own work and has not been submitted for a degree at any other university

Glossary of educational terms

CCE	Creativity, Culture and Education
CLA	Cultural Learning Alliance
DfBIS	Department for Business, Innovation and Skills
DfE	Department for Education
DfEE	Department for Employment and Education
DfES	Department for Education and Skills
E-Bacc	English Baccalaureate
MoE	Mantle of the Expert
NCC	National Curriculum Council
NACCCE	National Advisory Committee on Cultural and Creative Education
OECD	Organisation for Economic Co-operation and Development
Ofsted	Office for Standards in Education, Children's Services and Skills
PISA	Programme for International Student Assessment
QCA	Qualifications and Curriculum Authority
QCDA	Qualifications and Curriculum Development Agency

Images and tables

Personae

Imagineers

Jane Hytch, occasional imagineer (CEO, Imagineer Productions, design artist)
Kathi Leahy, chief imagineer (Artistic director, Imagineer Productions, performance artist)
Sarah Worth, imagineer (CEO and Artistic director, Highly Sprung, performance artist)
Mark Worth, imagineer (Artistic director, Highly Sprung, performance artist)
Roger Medwell, imagineer (CEO Imagineer Technologies, Medwell Hyde, engineer)
Phil Eddolls, imagineer (freelance theatre designer, design engineer)

Children (all pseudonyms):

2014 sample:
Abaar, Adila, Adrian, Azaad, Dakota, Darius, Earlene, Hema, Haroon, Issac, Karl, Kiran, Maarika, Madhila, Malwina, Mason, Oja, Zabia

Others (2014 field notes and 2015 focus groups)
Aabid, Almira, Hamim, Jasmeen, Kacper, Louise, Nisha, Tyrone, Xander

Summary of key dates / brief timeline

1998-2001

- Contracted to evaluate 'The Coventry Theatre Network' initiating professional relationships with Jane, Kathi, Mark and Sarah.

2004 – 2011

- Director of Creative Partnerships, in Coventry (Solihull and Warwickshire). Worked with Jane, Kathi, Mark and Sarah developing creative education through arts practice in schools.

2013

- Scoping discussions with Jane, Kathi and Roger culminating in the visioning meeting of The Imagineerium.
- Bid submitted to Arts Connect to fund *The Imagineerium* project with schools, supported by CSWP and local businesses.
- Identification of and negotiations with participating Schools

2014

- Jan – March Project planning
- April – August Project activity

2015

- July Project review with children

Abstract

The arts, art-making and creativity are popularly regarded as having value and importance to society and education. Yet, even at their politically most valued they have occupied a marginalised space in English schooling. This thesis is not an argument for more arts as a discipline in the school curriculum, but for art-making as a practice and site for a broader conception of education. It argues that experiencing the practice and culture of art-making provides a fertile and dynamic site for enabling learning, which can integrate different disciplines and encouraged a positive self-view in learners. The thesis draws upon a particular case study, *The Imagineerium* project, in which children were commissioned alongside professional artists and engineers to imagine, design and make models for a kinetic performance vehicle as part of a public event their city centre. The thesis adopts a multiple, mixed-method approach to the case study, combining traditional methods of questionnaire and interview with ethnographic field notes and participatory methods engaging all participants.

Here the compound term 'art-making' refers to the practice of making work in either one or a combination of art forms. It connotes the dynamic and developmental nature of growth, creation, formation but also of construction which interweave with ideas of producing an output and effecting an outcome, here in symbolic forms. The thesis draws on: Dewey's (1934) proposal of making in the arts as central to a conception of education as a democratic, creative and self-motivated process; Ingold's (2013; 2017) emphasis on the sensed, embodied ways of knowing such experiences promote; and Lave and Wenger's (1991) account of communities of practice. I argue for *The Imagineerium* project, as an emergent 'community of practice' where children experience, in an apprentice-like way, being 'legitimate peripheral participants' and are engaged in art-making as members of a community of practising imagineers (artists, designers and engineers), who collaborate in making.

The thesis shows the potential educational benefit of 'art-making as a site' of learning, of more closely reflecting real communities of art-making practice and of educating children

collaboratively with members of such communities. Such benefits include a changed power dynamic, increasing children's sense of agency and capability as well as proposing a potentially transdisciplinary curriculum model. The thesis further argues that educators need to promote and engage in educational experiences which foreground embodied learning, which is site-specific, and hence the spatial dynamic of such education.

Prologue: Setting the scene for the research

My research into *The Imagineerium*[1] project, the case study at the heart of this thesis, grew out of relationships and practices developed over many years preceding this study. The aim of the prologue is to contextualise the genesis of the enquiry and to locate it temporally, spatially and relationally: shaped by particular events and people. *The Imagineerium* project was developed by Imagineer Productions, a cultural organisation known for large-scale site-specific performance events. As part of the nation's 2012 Cultural Olympiad, Imagineer Productions developed 'Godiva Awakes', an arts and engineering, professional and community project which earned strong regional and national acclaim. The project that this research studied grew out of 'Godiva Awakes'. This, therefore, is where I begin, with a vignette.

'Godiva Awakes' a. Aerial performers celebrate Godiva's awakening.
b: Godiva walks amongst the people. Photographer: Andy Moore

Godiva Awakes

It is 29th July 2012. Yesterday evening thousands witnessed a unique, 6-metre-tall, mechanised puppet of Coventry's legendary Lady Godiva being unveiled and 'awoken' as part of a spectacular outdoor event. Aerialists scaled the new cathedral walls and zip-wired across University Square to

[1] *The Imagineerium* project is outlined briefly in Chapter 1 page 30 and further in Appendix E. The term Imagineerium (not italicized), refers to the space, physical and metaphoric, in which people 'imagineer'. The portmanteau term 'imagineering', coined in the 1940s (Sailer, 1957) and made famous by Disney, describes a blending of imagination and engineering.

awaken Godiva. Swarms of drummers, fantastically costumed golden and bronze hummingbirds and a choir of singers, in white, heralded her 'awakening'. Today, in Broadgate, in the city centre, she is being presented to the city, ceremonially clothed in her bespoke golden, orange coat, itself a work of art and celebration of the stories and creative, textile talents in the city.

'Godiva Awakes'. c. Godiva is greeted by Pru Porretta MBE, Coventry's official Lady Godiva. d. Godiva is dressed in her coat. e. Godiva walks again amongst the people of the city. Photographer: Andy Moore.

The process first of dressing and then later of manoeuvring Godiva from her walking rig to the cyclopaedia[2] takes time. It is labour-intensive and lengthy and yet the crowds remain. No-one seems to want to leave. Each stage requires bespoke pieces of engineering. She has arrived on the cyclopaedia to be dressed in her coat, which is presented on a frame, raised and received by an attendant (who is costumed as all attendants are in waistcoat, red neckerchief, white shirt and trousers). He balances on the rig at her shoulders and wraps the coat around her. Once dressed she is raised by crank to her walking rig so that her coat can be seen from all angles. A short while later she is transferred back from walking rig to cyclopaedia. A crank winds her back down to a sitting position, the process slowly folding her legs. The team of costumed artists and engineers attend and guide each stage. Finally she is wheeled in front of the cyclopaedia frame to sit behind her 'horse' in readiness for a tour the city before starting her journey to London. I take my place as a rider on the cyclopaedia.

[2] This is a bespoke structure in which Godiva is seated, as if on her horse. She can be animated by a stationary cyclist inside the structure. Behind, two lines of 26 x 3-wheeled cycles, locked together, power the structure, controlled by central braking.

Even with pseudonyms, it would not be possible to ensure confidentiality to the people involved in *The Imagineerium* project, who worked on 'Godiva Awakes', because it is such a distinct project and now has a profile in the public domain. Thus, further to the ethical consent sought at the outset of the project, I have secured permission to explicitly name and credit the key adult imagineers. I have known Jane Hytch, Chief Executive Officer of Imagineer Productions, for two decades. She was, at that point, artistic director of The Belgrade, Coventry's repertory theatre, and I was lecturer in Drama and Arts Education at the University of Warwick and regularly attended her 'Arts Alive' festival. Following my MPhil thesis into small-scale physical performance companies and education (Trowsdale, 1998) she invited me to become evaluator for a collaborative experiment, the Coventry Theatre Network (CTN) 1998-2001 (Trowsdale, 2002). In 2004, Jane formed Imagineer Productions with Kathi Leahy (director of one of the CTN companies) taking forward the spirit and learning of the CTN. This new company aligned these women's background in community arts with their experience in collaborating with internationally outstanding artists. Their work is site-specific, happening in non-theatrical places. The formation of Imagineer Productions coincided with me becoming director of 'Creative Partnerships Coventry', a flagship programme of the Labour government (Collard, 2012). The programme, as I saw it, was about mining the connections between the creative processes of professionals in the cultural sector with the learning processes of young people and teachers in schools. Imagineer Productions was one of the companies with which Creative Partnerships Coventry partnered to enable young people to develop as creative learners, exploring historical and social issues, the practices of creative practitioners, the city cultural policy, careers in the cultural industries and also to develop alternative curriculum models.

In 2009 Imagineer Productions won Cultural Olympiad funding for 'Godiva Awakes'. The bid and project were developed with former NP Aerospace CEO, Roger Medwell, with whom Imagineer Productions had worked previously to realise site specific performances events. The project inspired local industries, businesses communities and individuals to get involved. As a member of the cyclopaedia team taking Godiva to London during one week in August 2012, I witnessed how the project inspired people (both those involved and witnessing) and generated a sense of pride. Jane, Kathi and Roger believed that

'Godiva Awakes' offered a model for future collaborations between professional artists and engineers and young people. Jane approached me to join a meeting day alongside a range of local experts from across engineering, art and design, manufacture, science education, culture and city development to shape and begin to articulate a vision for 'The Imagineerium'. On behalf of the group I wrote up the collective ideas recorded at this meeting:

> The Imagineerium is a real, virtual and symbolic place in which to coach the habit of invention and feed the appetite for and valuing of applied and innovative craft. This is a space in which to imagine, engineer and actualise the extraordinary. In the Imagineerium, artists and engineers will have access to young people's thinking and young people will have access to the vision, expertise and knowledge of artists and engineers whilst working on real projects, grounded in Coventry's cultural and engineering heritage but focussed on its future.
>
> The Imagineerium project will create a physical space, frameworks and opportunities for young people to learn experientially how arts and science processes can connect to enable extraordinary things to be created. That is to say it will feed and harness the creative minds of young people, artists and engineers to guide and reframe the application of their analytical abilities. In so doing it will re-energise the appetite for engineering, stimulate the desire for practical investigation and study in STEM subjects and careers in engineering. (The Imagineerium: Imagining, engineering, actualising 16/7/13).

A successful bid was made to Arts Connect West Midlands, to fund a project to pilot this idea. I was a funded project evaluator, as an educational researcher at the University of Warwick. I had recently been accepted as a part-time doctoral student and Imagineer Productions invited me to make *The Imagineerium* project my study site. As such this thesis draws, in part, on data gathered for and reported on in 2014 for Arts Connect West Midlands (Trowsdale, 2014). Some sources such as field notes and video in 2014 and all 2015 data were uniquely gathered for this thesis.

In addition to Jane Hytch, there were five imagineers, key players involved in the project. Kathi Leahy, lead imagineer on *The Imagineerium* project, deeply committed to the disenfranchised, grew up in Coventry in working class and Irish communities. Kathi has

over 30 years of experience in directing theatre, carnival and performance events with, and for, communities, working in partnerships across civic, business and cultural sectors. She has taught drama in schools and in community settings and has a fierce commitment to young people for whom mainstream education has not worked. I had witnessed Kathi's work in many guises over the years, but not worked as closely with her until this project.

Mark Worth puppeteered Godiva and Sarah Worth, an aerialist and carnival artist on 'Godiva Awakes', were also part of the visioning day in July 2013. They are co-directors of a physical theatre organisation, Highly Sprung Performance Company (https://www.highlysprungperformance.co.uk). I have researched and been a critical friend, evaluator and most recently a Trustee to this company since 2001. A Creative Partnerships legacy grant enabled the company to develop primary school science performance-workshop project 'Commotion' in 2011. I, alongside a Physics Outreach worker, was advisor on its design and content. With their experience of KS2 physics and mathematics through movement practice, Imagineer Productions were keen to engage Highly Sprung Performance to explore an embodied approach to engineering within *The Imagineerium* Project.

Engineers Roger Medwell and Nick Martin were instrumental in making the mechanised Godiva and have since set up a partner business, 'Imagineer Technologies', marking a commitment to taking on unusual and innovative commissions from across the cultural and engineering sectors. Roger who owns and runs Medwell Hyde and Imagineer Technologies (imagineertechnologies.com), through his engagement with Imagineer, has become more involved in the cultural development of the city. He is also governor at one of the Coventry primary schools involved in the project and interested in developing future creative engineers. Nick has a Fine Art degree and a background in film effects, constructing animatronics, mechanical and technological engineering. Both were involved in scoping *The Imagineerium* project design. Phil Eddolls (phleds.com), a highly reputed theatre designer, who had worked with Imagineer Productions and Roger in 2006 on the Coventry Mysteries, joined the team a little after the others. Having learnt his engineering skills through a mix of opportunistic and planned training, often in

response to the demands of particular directors, companies or performances, Phil brought a dialogic, collaborative and highly hands-on dynamic to the team. He had studied drama and stagecraft, had experience of an apprenticeship-like arts education project, and was interested in working further with young people.

This prologue forms a backstory to the thesis in which Jane, Kathi, Sarah, Mark, Roger and Phil appear. It seeks to clarify my position as one enmeshed in some of the history, relationships and thus dynamic of the phenomenon I have investigated. Hereon my voice assumes that of the self-reflexive researcher.

Chapter 1: Introduction

The arts and creativity are popularly regarded as having value and importance to society and in education (Belfiore and Bennett, 2008; Sorrell, Roberts and Henley, 2014). Research evidence of that value has suggested benefits in terms of diversity, tolerance, well-being and happiness, social cohesion, creativity, and agility (see for example Catterall, 2009; Crossick and Kaszynska, 2016; Mowlah et al., 2014). These are echoed in educational research into the benefits to young people of arts and culture (Catterall, 2009; Comerford-Boyes and Reid, 2005; Eisner, 2002a; Gardner 1973; Jindal-Snape et al. 2018; See and Kokotsaki, 2015; Thomson et al., 2018). Yet, even when most politically valued, they have only occupied a marginalised space in English schooling. Bamford's (2006:11) international analysis reiterates that whilst the arts 'appear in the educational policy in almost every country in the world, [t]here is a gulf between the "lip-service" given to arts education and the provisions provided within school'. Concern over inadequate provision is often conceived of in terms of the relative amount of curriculum time or space the arts occupy (Cultural Learning Alliance [CLA], 2018; Tambling, 2019). In this thesis, I suggest that it is possible to think differently about the arts in education.

I argue that a focus upon the practice and site of the arts, upon art-making, can reframe our thinking. I suggest that we might conceive of art-making as an educative site where multiple skills, knowledges and understanding are both acquired and generated. I argue that learning, thus structured, is like a workplace where individuals are supported through collective activity to achieve a task. I draw upon Lave and Wenger's (1991) account of learning as inherent to undertaking tasks situated within a community practice, here an art-making community, and upon Dewey's (1934) and Ingold's (2013; 2017) accounts of art-making as inherently educative and embodied experiences. Whilst such a view of art-making might be more familiar to learners in (semi) professional contexts, and to home and informal education, it can also inform the more institutionalised education of younger children in schools.

The claims I develop throughout this thesis emerge through my analysis of a single case study, *The Imagineerium* project. I make three claims. Firstly, my analysis of *The Imagineerium* project advances the practice of art-making as an inherently educative process which engaged learners in embodied, cognitive and affective ways, all of which are important to a broad education. Secondly, both the site and practice of art-making structured children's education in ways which are different to how schooling typically structures learning. This generated a kind of 'community of practice' (Lave and Wenger, 1991) which situated and supported 'educative experiences' (Dewey, 1938). Thirdly, that the theories I draw on in this thesis, whilst not new, combined and applied to *The Imagineerium* project, offer a particular and unique contribution to sociological educational research. Using *The Imagineerium* project as a case-study of art-making, this thesis asks and responds to the following questions:

1. In what ways does *The Imagineerium* project foreground and articulate the practices of art-making in children's education?
2. What structures does *The Imagineerium* project require and propose that might be valuable to children's education?
3. How can participants' experiences of *The Imagineerium* project be conceptualised to inform future similar practice?

The study makes use of two terms: art-making and site. A fuller account of both terms and their significance for education is given in the next chapter. Here I seek simply to clarify what is intended by the terms. I define 'art-making' as the process of exploring ideas, in any single medium or combination of media, with the intention of shaping, forming or creating something. This reflects popular usage by galleries, arts organisations and educators placing a focus upon the process of making in the arts. My use of the term 'site' signifies a particular kind of space. It draws heavily upon the conceptualisation of spatiality, developed by social geographers such as Massey (2005). It also reflects ideas suggested by its use in the cultural sector by 'site-specific performances', typical of Imagineer Productions' live outdoor work. Site, in this study, signifies the agentic and dynamic meaning-making interrelationship between the material, geographic, metaphoric and relational senses of 'space'.

In this chapter I introduce the contextual landscape for the study. Firstly, in 1.1, I consider moments in the history of education which have shaped how the arts have been conceived and developed in English education. I identify themes which underpin the argument of this thesis. 1.2 introduces *The Imagineerium* project as the study site and explains the key terms of 'art-making' and 'site' used in the study. In 1.3 I identify the key theories this study draws upon and conclude the chapter in 1.4 by summarising the contributions of this research study and in 1.5 by outlining how the thesis is structured.

1.1 The arts in English schooling

Whilst an analysis of the history of the arts in education is not the focus of this study, a brief review identifies several issues which are contextually significant. I note evidence in educational policy for the arts being recognised as educative, and for belief in the arts as inherently physical, typically social, practices which stimulate cognitive, aesthetic and moral education. The arts are recognised as important in fostering learning that cultivates a civilised and well society (Acland, 1913; Belfiore and Bennett, 2008; Crossick and Kaszynska, 2016; DfES, 2003; Hadow, 1931; NACCCE, 1999; Ofsted, 2003; Ofsted 2010). This debate identifies a role for the arts in developing sensibilities valuable to the quality of life and skills which may be of economic importance. However, despite this, the arts have never achieved a high status in the English education system.

The Elementary Education Acts of 1880 and 1891, heralding free mass primary education in England, were largely characterised by standardised and transmissive pedagogies. However, a liberal sensibility amongst policy makers to the potential of the arts to stimulate human development in broad terms is also apparent. A view of children as active, sensory, competent and curious learners is clear in the Education Department's (1893) 322 Circular to Inspectors. The document recommended that teachers recognise and 'stimulat[e] … the child's spontaneous activity' as part of 'the harmonious and complete development of the whole of the child's faculties' (Gillard, 2018: Infant Schools, paragraph 12). This included 'the love of movement', 'the observant use of the organs of

sense' and 'that eager desire of questioning which intelligent children exhibit' (ibid). Such ideas were even stronger in the Hadow report which advocated 'experimentation', 'activity and experience', often through the arts, as practice-based and active forms of learning (Hadow, 1931). The curriculum included crafts, so that children might develop the kinds of art-making skills useful to their lives but, Hadow also specified that they learnt 'drawing … to stimulate aesthetic appreciation' suggesting the educative importance of children becoming attuned to beauty through the practice of art. Recognition of close connections between body and mind were also evident in the suggestion that 'dancing, singing, music and drama' fostered a 'physical culture … intimately connected with intelligence and character' (Hadow, 1931:xix-xx). Acland (1913:viii) argued for the continuance of the arts from primary into secondary education, advancing the idea of the importance of learning 'by bodily activity … doing', for developing 'mind and character' as well as a foundation for 'technical instruction'. From the outset of schooling in England then, there is evidence of art-making being both valued and understood as an educative practice. Learning is depicted as a holistic, body-mind process fostering intelligence and aesthetic sensibilities.

Acland's report highlights the personal importance of expressivity and creativity in art-making. He advised that teaching should encourage 'individuality and initiative' (ibid:ix) and the syllabus should recognise children's 'interest[s and]… creative instinct …[and] give considerable scope for originality' (ibid:17). The sentiment, in part, echoed Hadow who advocated that the secondary curriculum offer 'opportunities for practical work ... closely related to living interests' (Hadow 1926:174). Significantly for this thesis, art-making appears at this point in time to be seen as a social, pleasurable, personal, expressive and economically valuable skill to be developed through schooling. Learning is recognised as a holistic, body-mind practice, motivated by personal interest and the opportunity to express one's individuality and creativity. Acland's report also suggests that 'handwork', making in the arts and crafts, 'correlat[ed] …with other school subjects'. He suggested that 'connecting' craft-based practice 'with the general work of the school' was a 'necessity' and should 'arise naturally' and be of an 'incidental rather than systematic character' but that drawing was particularly significant in the sciences, maths and humanities. His account reflects a work-based understanding that undertaking any

tasks involves skills, knowledge and understanding from more than one domain; that visualizing, enacting and testing draw upon the arts and sciences. Both Acland and Hadow imply a belief in a close and holistic connection between the arts and sciences, between the mind and body, and value for art-making as an aesthetic, multidisciplinary, intelligent and creative practice. These are ideas important to this study and yet ones which have been under-developed in the contemporary period.

Yet whilst there is recognition of the importance of the arts, as subjects, they have fared somewhat differently in English schooling. A hierarchy, not just between the arts and sciences, but also within the arts appears rooted in the class history of schooling in England (Reay, 2017; Ball, 2017). Whilst the first infant schools emphasised 'singing, dancing and playing' (Hadow, 1931), and crafts were taught at primary and secondary level (Acland, 1913: Gillard, 2018), the arts had not featured in private (fee-paying) schools. The influence of liberal advocates heralded their introduction in the mid-nineteenth century. However, the art-making promoted in private schools was not the crafts which were useful to working classes on economic grounds, or the dancing that might characterise their leisure time. Instead visual arts, (particularly drawing and sometimes painting) and music (classical rather than popular genres) began to be included in the curriculum of the elite grammar and then public schools between the 1840s and 1860s (Gillard, 2018). Art-making by the children of the upper classes was in the image of the divinely inspired 'creative' and 'imaginative' artist (Williams, 1976) generating 'ornamental' art (Matarasso, 1997). The crafts, by comparison, were economically 'use'ful (ibid) as expected forms of future employment for working class children (Crone, 2013). This distinction provided a means by which upper and aspiring middle classes could reinforce class boundaries. Painting and music reflected the forms, and particularly the genres, of the arts preferred by the upper classes (Bourdieu, 1993) precisely because they were enrichments, peripheral to employment.

This distinction was further reinforced in the introduction of free schooling for all, conceived as a two (originally three) tier conception of secondary education (Spens, 1938). Technical and secondary modern schools emphasised crafts as physical practices focused on 'know-how' (Hirst, 1973). Grammar schools emphasised cognitive practices,

where sciences, classics and literature focused on 'know-that' (ibid). Art and music were concerned with developing the aesthetic sensibility of the upper classes. The argument was not simply class-defined routes through schooling, but based on intelligence, suggesting that intelligence was associated with class. (Spens, 1938; Gillard, 2018; Ball, 2017; Reay, 2017). By implication, crafts, and perhaps by association art-making per se, as physical practices, were deemed less intelligent activities. The effect was detrimental to the development of ambitions for art-making as a holistic educative experience.

The establishment of the Committee for the Establishment of Music and the Arts (CEMA) in 1940, however, reflected a liberal view of the importance of the arts in society. Formalised as the Arts Council of England (ACE), in 1946 ACE initiated the practice of government spending on the arts and reflected the post-war 'Arts for All' policies of the Labour government. This was the climate in which O'Neill's 1918-1953 successful Prestolee school (Burke, 2005; Holmes, 1952), which I refer to later, thrived with art-making at the heart of learning. Wider opportunities to practice and experience the arts informed a view of the child as innately curious, playful and creative. The 'child-centred', discovery learning spirit of the 1960s was captured in the Plowden report (1967) and texts such as *Child Drama* (Slade, 1954). Albeit situated in primary education, Plowden's ideas reached beyond this sector and were influential in fostering cultural and educational sensibility for the arts as expressive modes which facilitate varied ways of apprehending and sense-making. Such views are also echoed by the artists involved in this research.

The challenge to Plowden, which persists today (Ball, 2017; Jones, 2016), was instigated by Prime Minister James Callaghan's Ruskin lecture (1976). Whilst he noted 'the alertness and keenness' of pupils studying 'arts and crafts' he advanced the economic purpose of education and the importance of particular kinds of knowledge, disciplines and pedagogies (Young, 1971). Callaghan expressed concern over 'complaints from industry that new recruits from the schools sometimes do not have the basic tools to do the job that is required'. He bemoaned girls choosing not to study sciences, the disinterest of students to pursue careers in industry and suggested that teaching at all levels might be better aligned to and informed by industry needs (Callaghan, 1976). Robinson's (1989)

response was to argue that the arts were valuable on economic as well as the more established social grounds, but the 1988 National Curriculum did not reflect this including only 2D art and music, as 'non-core' subjects. Drama had a mention in English and Dance within PE, to serve the study of, respectively, literature and physical education. It heralded a handmaiden role for the arts in relation to other subjects.

'All Our Futures' (NACCCE, 1999) took up the political invitation to extend the claim for the arts, re-branded as 'creativity and culture'. It argued that they address economic and technological challenges facing education as much as the social and personal challenges. It also accepted an instrumental role for 'creativity and culture' in ensuring a 'broad, flexible and motivating education that recognises the different talents of all children' (DfEE, 1997:38) and which thereby might also enable excellence in literacy and numeracy. The report's strategically argued a palette of claims for creativity and culture. Its recommendations for business, society, government and the cultural sector to align and collaborate, reflected the Labour party's multiple expectations of education. Raising standards (Ball, 2017) was part of an 'amalgam of community … cultural belonging…. and a new participatory responsibility in the economic sphere' (Bernstein, cited in Ball, 2017:16). Labour's espousing of education and of 'ubiquitous' creativity (Neelands and Choe, 2010:287) as a 'core British value' (Blair, 2000) framed the arts as potentially important in developing these, but through its association with economic priorities was characterised as fostering an entrepreneurial mindset. The implication was that, as creative innovators, young people would contribute to the politically important mission of 'ensuring national economic competitiveness in the "global race" ' (Ball, 2017:16; Sahlberg, 2016). The artists who appear in this thesis had become accustomed to this neo-liberal, positioning and expectation of the arts to address multiple social, educative and economic priorities and as such it informed the thinking behind and design of *The Imagineerium* project.

Labour's education, creativity and culture foci spawned a series of initiatives and publications in the early 2000s; for example, QCA (2004), DfES (2003), Ofsted (2003). 'Creative Partnerships', the programme that I was involved in, launched in 2002, connecting creative professionals, almost exclusively from the arts and cultural sector, to

work in partnership schools to reimagine approaches to education. Creativity was woven through education reform in a holistic view of the educated child as a 'confident individual' and 'responsible citizen' as well as a 'successful learner' (QCDA, 2010; Ofsted, 2010; Rose, 2009). What was proposed was a more connected and porous curriculum, where skills and subjects could be situated and where those beyond school with relevant resources might contribute. The idea that educatively interested partners, such as community artists, might engage with educators (Parker, 2013) was the background to and climate in which *The Imagineerium* project was conceived.

Whilst the political context appeared to value the arts and culture in education through an economic framing of the value of creativity, sociological analyses argued differently. The historic dominance and control of cultural and political structures by the ruling classes whereby arts, and particular art forms, had low status remained. Any temporary re-positioning by a political party did so within the elitist and reproductive action of the arts and creativity (Bourdieu, 1993). Alongside an economically driven emphasis upon STEM (Science, Technology, Engineering and Maths) (Colucci-Gray et al. 2017), the ruling classes ensured that new educational policy did not essentially alter the status of the arts in society (Bourdieu, 1993; Thomson et al., 2019). The defeat of the Labour administration affirmed such an effect. In their first Comprehensive Spending Review of 2010 the Coalition Government announced a 41% administrative cut to the Department of Culture, Media and Sport, 50% cuts to the Arts Council and approximately 30% cuts to the Arts (McDonald, 2010). Funding for national creative and cultural learning programmes and arts organizations such as Museums, Libraries and Archives Council and the Film Council were cut with immediate effect. Associated plans for curriculum reform which sought to emphasise skill development, and the role of creativity and the arts were also halted.

In school policy, developments such as The English Baccalaureate, introduced in 2010 and Progress 8 in 2016, furthered the exclusion of the arts in schooling by double weighting English and Maths in relation to all other subjects and reducing 'high value arts' (namely art and music) to the lowest rated group of 'open': 'approved academic', 'vocational' and 'arts' subjects (DfE, 2014a). Their introduction and use in Ofsted

inspections has reinforced historic discipline hierarchies, directed pupils away from opting for an arts subject at GCSE and encouraged schools to reduce arts provision (Jeffreys, 2018). Between 2010 and 2018, arts GCSE entries have reduced by 38%[3] at GCSE and at A Level by 29% (CLA, 2019). Design and Technology (-67%) and Combined (Performance/Expressive) Arts (-61%) (ibid), the arts areas addressed in this study, have seen the most significant cuts. The character of studying the arts has also been the subject of reform with greater emphasis upon form and content in a bid to 'ensure that the arts are 'every bit as rigorous as the rest of the school curriculum' (BBC, 2015). In such a political context, arguments for more time, space and resource exclusively for the arts seem unlikely to gain traction. This thesis therefore explores thinking differently about the arts.

In sum, this brief review serves to show that the arts have featured in the history of English schooling, whilst also identifying several themes of significance for this thesis. It is worth highlighting the key points to the discussion thus far. Firstly, I noted that art-making has been recommended in English schooling policy as educatively valuable, but that such recommendations have not been realised. Secondly, art-making is recognised as the source for the development of a broad range of embodied, affective and cognitive learning. However, schooling reflects constructed and historic beliefs about intelligence which bifurcate the cognitive and embodied in learning. This separation has advanced a belief that conceptual understanding is both more valuable than the practical and, more significantly, should be developed separately from and without the need for practice. Such beliefs potentially increase the gaps between learning, schooling, wider life and employment. Thirdly, with the exception of an influential 'heyday' for the arts when a breadth of value was recognised, economic drivers, intensified by the Global Education Reform Movement (GERM), have re-framed the arts as both peripheral to core business of schooling and, where present, needing to achieve multiple goals. The value of the arts is typically framed as dominantly an economic value in coaching an innovative and

[3] Some government accounts suggest a smaller reduction, but this is based on excluding design and technology which was previously reported as an arts subject. Small increases in art and design are likely to be down to students re-routing following design and technology related routes having been cut (CLA, 2019)

entrepreneurial mindset, for example as a handmaiden to STEM subjects (Colucci-Gray et al., 2017).

1.2 *The Imagineerium* project as a site for study

The Imagineerium[4] project was developed following the success of 'Godiva Awakes' which promoted interest in regional engineering and manufacture. A 43% gap (Kumar, Moss and Johnson, 2016:2) in skills in engineering perhaps heightened local interest. The project echoed interest in STEAM education, where the arts are connected with 'STEM' subjects, namely Science, Technology, Engineering and Maths education (see Colucci-Gray et al., 2017 for a review). The arts are argued to have a role in overcoming historic division, famously noted by CP Snow (1959), between arts and sciences. The rhetoric of young people's perception of the sciences as more 'difficult', and 'elite' as well as less appealing than the arts (Archer et al., 2013) has led to the consideration of the humanising, inclusive, active and connecting qualities of the arts by STEM educators.

The project was developed in Coventry in the wake of the national Creative Partnerships programme (Creative Partnerships, n.d.; Collard, 2012), which had engaged cultural organisations and schools in developing creative approaches to pedagogic, curricula and cultural challenges identified by the schools' strategic development plans. Programmes gave children experience of creative, typically art-making, practices with a view to raising aspirations and developing children as reflective and 'creative' learners. Being creative in this programme involved promoting children's readiness to think differently, to imagine, to develop ideas and solve problems, to be resilient and resourceful learners keen to develop and refine work, showing willingness and initiative as well as being empathetic and collaborative (ibid; Cropley, 2000; Lucas, Claxton and Spencer, 2013). Engineers as well as educators involved in developing the vision for *The Imagineerium* project were equally keen for such behavioural development.

[4] The term The Imagineerium, non-italicised, refers to the physical space in which imagineers work, made safe and workable for children for some of the project. Italicised, the term refers to the project.

The idea of the project was, drawing on the adults' work during 'Godiva Awakes', to construct an experience in which young children, as if 'imagineers', would 'imagine, make, amaze'. Children were to be 'commissioned' to create models, with one per class being built to full scale and performed as part of the Godiva cavalcade launching the first Festival of Imagineers in 2014.

1.3 The theoretical context for the study

This empirical study, investigating the educative value of art-making, reflects a social constructivist paradigm. It does not draw on a single theory or body of literature to construct its argument. Rather, its ideas draw on different literatures spanning the arts, education and embodiment to frame a view of art-making as an inherently social, embodied and highly educative creative and cultural practice. In connecting literatures on art-making, embodiment and communities of practice as being educative, the underpinning line of argument of the thesis is made apparent. The argument is brought together firstly through Dewey's account of experience as education, and secondly Lave and Wenger's account of communities of practice as a context where educative experiences are inherent. Both are developed through literature which recognises embodiment and affect as integral to educative activity.

The first section of the literature review explores the way in which art-making can be coherently conceived as a site for educational experiences. After clarification of the terms 'art-making' and 'site', the section is framed by a consideration of Dewey, and Deweyian scholars. I argue that the practice of art-making generates a dynamic and fertile site for learning. Working in such sites requires responsiveness and proactivity, fluidity and flexibility, collaboration and self-direction, research, exploration, practising of skills and honing of critical judgement. I argue that art-making both deploys and generates the educational structures and cultures which can attune children to the sensory and affective understandings that facilitate and promote broad, rich and

multidimensional notions of knowing and learning. Building on this account of art-making as an educational experience, I draw on Lave and Wenger to explore the collaborative and collective nature of art-making as a particular kind of democratic and generative social practice. I argue for such social contexts as effective educative cultures for learning and for the community as 'teacher'. From there I focus on Lave and Wenger's situated learning model and the inherently educative nature of a community of practice concluding with a focus on how such communities enable 'legitimate peripheral participation'. In the final section of the literature review I address a central aspect of this study; the idea of learning as a complex integrated process wherein physical action and sensation interact with thinking and emotion. In particular, I focus in the ways in which our bodily actions are intertwined with our cognition, the role of imitation by observation in learning from others, and the role of body states, most significantly emotions, in these processes. I use the term 'embodied learning' to capture these aspects of human experience.

1.4 The contribution of this research study

This research explores interrelations between the embodied, sensed and emotional dimensions of learners, and the value of engagement in the conditions and practices of art-making. It draws on discourses of art-making, embodiment and the social practice of education in relation to *The Imagineerium*, an arts and engineering project. It argues that such an educational practice develops young people as learners in the broadest sense and in particular domains: as polymaths, scientifically minded artists and artistically minded artists. Theoretically, therefore, this research is innovative in the way that it positions art-making for contemporary education. Methodologically, it adapts and extends forms of enquiry used in action research. Here, mixed participatory methods are embedded as an intrinsic part of art-making. This approach sought first to investigate, from the inside, the educative value of *The Imagineerium* project, and to identify the theoretical frame which might best illuminate the processes at play within it.

As the previous section implies, there is a certain timeliness to this study. In an extended period of austerity the arts and creativity have again been positioned as peripheral to the core of education. In the light of this positioning, three points are worth making. Firstly, there is dissatisfaction with the narrow character of mainstream education in England (see for example Ball, 2017; Big Change / Innovation Unit, 2019; Reiss and White, 2013; Young 2013). The arguments for situated, local, enactive practices align with the analysis of *The Imagineerium* project in this thesis. Secondly, global competition and economic imperatives have focused government policy to prioritise learning in the STEM subjects (Science, Technology, Engineering and Mathematics). Sociological perspectives suggest that, for girls especially, but boys also, the affective dimension, which matters to young people, is less attended to in the sciences (Archer et al., 2014). Archer et al.'s research suggests that whether they are motivated to learn science or not, young people rarely view themselves as potential scientists. They suggest this is due to a lack of role models and because their educational and lived experience of science is devoid of social and affective contextualising, rendering such a conception as 'unimaginable' (Butler 1990). As will be seen, this thesis considers the significance of dimensions of learning facilitated by art-making, particularly the social, embodied and affective, in relation to the cognitive. Furthermore, the thesis explores how perceptions of oneself as a capable learner might be developed; particularly in subject areas such as the physical sciences where such associations are least common. Thirdly, the recent period has been one in which the value of culture and the arts has been under threat in education (Henley, 2012; Sorrell, Roberts and Henley, 2014) and under scrutiny more widely in society (Crossick and Kaszynska 2016; Neelands et al., 2015; Mowlah et al, 2014). In a period when curriculum time for discrete art forms is hard-won territory, and when learning in the arts might be more form and criteria focused, this thesis argues that there may be value in focusing upon the culture and site of art-making as an integrative context for a number of subject areas.

Finally, this thesis argues for a conception of the arts as critically important across education. I do not argue that this should happen by more attention to the arts as conceived currently in educational policy and school curricula, although this attention is certainly not to be discouraged. Rather, I argue for a conception of the arts, which

acknowledges a broader and more vital view of art-making as part of the entire educational process. The underpinning arguments are not new. Progressive educators have long advanced the importance of active 'doing' as educative. Dewey, often considered the 'founding father' of progressive education, argued that the process of making and crafting in art forms is a natural human way of being and thus a holistically educative process (Dewey, 1934). A similar argument is made by Ingold (2013; 2017) and Sennett (2008) for art-making as an activity in which one is connected with that which one is creating. It is a view which recognises that in some cultures art-making does not exist as a separate enterprise at all, rather that it is, at once, a way of being human and a way of making a living. The Balinese, for example, have no word for 'art' (Gray, 2016) because it is not something they make, but rather integral to who they are. It is not outside of them, but within. This thesis suggests that art-making, as a community of practice (Lave and Wenger, 1991), can be critically important for education.

1.5 The organisation of the thesis

So far, I have outlined the background to, character of and argument of the thesis. In Chapter Two, I map the areas of literature which constitute the underpinning theory for this argument and provide the basis for the design and analysis of the case study. Chapter Three explains the methodology of the research. Chapter Four analyses the design of *The Imagineerium* project. Chapter Five uses a selection of vignettes to analyse children's experience of *The Imagineerium* project. Chapters Six and Seven respond directly to the research questions, drawing from chapters four and five to discuss the findings in terms of the significance of art-making. They do so firstly, as a site and secondly, as a structure for education. Chapter Eight concludes the thesis with a summary of the argument and considers the implications and broader significance of this argument.

Chapter Two: Literature Review

Introduction

The central questions of the thesis are located at a nexus of different literatures spanning the arts, education and embodiment. The chapter is organised to journey thematically through these different literatures and consists of three sections: 2.1 Art-making; 2.2 Education as a Social practice; and 2.3 Bodies and Learning. Together, this chapter provides the theoretical background to the key pedagogical ideas the underpin the entire research. Education is, after all, concerned with developing people, and as Dewey suggests, all debates about education tend to be located in two oppositional positions about how it occurs. One suggests that education should be concerned with 'development from within', giving primacy to a child's 'natural endowments'. The alternative argues for education as a 'formation from without', where the purpose is 'forming habits of action in conformity with [prescribed] rules and standards', that is, those deemed important to society (Dewey, 1938:17).

Dewey recognises the limitations in both these two positions and argues instead for 'educative experiences' which draw from both (Dewey, 1938:29). He suggests that art-making constitutes such an experience (1934), one which values and enhances children's 'natural endowments', their innate and individual talents as sentient problem-solving humans, so that they are both individually and collectively developing 'from within'. As art-making happens in social and cultural contexts, such experiences also constitute influences 'from without', which Dewey (1934) suggests reflect the principle of 'democracy' (1916; 1938:35) enabling 'intelligent action' (Dewey 1929/1960). In such a way, children can evolve as generative, interpretative, intelligent actors in society, able to make constructive use of their 'natural' talents.

The Imagineerium project likewise seeks to facilitate children's 'development from within' in relation to learning about the world 'from without' through a situated

educative experience working as 'Imagineers'. Dewey's argument for educative experiences as the foundation of learning, and art-making as having particular potency as experience, has resonance for an educative model, like *The Imagineerium* project, which connects schooling with educative practices beyond school. Here democratic and creative principles of learning underpin the interweaving of instructional and expressive pedagogies and inform how children might learn to live in society.

2.1 Art-making

As noted earlier, the term 'art-making' used in this thesis reflects the character of the creative process in *The Imagineerium* project. Although 'art' can refer to the singular form of (typically visual) art, here the plural sense of 'arts' is intended. This use reflects a practice, perhaps more common in schools, of using 'making' (see National Curriculum Council, 1990:48) as a generic term for creative practice, where the given medium of the arts is already understood. Here, with the term art-making, I am simply making this understanding explicit. The term is expedient for this study to describe a creative process involving drawing, craft and performance. In the cultural sector, making vocabulary is often specific to the particular media. In a professional theatre this might reflect the particular role of a maker, such as a writer, actor, director, designer, etc. In other drama and theatre contexts, such as educational drama or the physical theatre and site-specific performance work that imagineers engage in, the activity of making might be termed 'devising'. This reflects a process whereby the performance text is co-constructed between the company and director, together, as an ensemble. 'Making' is used in the Design and Technology National Curriculum (Sefton-Green and Sinker, 2000:11), and has perhaps been more visible recently through the growth of the maker-movement (Halverson and Sheriden, 2014). Nonetheless both theatre and art practitioners recognise 'making' in 'the arts', and by association art-making, as an inclusive term which can signify across performative and 3D arts, educative and professional contexts. It is this inclusive use that is useful in this thesis.

The sense of art-making active in this thesis, discussed further in 2.1.3, reflects its complexity as a dynamic, embodied, intellectual and affective process (Dewey, 1934; Eisner, 2002a; Gardner, 1973; Greene, 1995; Ingold, 2013; Ross, 1989; Sennett, 2008; Williams, 1961). The entire thesis draws on conceptions of art-making from philosophical, anthropological, cultural and psychological perspectives and from theorists who all share an interest and belief in practicing the arts as inherently rich with educative value. I discuss in two shorter sub-sections, firstly the kind of art-making this thesis is focused upon (2.1.1.) and then the notion of a site of art-making (2.2.2), before turning to the final and substantive part of this section on art-making where I discuss what characterises and is valuable about art-making in educative terms (2.2.3).

2.1.1 The kind of art-making: community not elite arts

I have suggested that the term 'art-making' is useful in the thesis as an inclusive term. However there is a caveat. The context and purpose of any art-making characterises it in a way which is culturally specific, and which reflects its history. Not all contexts and purposes appear relevant to this study. Williams (1961) notes that elite arts, as distinct from the more popular crafts of the working classes, emerged alongside the popularising of the 'romantic artist' during the period of the Industrial Revolution. He argues that the new bourgeoise adopted and preferred the arts patronised by the aristocracy, such as painting, poetry, classical music and theatre, over the more collaborative practices of collective, maker crafts (a point mentioned earlier in 1.1, p.24). By comparison 'community arts' and their contemporary successor 'participatory arts' reflect the continuance of popular art-making practices (Matarasso, 2019). Matarasso (2019) characterises community/participatory arts as socially inclusive; disregarding professional training as a necessary prerequisite for involvement; locally relevant; as expressive of social, personal and political ideas, and thus valuing the voice and experiences of all in a society. Whilst they also work professionally with world famous artists, this is the tradition in which Imagineer Productions' practice is grounded. Community/participatory arts in contemporary times might be seen as located in the space that publicly funded professional artists were once allowed: able to critique the

governing classes and politics as part of in a healthy democratic society (see McGrath, 1990:33-4; Kester, 2011). They are recognised as giving

> people access to a means of self-expression, even of self-definition, that no other form of collective action offers … In a democratic context, cultural expression is a fundamental human right because it allows individuals and groups to define themselves and their beliefs, and not only be defined by others.
>
> (Matarasso, 2007:457 / 2015:11)

Community/participatory arts are enacted through structures and practices which make democratic and inclusive art-making possible, through ensembles rather than any hierarchical process, and through the collective rather than the individual. Community artists often work with the disadvantaged, disenfranchised and isolated in society. As a profession, community artists often have years of experience in what Meade and Shaw (2007:414) describe as 'entering attentively into the experience of others, excavating and exploring the causes of flaws and wounds in society, thinking critically about structures and relations of power and acting creatively and collectively to transform the world for the better.'

Perhaps an obvious, but not insignificant, aspect of such practice is the sharing of art-making in the community: projects culminate in public events, witnessed by local if not wider communities. Cunningham (2015) notes that a broad aesthetic, characterises participatory and place-based art initiatives, one which reflects the people and particularities of that place. In *The Imagineerium* project, that particular aesthetic positions children as art-makers, beyond (and also situated within) their school communities and as different equals alongside adult art-makers. This horizontal rather than hierarchical structure at the heart of such practices is a significant aspect of such practice for this thesis.

Participatory arts events, such as the cavalcade and public performances in which this project culminated, are at once special and, rooted in 'everyday creativity': activities which might be characterised as having 'originality' to and 'meaningfulness' for those

involved and which may 'pave the way' (Richards, 2011) to a normalising of creativity as a valued part of human ecology, contributing towards 'self-actualising' (see Maslow, 1987). Whilst the activity of art-making is central in this thesis, it is important here to recognise it as art-making predominantly in the history, tradition and purpose of community/participatory arts aligned to a broad account of creativity. These are the roots of Imagineer Production's practice and thus of *The Imagineerium* project.

2.1.2 Art-making as a site

The use of the term site in this thesis reflects both ideas suggested by 'site-specific performance' and activated by particular common usages of the term site. As a kind of space, both physical and metaphoric, it draws also on notions of spatiality, which are central to its use. Practitioners tend to resist definitions (Pearson, 2010:1), but nonetheless site-specific performances can be said to occur in geographic locations which are intentionally chosen to communicate the significance of that site in relation to the work created. Often in a 'town, building or monument' (Oxford dictionary n.d.), site specific performances attract audiences interested in both the work and the site. Such sites are pregnant with a cultural sense of being 'a place where a particular event or activity is occurring or has occurred' (ibid). Both community and professional artists design, make and develop events in adopted and adapted places which will be resonant for the audiences who experience the events. Such sites might already be rich in cultural significance, such as Coventry cathedral ruins, where Imagineer Productions and others have performed Mystery plays. Or they may become significant through performance. Similarly, the Polish company, Teatr Buiro Prodozy's 'Carmen Funebre', which enacts the massacre and destruction of cities in Eastern Europe, was performed first in the ruins of the burnt cathedral and secondly in a piece of wasteland in Coventry, a place where a building had been razed to the ground and nothing new yet built. Here the sites intensified the social and political commentary of the piece.

The character and locations of site-specific performances generate a different relationship with audiences to traditional theatre spaces. Often, as with 'Carmen

Funebre' and with Imaginer Production's work, they reflect notions of 'platea', from medieval theatre, denoting a ground level area, shared with the audience and thus 'rooted in the common experiences … of the people' (Weimann cited in Lin, 2006:284). Furthemore, a site, as the term is used here, may involve several performance areas combining platea with moments of the more formal, raised 'locus', or stage. Since medieval times locus has been associated with high status characters, traditionally physically and symbolically 'most distant from the audience' (Lin, 2006: 284). 'Platea' signalled a shapeshifting, liminal space, which could in a moment signify a different location in the play's narrative and where the imagined world of the play interacted and blurred with the everyday world of the people. The significance of such notions of platea, in informing those of site, are taken up in Chapter Four in discussing how Imagineer production's history shaped *The Imagineerium* project.

In this research project, the word 'Imagineerium' was used most often by imagineers to denote the physical building space where imagineers work, as a site where something 'is happening or will happen' (Cambridge dictionary). The building, the former Powerhouse for the Daimler car factory, was the hub of car production. As I write, it is undergoing development to become a 'Creation space' a hub of networking and activity for arts organisations and businesses in Coventry. Thus, 'site' reflects a physical space for meaning-making activity and connection between different others.

A second idea which picks up on the symbolic and relational qualities often afforded through site-specific arts events, is suggested also by the idea of site as an abbreviation 'for building site' (ibid) and echoed in spatiality theory. This is the idea of site as a space which is in the process of being constructed, is 'always being made' (Massey, 2005:221) as 'an open ongoing production' (Ibid:121). A site-specific event responds to, creates from and adapts the affordances and particularities of the site (Pearson, 2011). The material aesthetics of the site characterise and generate part of its appeal. Likewise, the physical space of the Imagineerium is one that is repeatedly re-configured. Space and material resources are always being re-appropriated and developed by the practices of, and the personalities and interrelationships of the people working there on different projects. This regular occurrence at the Imagineerium and in the adaptation of school

spaces during *The Imagineerium* project is living evidence of how space is 'an ongoing product of interconnections … [which] present us with a heterogeneity of practices and processes' (Massey, 2005:221). The use of spaces in the project is discussed further in Chapter Four and in Chapter Five, different spaces and their uses characterise the selection of vignettes from the project. Sites, like the Imagineerium, attract and act as a hub for people interested in the practices being developed there, much like a 'website' (Dictionary), a further definition of site.

McGregor argues that the physical and temporal components of spaces are not simply passive presences' that 'mediate between humans' but are 'active components of such relations' (McGregor, 2004:349), actively making meanings. She notes how the 'architecture … artefacts and technology in schools' reflect particular 'social relations', generating particular and subject specific cultures and sub-cultures, normalising particular conceptions of 'curricula and pedagogic practices, and the space-time organisation of the timetable' (ibid). Art-makers both enact and generate a different kind of spatiality from traditional schooling. They work in spaces where they can move, work at scale, access particular equipment and resources at particular times, collaborate and isolate themselves as the task demands (McGregor, 2004; Matarasso, 1997; Glaveanu, 2018; Ingold, 2013; Sennett, 2008). They collaborate with a variety of partners, depending on purpose and interest, and work to varied tempos and rhythms. Guided by personal and collective ideas and skills, as well as purpose, their work generates particular kinds of relationality between people, materials and spaces. Considering the physical spaces, places, temporal rhythms, solo and collaborative practices of art-makers offers a useful foil for reflecting on the space and pedagogy of schools. As suggested by Thomson et al. (2012), and echoed throughout this thesis, artists offer a pedagogic 'platform'. Art-making is thus revealed as agentic, a space for generative activity and for connections between different people.

In sum, the notion of art-making as a site of education that this thesis explores, draws on an analysis of *The Imagineerium* project as operating in similar ways. It echoes Lave and Wenger's (1991:94) characterisation of communities of practice as spaces where learning is inherent and occurs in ways that are more 'decentred' than McGregor (2004)

notes is typical in schooling. Collaboration places adults and children, and children and children in a more horizontal relationship, learning 'mostly in relation with [each] other' (Lave and Wenger, 1991:93). Site, as conceived in this thesis, acts as proxy for physical, cultural, social and metaphoric spaces that these varied definitions connote.

2.1.3 Art-making as an educative experience

Arguments for the arts reveal a strong belief in our cultures that both the desire to make in the symbolic forms of the arts and the valuing of products so made, is innate in humans. Children's finger paintings decorating the high walls and ceilings of caves dating back 13,000 years, argue for the impulse and desire to cultivate art-making as a culturally valued practice (Sorrell, Roberts and Henley, 2014). Dewey's (1938) desire to value a child's 'natural endowments' and so to recommend that educators attend to 'development from within', seems to echo this; the wider literature suggests that all educators, since Dewey, who value the arts accord with his view.

That said, just as the parents of the cave dwelling children modelled painting and drawing on cave walls, gathered the dyes and created the paint for their children's fingers and lifted them up for the express purpose of painting, so must educators model, resource and construct opportunities for educative experiences. Shaped by the needs and cultural preferences of that society, such actions constitute a 'formation from without'. In Dewey's eyes, such formation models imply democratic and intelligent action. For the cave dweller child, this might mean being enabled to experiment with and refine ways to represent the shapes and patterns they have experienced or imagined in their lives to date. As such, art-making as it is used in this study involves developing sensorial and affective perception, logical and critical judgement. The widely recognised interdependent character of such sensorial and affective processes (see for example Dewey, 1934; 1938; Eisner, 2002a; Gardner, 1973; Greene, 1995; Ingold, 2013; 2017; Lambert, 2018; Sennett, 2008) is at the heart of how art-making is conceived in *The Imagineerium* project and in this thesis.

Given how core the idea of the sensorial and affective nature of art-making is to this thesis, it is worth saying a little more about it. Gardner (1973), for example, suggests that human development relies on the interrelationship of three systems: making, perceiving and feeling, with feeling and making as the necessary stimuli for perceiving, that is to say, to realising and understanding something. He argues that experience of 'the arts qualitatively enhances human capacity to direct and control one's making activity' (ibid:158) because the arts are symbolic as well as practical. He suggests that 'a child's behaviour … comes increasingly to be permeated by a desire to express discriminations, feelings and beliefs through a symbolic medium' (ibid:31-7). The appeal and power of the arts, Gardner argues, resides in this symbolic character, namely in how they affect 'communication between individuals through the creation of nontranslatable sensuous objects' (ibid:36). Given his broader reference to the arts, as a plural form, Gardner's term 'objects' here is understood to include transitory experiences and events. It is the process of creating 'objects' in the media of the arts, Gardner seems to argue, that involves a 'combination of subjective and objective factors', and which 'transcend the distinction between affect and cognition, between feelings and thought' (ibid:36). These porous interrelationships emphasise the significance of art-making as a practice richly 'intelligent' in character, a point echoed also across empirical literature (see for example Fiske, 1999; Moon et al. 2013, Paris and Hay, 2019; Thomson et al. 2018; Winner, Goldstein and Vincent-Lancrin, 2013).

Gardner's work on multiple intelligences, whilst contested as intelligence per se (see Sternberg, 1983 for example), emphasises a commonly recognised view that people have different abilities. He argues that people form or make meaning in particular 'modalities' which reflect their different abilities, such as the 'musical-rhythmic', 'visual-spatial', 'verbal-linguistic', 'bodily-kinaesthetic', 'interpersonal', 'intrapersonal' (Gardner, 1973). These modalities are realised through practice, through a form of making. One cannot develop musical ability without making music, for example, and making necessarily involves feeling and thinking to generate perception. The particular material and aesthetic forms of the arts feed and inform such making. The material and aesthetic forms of art-making in this research involved human bodies, music, metal, wood, cardboard, fabrics, plastics, physical theatre, design and 3D forms. Whilst such tangible

media are clearly distinct from the ideas and feelings expressed through the process of forming and shaping, the very practice of making interweaves them.

In *The Imagineerium* project, we can see the different modalities come into play. For example, one group's idea had started from a child imagining Newton's apple dropping on his head and giving him an idea. The group adapted the idea to the tree sprouting inventions like an imagineer. Finding a length of concertinaed plastic vent hosing that boys enjoyed twisting, compressing and stretching prompted a different trunk design. This led to the idea of things popping from the trunk: birds, paper with ideas written on them, tools. Resources nearby included a costume design which used pages from a printed book. Within moments the leaves of the tree were to be ideas written on paper signified by pages from a book. Here, as Gardner argues, the intermingling of the 'making, perceiving and feeling' of, say, the look and feel of materials, talk, and other artists' work in progress, fed the collective intelligent action of the group of children. Material and form give rise to ideas in the minds of makers, just as makers imagine ideas and seek to realise them in particular media and form.

Ingold's (2013) anthropological frame likewise emphasises making in the crafts as an essential human behaviour, a simultaneously productive, imaginative and educative activity, developed in social contexts for particular purposes. It is this sense which has particular value in this thesis. Echoing Gardner's interrelated dimensions of 'making, perceiving and feeling', Ingold (2013:11) argues that '[i]t is … by watching, listening and feeling – by paying attention to what the world has to tell us – that we learn'. Acknowledging Dewey's (1934) influential argument for making art as an active educative experience involving 'development from within' (Dewey, 1938:17), Ingold (2013:1) argues that '[t]he only way one can really know things – that is, from the inside of one's being – is through a process of self-discovery'.

Like Dewey, Ingold sites his argument in the forms, materials and practices of the arts arguing that '[t]he craftsman …. thinks through making … The way of the craftsman is to allow knowledge to grow from the crucible of our practical and observational engagements with the beings and things around us' (ibid:6). Similarly, Sennett (2008)

affirms Ingold in many respects, noting the importance of the observational but particularly the significance of the physicality and generative nature of making because 'all skills, even the most abstract begin in bodily practices; technical understanding develops through the power of imagination' (Sennett, 2008:10).

This recognition of the educative benefit of 'making' was noted early on by Acland (1913), who argued that 'handwork', practical learning, 'can be so taught as to foster certain qualities of mind no less than of hand or eye'. He claimed that such making practices have a unique value in cultivating habits of mind which 'cannot be cultivated to the same extent, if at all, by the traditional school subjects. The spirit of initiative and resourcefulness evoked by dealing with concrete things is not confined in its effects to the particular work in question' (Acland, 1913:7). Interestingly the qualities of 'initiative' and 'resourcefulness', that he considers such crafting fosters, alongside 'resilience' are ones that contemporary educators and employers suggest are both needed and challenging to develop in schoolchildren (CLA, 2017; Kumar, Moss and Johnson, 2016; Yakman, 2010; Youth Employment UK n.d.). Acland (1913:7) argues for the importance of struggling with difficult tasks. Making 'gives the opportunity for each individual pupil to deal with and conquer an outside force or forces over which only he can gain the mastery' which he equates with self-management, suggesting that this constitutes a 'deliberate effort to gain mastery over himself' (ibid). This achievement is dependent on the 'definitely active attitude which he must take up' and there is no short cut or alternative, but that 'work of this kind has to be done by the pupil himself' (ibid). Echoing a Rancièrian spirit, Acland argues that the practice of making 'forces him to observe and to think, [because] if he makes a blunder it acts, so to speak, as an automatic schoolmaster, the pupil see[s] for himself that what he is doing is wrong' (ibid). He argues that 'such a training is obviously favourable to the growth of common sense, readiness and adaptability' (ibid). Simply put, Acland argued that working physically, or practically, in crafting attunes the child to attend closely to what s/he is doing, to creatively problem-solve, adapt and thus become resilient and resourceful in their thinking and practice.

Sennett later echoes, and in some respect extends, Acland's account. He argues that making is valuable and important both for the perceptions and knowledge it generates,

but also for the emotional reward and consequent positive self-view that emerges through the process and products of making. He argues that the aesthetic appeal of activity which resonates for the individual who has chosen the media and/or form for an idea, not only promotes mastery of skill, knowledge and insight related to that art-making practice, but also effects a positive and grounded sense of self-esteem. Echoing Acland, Sennett implies that an education in which art-making is central would enable children to develop skills 'anchored in tangible reality' and thus feel connected to society, purposeful and able to 'take pride in their work' (Sennett, 2008:21).

This point about the 'tak[ing] pride in their work' is also echoed in Sennett's analysis of how respect is generated in a society. He argues that crafts and arts makers, whose skills are witnessed in society, 'enjoy more prestige' (Sennett, 2004:54). Their skills, he argues, are worked at and developed uniquely by the individual, over time, as they experience and draw on what Dewey would call 'the rhythmic crises that punctuate the stream of living' (Dewey 1934:5). In this way, the patterns and materials of the social and natural environment constitute the everyday aesthetics by which makers are fed. In turn, as is also implied in this study, self-esteem can be said to develop as makers develop mastery in making, using the material resources and cultural aesthetics available to them and modelled by others in their environment. This mastery involves being able to make aesthetic judgments about their practice as well as developing bodily control to manipulate the available resources in particular ways (see Ryan and Deci, 2000; 2017).

This dynamic of art-making in general, following Sennett, generates agency for the learner, and such agency, Sennett argues, is at the heart of self-respect. Indeed, he suggests that the greatest disrespect of any society (and by implication any education system or school as a microcosm of society) is to direct and decide on behalf of others, so that individuals are effectively invisible, 'not counted as full human beings' (Sennett, 2004:x). By implication, any form of art-making has potential to provide an affirming community of practice (Lave and Wenger, 1991) in which individuals can develop skills, understanding and positive, emotionally significant relationships to materials, others and themselves. The positive change within the maker's practice and self-perception, that is implied in Sennett's account of art-making, is therefore constructed in the social context

of the maker's community.

Ingold (2013:134) brings in other but similar ideas to making as they are conceptualised in this research. He suggests that the practice of making generates a virtuous circle of 'living creatively in a world that is itself crescent, always in formation'. His account reflects the dynamic sense of the art-maker as a 'live creature' (Dewey, 1934), responsive, present, and immersed in the physical and metaphoric 'stretch toward', as Ingold (2017: 21) puts it, and the sensory, symbolic and aesthetic qualities promised by making. Ingold's choice of the term 'crescent', with its lunar association of the waxing moon, conjures up the dual temporal qualities of 'being and becoming' (Uprichard, 2008) in relation to the looking forward of 'not-yet-ness' that the process of making affords (Ingold, 2014:135). Ingold argues that education should be modelled in this way, with practices that attune and feed the human capacity 'for attention'. He defines attention as embracing 'caring' about, as well as the more commonplace attuning of the senses which is conveyed in the idea of 'being present'. This also heralds the forward-looking temporality, which he argues is inherent in learning, of a sense of 'longing' and desiring which underpins the intrinsic appetite for and delight in learning (Ingold, 2017:21). Managing the dual temporality of present and future, a characteristic of making, is noted by Uprichard (2008) as characteristic also of young people who, she argues, live the present with a sense of future. Young people might thereby, following Dewey and Ingold, be considered ideal art-makers.

A similar temporal elision is present in Dewey's (1934:47) account of art-making as a creative and intelligent act of making links and making sense of ongoing and varied sensory and cognitive information. He argues that to make a

> connection between what he [sic] has already done and what he [sic] is to do next… [the artist] has to see each particular connection of doing and undergoing in relation to the whole that he [sic] desires to produce. To apprehend such relations is to think' (ibid).

The more such thinking is practiced, the more these habits and skills of analysing, synthesizing and perceiving develop. As Eisner (2002b:6) argues, 'as we learn in and through the arts we become more qualitatively intelligent' improving our

> ability to compose qualitative relationships that satisfy some purpose. That is, what a composer composes are relationships among a virtually infinite number of possible sound patterns…. To succeed the artist needs to see, that is, to experience the qualitative relationships that emerge in his or her work and to make judgments about them. (ibid:5)

This account of composition, which emphasises art-making as a purposeful, 'generative and interpretative' activity (Ross, 1989:18), is a useful one for *The Imagineerium* project where children were designing to a brief and learning through the process. Eisner's reference to sensory modalities (Gardner, 1973) reminds us of Reid's (1980:8) advice that 'not everything knowable can be articulated in propositional form'. The idea is echoed also in a recent empirical study of young people's sense of the value of experiencing the arts in schools. Their claims of being 'experimental … try[ing] different ways of doing something until it works' as a felt and life-wide skill, and of developing a 'sense of agency and independence … self-belief and confidence' (Thomson et al., 2018:10-11) suggest that experiencing the arts is foundational to learning. Making in the arts requires flexibility in the moment, in relation to how the brief, the purpose of the practice, is realised. Eisner calls this 'flexible purposing' (Eisner 2002b:7) emphasising its value for learning, future careers and wider life. He argues that directive, organised processes in schools and society have reduced opportunities for young people to develop this capacity.

Art-making as a 'meaning-making' educative activity which can 'awaken…[and] disclose the ordinarily unseen, unheard, unexpected (Greene, 1995:28) is valued across schooling and society for raising personal, social and political awareness. Greene's notion of the arts stimulating a re-framing that provokes a 'wide-awakeness' is often cited in the community arts literature for generating a space 'where political and pedagogical roles and relations can be renegotiated and re-imagined' (Meade and Shaw, 2007:414) and is echoed in current participatory arts accounts (Matarasso, 2019). Lambert too emphasises the political importance of this aesthetic framing for educative re-negotiation and re-imagining. She argues, in Rancièrian terms, that 'situat[ing] pedagogic relations and experiences in aesthetic terms is to draw critical attention to the ways in which teaching and learning both support hegemonic modes of sense perception' which

can 'redistribute the sensible' (Lambert, 2012:224) of both art and social relations. The potential for art-making to re-structure and re-distribute is one I take up further in Chapter Seven.

2.1.4 Summary

I have argued that the practice of art-making generates a dynamic site for learning. Working in such sites require responsiveness and proactivity, fluidity and flexibility, collaboration and self- direction, research, exploration, practising of skills and honing of critical judgement. As an enactive practice, involving symbolic forms and the exploration of socially and personally relevant ideas, art-making demands and generates an integration of all of these dimensions and fosters positive learning dispositions. The art-making in focus in this study has developed through community and participatory arts where such practice is recognised for giving voice and agency to its makers. Such arguments recognise that art-making both deploys and generates the educational structures and cultures which can attune children to the sensory and affective understandings that facilitate and promote broad, rich and multidimensional notions of knowing and learning.

2.2 Education as a social practice

This section explores education as a democratic, generative social practice. I argue for social contexts as effective educative cultures for learning (2.3.1) and for the community as 'teacher' (2.3.2). From there I focus on Lave and Wenger's situated learning model and the inherently educative nature of a community of practice (2.3.3) concluding with a focus on how such communities enable 'legitimate peripheral participation' (2.3.4).

If art-making has educative significance different from that of everyday schooling, it may be helpful to look outside of such formal schooling and towards alternative and informal

contexts. The appetite for alternatives to the dominant model of schooling has history. Ranciére (1991) for example provokes us to consider the effect of a 'low status' teacher model: here the teacher engages with students as equals in intelligence rather than being the expert reference point. Steiner (1968; 1983) argues for a holistic approach to education: where the body and spirit are of equal value in learning and are trained and attended to equally. O'Neill's Prestolee school (Burke 2004; Holmes, 1952) proposes that real-world projects form the context for situated learning. Such models of education are characterised by a less directed relationship between teacher and pupil than is typical in formal schooling. There is also often a different configuration of curriculum, perhaps with 'weak' (Bernstein, 1975/2003) subject borders, and choice by or negotiation with the learner. Often there is a more fluid appropriation of time and space, in response to children's interests and rhythms. A number of school innovations are characterised by closer relationships with localities, with professional and community partners (see for example Royal Society for the Arts n.d.). The recent increase in home schooling, up by 65% 2009-2015 and a further 40% 2015-2018, likewise suggests concern with how well formal schooling supports all children to flourish through education[5]. Each of these ideas connect with the ambitions of *The Imagineerium* project and are echoed in the work of the key theorists on which I draw in this chapter. I turn firstly to Dewey's and Vygotsky's views of the conditions and contexts which facilitate human flourishing and learning. I then consider Lave and Wenger's anthropologically grounded and social constructivist model of situated learning; where legitimate peripheral participation in a community of practice characterises apprenticeship learning in ways which appear to have particular resonance for *The Imagineerium* project.

2.2.1 Dewey on communities as educative cultures

Dewey (1987; 1916; 1938), like Vygotsky (1978), argued that a child's daily lived experience and context should form the basis for a socially situated, personal relationship to learning. If the formation of humans is a communal process, in Dewey's (1987:7) view,

[5] https://www.bbc.co.uk/news/education-35133119; https://www.bbc.co.uk/news/uk-england-42624220

it followed that school ought to be a 'form of community life in which all those agencies are concentrated that will be most effective in bringing the child to share in the inherited resources of the race, and to use his own powers for social ends.' The terms 'democratic' (1916) and 'creative' (1939; Hallman, 1964) characterise Dewey's argument for learning by experience. He argued for creative democracy as 'a way of life controlled by a working faith in the possibilities ...[and] potentialities of human nature … as exhibited in every human being irrespective of race, color, sex, birth and family, of material or cultural wealth.' (Dewey, 1939:2). Herein a child's lived experience and interests could be 'a freer and more humane experience in which all share and to which all contribute' (ibid:3), thus necessitating their active involvement and inquisitiveness to shape both the process of learning and the knowledge that emerges. The call to give freedom to, and respect the individual, because humans are rich with potential to assimilate and 'anyone can learn' (hooks, 1994:13), underpins many critiques of education. Respect and freedom are argued as necessary to avert the humiliating effect of 'the banking method' (Freire, 1970) the diminishing effect of 'transmission model' (Apple and Wexler, 1978; Bernstein 1975 /2003). Ingold pursues this in the following;

> It is simply impossible Dewey insists, for the beliefs and attitudes that a social group cultivates in its immature members to be "hammered in" or "plastered on"; they cannot be "physically extracted and inserted", and they cannot spread by "direct contagion" or "literal inculcation". You might be able to do such things with material entities like nails, teeth and germs, but not with ideas whose very formation depends on experience. (Ingold, 2017:9)

This contention that for attitudes valued and desired by a society to be learnt they must be formed through experience is at the heart of the design of *The Imagineerium* project discussed in chapter four. The project is physically and culturally sited in Coventry, its histories, mythologies and future aspirations, and thus Dewey's view that locality and context should form the basis of a socially situated, personal relationship to learning is helpful in framing the analysis of the project's 'authentic' (see Newland, Marks and Gamoran, 1995; Lombardi, 2007; Drake, 2007; Christmas, 2014) commission.

2.2.2 The attuned community and / as teacher

Less than ten years ago, English educational policy resonated with of Dewey's advice for learning as life-wide, situated beyond, as well as in, the school. The Excellence and Enjoyment Report (DfES, 2003) invited educators to 'think creatively about how [to] use the skills of everyone in the school… parents and the whole community'. The words imply something of Dewey's democratic belief in human creativity (Dewey, 1939). Charles Clarke, as education secretary, appeared to promote diverse and locally framed approaches in his recommendation that:

> [d]ifferent schools go about this in different ways …[because] different sparks make learning vivid and real for different children [so that] children experience ... the joy of discovery, solving problems, being creative in writing, art, music, developing their self-confidence as learners and maturing socially and emotionally' (DfES, 2003:3).

Clarke's reference to 'the joy of discovery' and to recognising and fostering individuality and individual strengths in children, harks back to the 1960s. The Plowden Report into primary education (1967: np) stated that '[o]ne of the main educational tasks of the primary school is to build on and strengthen children's intrinsic interest in learning and lead them to learn for themselves '. Plowden's account, reflecting the influential work of Piaget (see Halsey and Sylva, 1987) and also that of Dewey, argues that learning is ubiquitous, consequently schools should foster a porous relationship with parents and the community; and children should learn, through discovery, about the world around them. The form and culture of the arts were seen as natural aids to such experimentation and expression.

Piaget's ideas about a child 'learning through their own active efforts' (ibid: 9) may have implied an 'insignificant role' for the teacher in developing children's learning (Bryant, 1984 cited in Halsey and Sylva 1987:9). Dewey, however, envisaged a crucial role for the teacher in setting the environment and conditions for quality experiences in learning, particularly in attuning to and recognising when supportive or challenging interventions were needed (Ryan, 1999). Dewey argued that there are 'two principles which are fundamental in the constitution of experience: the principles of continuity and

interaction' (Dewey, 1938:55). The term 'continuity' emphasises how 'every experience is a moving force' (ibid:38) meaning that how a child responds to a new experience is shaped by the interaction between past experiences and the present situation. It follows therefore that no experience has 'preordained value': that what might resonate for and thus stimulate one child, might not resonate, in fact may even be detrimental, for another. Indeed, it suggests that a range and wealth of pedagogies and experiences are needed to stimulate education for all children and to avoid the danger of non-educative experiences or mis-educative ones which, wittingly or unwittingly, are capable of 'arresting or distorting the growth of further experience' (ibid:25). The teacher's role is to attune and become sensitive to how children respond, and to adapt and develop experiences accordingly, so that they are experiences which 'arouse curiosity, strengthen initiative and set up desires and purposes that are sufficiently intense to carry a person over dead places' (ibid:38). This argument is central to Ingold's (2017) interpretation of Dewey and his recommendation that educators attend to children to see what does arouse curiosity and stimulate 'attention'. Ingold advises that educators use the insight they gain to foster the conditions and create experiences that will cause children to feel like they want to 'reach out', almost as if they are physically straining in that 'stretch toward' (Ingold 2017:20) learning.

2.2.3 Social contexts as inherently and authentically educative

Dewey and Ingold take us some way towards how such educative experiences might be designed, but their focus is not at core pedagogic. Whilst Lave and Wenger (1991) similarly profess that their argument for 'situated learning' is not empirically tested in pedagogic terms, they do note implications for schooling. They offer theory derived from a series of case studies designed to answer their question 'what kinds of social engagements provide the proper context for learning to take place' (Hanks, cited in Lave and Wenger, 1991:14). Their account of situated learning requires a more integrated approach to curriculum and 'authentic' learning in relation to the real world, both ambitions of *The Imagineerium* project. However, reversing the framing common to current UK apprenticeship schemes where learning is positioned and directed within a

work-based situation, Lave and Wenger argue that social practice is the primary, generative phenomenon and learning is one of its characteristics. 'Learning is not merely situated in practice – as if it were some independently reifiable process that just happened to be located somewhere; learning is an integral part of a generative social practice in the lived-in world' (Lave and Wenger 1991:34).

Their conception of 'situated learning' centres on the theory of 'legitimate peripheral participation', which recognises that people 'inevitably participate in communities of practice' in many aspects of their lives, for example, through interests, localities, their cultural history, friendship groups at school. 'Newcomers' to the community develop an understanding of how to behave and operate in such groups, they learn the unspoken rules of the community and thereby gain 'the mastery of knowledge and skill [and] to move toward full participation in the sociocultural practices of a community' (ibid:29). The significance for education lies in the desire to participate. 'A person's intentions to learn are engaged and the meaning of learning is configured through the process of becoming a full participant in a sociocultural practice. The social process includes, indeed it subsumes, the learning of knowledgeable skills' (ibid:29). They argue that this phenomenon is at the heart of the human characteristic of learning through experience. 'Learning through legitimate peripheral participation takes place no matter which educational forms provides a context for learning, or whether there is an intentional educational form at all' (ibid:39).

The process of becoming a 'full participant' is made clearer in their expounding of the notion of 'peripherality'. They note 'that there are multiple, varied more or less engaged and inclusive ways' of locating oneself as part of a community, and that such '[c]hanging locations and perspectives are part of an actor's learning trajectories, developing identities, and forms of membership'. Peripherality then is 'a positive term' signalling a dynamic journey whereby members develop new understandings as they get involved in different ways. It is not a 'value-based judgement' and no 'linear notion of skill acquisition' exists (ibid:36). Their work, like that of Ingold (2017), is founded upon anthropological studies of how mastery in non-western cultures is gained by apprenticing in a craft. Their studies suggested that learning processes in such contexts were both

‘effective and benign’, two characteristics strikingly different from some of the critiques of formal education noted above. Their theory of legitimate peripheral participation is thus an analysis of ‘how apprentices might engage in a common structured pattern of learning experiences without being taught, examined or reduced to mechanical copiers.’ (Lave and Wenger, 1991:30).

Whilst Lave and Wenger are clear that their theory of legitimate peripheral participation, which underpins their account of situated learning, is not an argument for an educational form or pedagogy to be applied in schooling, they are often drawn to reflecting on what it might offer to pedagogy and schooling. They critique the ‘pedagogical structuring’ typical of formal schooling, suggesting that it would benefit from reflecting ‘the structure of the social world’ in order to realise the learning inherent in ‘social practice’ (ibid:49). Lave and Wenger foreground the significance of the holistic, social, lived context where people bring their knowledge of experiences together. They form new knowledge through practice continually shaping how and what is learnt, both intentionally and unintentionally. This provides a useful frame for examining how children adopted and understood the expected ways of being and behaving in *The Imagineerium* project.

2.2.4 Being and becoming, relationally, through social context

Reflecting a social constructivist perspective, Lave and Wenger critique the conceptualisation, endemic in most schooling systems, of the individual as the ‘nonproblematic unit of analysis’ (ibid:47); and learning ‘as a matter of transmission and assimilation’ and ‘largely cerebral’ (ibid:4). This focus upon the individual who internalises learning, they argue, ignores the learner as a whole person, situated in the world and developing learning through and with their others. The dichotomies and hierarchies generated by this intensification of individualism, ‘between inside and outside’, between thought, feeling and action, have long been critiqued (Freire, 1970; hooks, 1994). The ‘neoliberal’ policies of the Blair Labour government (Ball, 2017) affirms the continuance of such concerns in the contemporary period. Whilst Lave and Wenger (1991:49-50) are also concerned with learning and the individual, they frame ‘learning as

‘the whole person acting in the world … [which] focuses attention on ways in which it is an evolving, continuously renewed set of relations’. The importance of this relational focus for this thesis lies in the significance it gives to a child’s sense that their full identity matters, which appears to be significant for the children involved in *The Imagineerium* project.

Lave and Wenger emphasise how, in a community of practice, learning happens through social action and interaction, along a horizontal plane which can decentre the traditional teacher/pupil dyads, diffusing and directing learners’ foci toward peers. Whilst this cannot remove unequal power relations this ‘decentring’ (ibid:93) can help reduce disabling beliefs about the self and emphasise to participants that they are part of a ‘richly diverse field of essential actors’ (ibid:56). These ‘relationships of participation’ can feed a ‘broader conception of individual and collective biographies than the single segment encompassed in studies of “learners”’ (ibid). This broader conception emphasises that people are ‘always …. more or less competent at doing certain things throughout our lives’ as ‘a conceptually more realistic representation of both children and adults’ where we are all in the process of ‘ ”being” and “becoming” ’ (Uprichard, 2008:307). If freely entered into, being part of a community, such as that of the imagineers, is then a choice to belong, to be identified with and defined through the practices and behaviours of that community. As Lave and Wenger put it:

> Learning thus implies becoming a different person with respect to the possibilities enabled by these systems of relations. To ignore this aspect of learning is to overlook the fact that learning involves the construction of identities..... identity, knowing and social membership entail one another. (Lave and Wenger 1991:53)

In a community of practice, where learning is relationally constructed, Lave and Wenger continue, ‘there is very little observable teaching; the more basic phenomenon is learning.’ (ibid:92-3). Whilst current apprenticeship education development in the UK may not wholly concur (DfBIS, 2015), Lave and Wenger suggest that the practice of the community ‘creates the “curriculum” in the broadest sense’ (Lave and Wenger, 1991: 92-3). Structure is given by the shared tasks that participants engage in within the practice. Thus, in such a context, knowledge is not passed from teacher to pupil / master to

apprentice but rather 'the circulation of knowledge among peers and near-peers … spreads exceedingly rapidly and effectively' (ibid:93). Knowledge here is seen as more than 'mental processes and … the acquisition of knowledge' (ibid:50) but as whole bodied, live and interactive. They argue for the dialogic character of learning, that conceptual understanding emerges out of the specific context, which 'is why stories can be so powerful in conveying ideas, often more so than the articulation of the idea itself' (ibid.33). Likewise, they note the significance of talk situated inside an experience generating the 'difference between talking about practice from outside and talking within it' (ibid:107). They explain further that 'talking within [practice] itself includes both talking within (e.g. exchanging information necessary to the progress of ongoing activities) and talking about (e.g. stories, community lore).' The crucial point they make is that talk is not 'a substitute' for participating and practising but 'a key' to it (ibid:109).

This structure and related phenomenon, which Lave and Wenger suggest, is generated by situated learning in a community of practice, is of particular relevance to the design and analysis of *The Imagineerium* project, namely that 'engaging in practice, rather than being its object, may well be a condition for the effectiveness of learning' (Lave and Wenger, 1991:93). Participation, such as becoming an imagineer, is conceived 'as a way of learning - both absorbing and being absorbed in – the "culture of practice" ' (ibid:95). This may be particularly significant for children, who Lave and Wenger describe as naturally 'legitimately peripheral but kept from participation in the social world more generally' (ibid:104) and that fundamental 'problems of schooling' might be more related to access than pedagogy. Implicitly then the transformative possibility of schooling, relies upon

> the ways in which the community of adults reproduces itself, with the places that newcomers can or cannot find in such communities and the relationships that can or cannot be established between these newcomers and the cultural and political life of the community. (Lave and Wenger 1991:100)

2.3.5 Summary

In this section, I have outlined key aspects of Lave and Wenger's (1991) notion of community of practice, which runs throughout this research also. They provide a key and strong account of an educative social context, where learning happens naturally through immersion in the situation of a practising community as a legitimate peripheral participant. In this context, members of the community are at once learners and teachers with, and for, each other. The model enacts the democratic and creative ideas of Dewey, and others whose ideas form part of the literature landscape for the thesis, such as Rancière, Ingold and Eisner. Common across many different scholars' accounts, and is also core to this research, is an argument for the enactive, interactive and sensorial character of learning. Attention to the affective, embodied and cognitive dimensions are required and engaged with for learning (Ingold, 2017). To that end, in the next section I consider the role of bodies in learning, particularly focusing upon the integrative, social and affective qualities suggested by research to date which have particular resonance for *The Imagineerium* project.

2.3 The 'embodied' nature of learning

At the heart if this study is the idea of learning as a complex integrated process wherein physical action and sensation interact with thinking and emotion (Dewey 1934; Eisner, 2002a; Ignatow, 2007; Ingold 2013; Lave and Wenger, 1991; Sennett, 2008; Wilson, 2002). In this section, I locate and develop this aspect drawing upon literature from philosophy, psychology, cognitive science and sociology. In particular, I focus on the ways in which our bodily actions are intertwined with our cognition, the role of imitation by observation in learning from others, and the role of body states, most significantly emotions, in these processes. I begin with an explanation of my use here of the term 'embodied learning' to capture these aspects of human experience.

There are a number of terms used to reflect the 'bodily turn' (Ignatow, 2007:116), some are specific to particular disciplines, but the differences also emerge from the difficulties involved in communicating the character of interrelationships associated with the body-mind-emotion dynamic. This is evident in constructs like 'brain-body-world entanglements' (Blackman, 2012), 'embodied brains' in relation to 'social emotion' (Immordio Yang, 2016), or the slightly enigmatic 'embodied affectivity' (Fuchs and Koch, 2014). Whilst 'embodied cognition' (Lakoff, 2012; Wilson, 2002) is popular (typically used to signify how bodies function in sensorimotor and neurological terms, in relation to social cognition, intuition and affect) it is problematic because what it refers to is 'not just cognition' (Anderson, Richardson and Chemero, 2012:727). There is a 'complexity of intimacy of interaction' (Dewey, 1929 /1958:261) between the biological and social stimuli, which render distinction difficult, not least because they 'use the same neural real estate' in developing 'perception, action, judgment, language, and motor control' (Anderson Richardson and Chemero, 2012:727). In order to reflect this latter understanding I use the term 'embodied learning', which is common in the fields of education, arts (Bresler, 2004; Stolz, 2015) and psychology (Kontra, Goldin-Meadow and Beilock, 2012). This deliberately underscores my focus upon the active, sensing and integrating dynamic of bodies in the experiences of people engaged in physical, emotive and educative activities.

2.3.1 Learning bodies[6]

The notion of interaction between our bodies and minds as the source of learning is supported by a critical mass of scientific research (see for example Claxton, Lucas and Webster, 2010; Greeno, 1999; Rambusch and Ziemke, 2005; Wilson, 2002). Wilson's (2008:375) evolutionary account suggests that human cognition 'grew out of previously existing sensorimotor abilities' which 'built upon, and still reflects, the structure of our

[6] I use the term 'bodies' in recognition of the critique of 'the body' as one 'denoting a singular, universal or normalised conception of embodiment' (Mascia-Lees, cited in Lambert, 2018).

physical bodies and how our brains evolved to manage those bodies.' The unparalleled size and character of the evolved human brain and our unique 'capacities for language, long-term plans, manipulation of abstract concepts and accretion of knowledge and skills across generations' which have 'no competitors in other animals' (ibid) relies, she argues, on the stimulus transmitted by bodies in context. This explains, she argues, both the growth of the human brain over the centuries and our ongoing capacity to develop, imagine and invent which is fundamentally grounded in '… the use of perceptual, motor and spatial representations of the body and the physical world' (Wilson, 2010:184). The 'neural plasticity' of the brain means that the 'cognitive tools' of the body can in effect 're-engineer the system' (ibid:181) in response to contextual stimuli (Immordio Yang, 2016; Gallese, Eagle and Migone, 2007). The argument has particular significance for the design of *The Imagineerium* project where children work in physical theatre, drawing and 3D making to invent their designs.

A range of studies of gesturing and physicalising, in language, mathematics and science contexts from early years to university level indicate 'that doing a relevant action leads to enhanced learning over passively viewing that action' (Kontra, Goldin-Meadow and Beilock, 2012:736). Studies of the physical gesturing of adults and children, including those involving blind from birth participants (Iverson and Goldin-Meadow, 1998) and children experiencing the struggle of learning and understanding something (Alibali and Goldin-Meadow, 1993; Alibali and Nathan, 2012), suggests that gesturing is common 'even when [it has] no obvious function' (de Nooijer et al., 2013:173). It appears 'to grease the wheels of the thought process that the speaker is trying to express' (Wilson, 2002:629). Whilst there is limited research evidence on the topic, the act of doodling may have a similar value to this kind of gesturing (Andrade, 2010). The role of mirror neurons in observing, copying, thinking and feeling is contested, (Rizzolatti and Craighero 2005, Heyes 2010, Churchland, 2011) but there is no doubt that mirror neuron behaviour is responsible for the cognitive stimulation of thought and understanding by physical imitative action. This was also evident in Kontra et al's (2015:748) testing of their students' ability to reason and explain their understanding of the scientific concepts of torque and angular momentum. They argued that 'students who felt the consequences

of the vector nature of angular momentum outperformed students who observed the same phenomena'. The authors concluded that:

> When physical experience is closely tied to the to-be-learned content, subsequent activation of sensory and motor systems can effectively support students' reasoning [and] may be most influential in the initial stages of learning when students are resolving misconceptions and in areas of science in which kinetics come into play e.g. physics, engineering and chemistry. (ibid)

Whilst these students were older than those involved in *The Imagineerium* project, the same phenomenon was noted in a study of early years children learning about planets through physical activity (Mavilidi et al., 2017).

Wilson argues that evidence of this physically rooted nature of our cognitive processes can be seen in habits of physical organisation and representation of our thinking. She cites habits of laying out the parts of a piece of flat-packed furniture to help us think through the process of assembly, or of creating a scaled aerial diagram of where things might go in a room, or, as in *The Imagineerium* project, where children and imagineers sketch or create a technical drawing of a design idea or map out areas to help us picture geographic relationships. Wilson argues that this capability reflects the role of the body in imaginative, symbolic, abstracted or representational accounts, where 'the purpose of the activity is no longer directly linked to the situation' (Wilson, 2002: 629) such as when relationships between ideas are shown visually in a Venn diagram.

Similarly, Lakoff (2012:776) argues that 'the same neural circuitry used to run our bodies physically also structures our reasoning processes about all events and actions, not just physical ones, but abstract actions and events as well'. The notion that the body underpins abstracted thinking is echoed by Wilson's (2008: 377) argument that 'fairness, reciprocity, morality, and justice' also have 'biological bases'. She argues that our evolutionary story is one of 'escape from situation bound cognition to a more flexible, abstract and "general purpose" form of cognition" ' (Wilson, 2008:376), where we see analogies and imagine. Human cognition relies simultaneously then on the biological stimulation of the body-mind in action, yet its uniqueness lies in the ability to decouple from the present environment. Thus, following Wilson, it engages in and represents

situations and ideas that may be from the past, may be anticipated in the future, be physically distant, imagined, generalised beyond the particular present instance or even abstracted from it. The significant and 'striking feature' that such research points to is 'the way in which we expand the domain of what is "embodyable" by creative use of body resources, decoupled from immediate action on the environment' (ibid:381).

The capacity for thinking, and particularly for imagining and inventing, may indeed rely in what such researchers label 'off-line' action, namely where the body is not actively doing, but is drawing on experience of prior ('on-line') activity and the knowledge of what the body does and feels when active and doing. This capacity is evident in our capability to invent, such as to design, to choreograph movement, coach a sport or compose music, which commonly relies upon a level of mastery in that particular domain – knowing how particular shapes, lines, sounds, might look, feel or affect (Gardner 1973, Csikszentmihalyi, 2014; Sennett, 2008). But having mastered such skills, we are not limited to reproducing the same ones, we can re-imagine how such elements might connect, construct new meanings through shaping, layering and juxtaposing, exploring contradictions, flow and effect (Csikszentmihalyi, 1997; Roese and Olson, 1995; Sawyer, 2013).

2.3.2 The affective body: Perception and feeling

The section above could be understood as concerned with how bodies shape and structure cognition. Whilst context featured within this dynamic, this next section examines this more focally. Merleau-Ponty suggests that our bodies constitute 'the seat' and 'fabric' (Merleau-Ponty, 1958/2005:175) of interactive communication not just with our brains, but also with our worlds, as 'a nexus of living meanings' and thus are 'the general instrument of … "comprehension" '(p.273), of synchronisation, of perception. Ribeiro (2014:560) argues that whether biologically, culturally or locally /individually stimulated, Merlau-Ponty believes that the motor activity of the body is where 'the birth of sense' occurs as a person 'starts to explore and cope with the world'. We synchronise physical and worldly sensations generating a 'living significance' (Merleau-Ponty,

1958/2005:243) for us as individuals. This is 'the process by which perception becomes personalized'. (Ribeiro, 2014: 560). The significance for this thesis lies in the personalised emphasis Ribeiro gives of Merleau-Ponty's account of perception as simultaneously drawing from three inseparable elements: '(a) the embodied experience of individuals, (b) the physical features of the perceptual scene, and (c) the context' (Ribeiro, 2014:570). As Dewey's emphasis on the continuity of experience emphasises (Dewey, 1938), an individual's prior experiences will ensure that the sense they make of new experiences will be unique. These differences result in each individual attuning to the features of an experience which resonate, or which seem personally relevant to them. Thus, as Dewey (1938) and Gardner (1973) have also suggested, two people can simultaneously experience the same sense data of the same thing, at the same time, in the same space and yet perceive it differently.

Research also suggests a dual biological and social connection between the activation of 'mirror neurons', stimulated by observing human behaviour and empathetic engagement with the observed (Rizzolatti and Craighero 2005; Heyes 2010). The mirror neuronal system activates copying as one person observes another's behaviour and thereby signals an attunement to the observed. Children talking in groups in *The Imagineerium* project could, at times, be seen echoing each other's postures during conversation and thereby unconsciously communicating empathy to the fellow team member explaining an idea. Such 'mirroring' is not exact copying, rather 'congruent and attuned responses, including complementary or modulating responses…[which]…. enable empathic understanding.' (Gallese, Eagle and Migone, 2007: 151). The significance of practicing this imitative behaviour has been noted beyond the cognitive sciences. Ensemble work, in a theatre or drama group, which likewise needs practicing to refine the attunement of each to the whole, has been argued to feed and reflect the human need for collaboration and a sense of belonging (Boyd 2004; Trowsdale and Hayhow, 2015). This suggests that, as social beings, both as adults and as children, we

> relate mimetically to the surrounding world…[and i]n this process of making [our]selves similar or alike to this world … extend [our]selves into it, accord it a place in [our] own internal imaginary worlds, and educate [our]selves in the process' (Wulf, 2008:65).

Indeed, Wulf's account of mimesis as a physical, unconscious 'behaving like' where 'learning takes place by interpreting' (ibid: 64) actions and symbols, resonates with Lave and Wenger's account of learning as inherent in a community of practice. As Wulf expounds 'dealing with the outside world and forming the self are both part of the same system' (Wulf, 2011: 95). In his view, learning is 'a process by which the act of relating to other persons and worlds in a mimetic way leads to an enhancement of one's own world view, action and behaviour' (2008: 56). This is particularly significant for explaining children's apparent stronger sense of self through echoing Imagineer-like behaviours during *The Imagineerium* project.

As Iacoboni suggests 'mimicking others is not just a means of communicating non-verbally; it helps us to perceive each other's expressions (and therefore their emotions)' (2008:111). Such empathy is at the root of caring, understanding and a sense of belonging because

> sharing of experience ... is at the root of our ability to act as individuals but also as members of a society… Moreover, our capacity to appreciate the emotional reactions of others is correlated to a particular group of areas that are characterised by mirror properties. Emotions like actions are immediately shared. (Rizzolatti, Sinigaglia, and Anderson, 2007:xvi)

Tomkins' affect theory (1962/2008) argues that mimetic behaviour, that is bodily action, both fires and is fired by emotional experiences. Mimesis stimulates feelings which are contagiously irresistible. We smile involuntarily when we feel happy (Gregg and Seigworth, 2010: 191) and when we 'adopt emotion specific postures, [we] report experiencing the associated emotions' (Niedenthal, 2007:1002). So, frowning elicits negative feelings and smiling positive ones. Further, Niedenthal advances a 'causal relationship' not just 'between embodying emotions [and] feeling emotional states' but also with 'acquiring and using information about emotion' (ibid:1002-3). This information gathering allows memories to be stored, re-enacted in the body, often in subtly nuanced ways, and thus re-experienced. This process of 'bodily feedback' also enables the perception of emotional meaning and consequence. Fuchs and Koch (2014) remind us that resonances in the body, whether stimulated by movement, postures or sensation, are also in dialogue with the affordances of the environment. Touch and eye contact are

widely recognised as significant in building trust, making others feel safe (Montague et al., 2013; Herbert and Pollatos, 2012) and ultimately for a positive self-view (Herbert and Pollatos, 2012:695). This may account for the affective character of the arts as symbolic and physical forms which affect or 'touch' us, generating a sense of emotional intimacy or empathy with an 'other' (Perry and Medina 2011:63; Chappell et al., 2012).

We see these ideas reflected in a range of historically significant educational philosophies. Steiner, Dewey and Montessori reflect a belief in children's innate creativity and have advocated art-making as a physical and expressive training, which is foundational and integrative for education. Steiner's 'eurythmy' sought to harmonise the child with the beauty of the natural and spiritual world. Both Steiner and Dewey reflected a belief in children's innate creativity advocating the alignment of education to the rhythms of nature (Steiner 1923/2002; Dewey, 1929/1958). Montessori (1966) advocated for young children to 'experiment and experience' as a foundation for learning. 'Engaging children in whole-body activities is said to promote the full development of proprioceptive, balance-related, and gross and fine motor skills—upon which later learning and academic success will depend' (Sobo, 2013:28). More recently, Claxton, Lucas and Webster (2010:iii) take up these themes, arguing that the tendency of curricula and pedagogies to progressively reduce the amount of enactive physicality limits rather than develops learning; 'recent research argues that what is obviously appropriate for a 4 year-old may have much greater relevance for a 17 year-old …than was previously thought.' They echo Steiner's (1923/2004:57) critique of dominant models of education where the physical character of school spaces, knowledge-based curricula, transmissive pedagogies and the default teacher-pupil dynamic all position the body peripherally 'as an "extra"', almost as an inconvenience to be stilled.

2.3.3. Summary

In this section, I have drawn upon a range of research to argue for the significance of attending to our sensate bodies and physical action in developing education. Ignatow suggests that rather than considering children as thinkers, schools might instead both

enable a more physically enacted curriculum and see children holistically as 'emotional, intuitive human beings for whom reflective thought may channel intuitions' (Ignatow 2007, 127). Physical actions have been argued, to not just stimulate, but interact in complex ways with emotions, intuition and thinking. Physicality, then, is indeed 'an amplifier of learning' under recognised in current mainstream education (Claxton, Lucas and Webster, 2010, 5). Rambusch and Zeimke (2005) suggest that models of situated learning (Lave and Wenger, 1991), where physicality underpins practice, provide the basis for learning as a recognised social practice in a community.

Chapter 3 - Methodology

Introduction

Having set out the theoretical landscape of this thesis in Chapter Two, I turn here to expound the design of my research into *The Imagineerium* project as an educative art-making site. In the first section I discuss the theoretical foundations which characterise this research design before detailing the methods, sampling and ethical elements of its implementation.

In the introductory chapter to this thesis, I clarified that this research began as an investigation into a pilot project which, at that moment in time, was emergent, still 'in the making' (Greene, 1995). The research design sought to investigate what might be educatively valuable about this art-making project for the children involved, from the perspectives of all participants: the children themselves, their teachers and the adult imagineers (artists and engineers). The enquiry was thus, self-evidently, exploratory in character, and the research the design needed to reflect this. But this was not an unbounded enquiry. Both the project and the research enquiry emerged from, and were therefore framed by, the art-making of the project and the particular practices, traditions, histories, beliefs and values of the imagineers, as well as my own as researcher. The research design was conceived to engage participants' interests and insights. It developed alongside and, in part, was enacted within the project activity. This approach ensured that such beliefs and values were active in shaping how the study was conceived and constructed.

The presence of Dewey, Ingold and Lave and Wenger, key theorists identified in the previous chapter, suggest that this study is situated and designed within a broadly social constructivist paradigm. Here the emphasis is upon knowledge as 'socially and culturally constructed … [where i]ndividuals create their own subjective meanings of their experiences through interaction with each other and their surrounding environment'

(Hartas, 2010:44). Dewey's central argument about education is significant here. In suggesting that education should be designed to enable development both 'from within' and 'from without' (1938) he recognises that we come to know and understand in embodied and intuitive ways as well as empirical and logical ways (Dewey, 1934). He reflects the importance of multiple rather than singular epistemological and ontological perspectives. This research into *The Imagineerium* project occupies a similar space. Whilst foregrounding education as an interpersonal, social, affective and embodied knowledge constructing practice, it also recognises knowledge as outside of the self. Thus this research takes account of multiple positions. This is evident in *The Imagineerium* project design, recounted in the next chapters, where art-making is initiated through a commission which both invites children to imagine something 'not yet invented' but to do so within the constraints of a particular brief. It interweaves knowledge that is personal, negotiated as well as given; knowledge that is embodied, cognitive and affective. The project's ontological roots are located in the particular histories of Jane, Kathi, Mark and Sarah, artists identified in the Prologue to this thesis, who create work in participatory, youth and education settings, where the agency of the arts are foregrounded. Our work together through Creative Partnerships 2002-2011, which had given profile locally to arts-based creative learning in schools, strengthened culturally inherited beliefs about the arts in society and education as beneficial (Matarasso 1997, Eisner 2002a, Belfiore and Bennett, 2008, Crossick and Kaszynska, 2016).

By 2014, when this study began and in the wake of swathing cuts to the arts and education, the arts and culture research community were being tasked to focus more upon scientifically 'robust methods', more 'in-depth qualitative methods' and particularly on 'clearer theoretical frameworks' (Mowlah et al., 2014:39-40). The latter was considered necessary to address the 'huge methodological challenge' of research in this field, and necessary to generate trustworthiness when research into the arts in society and education had been considered wanting in terms of epistemological and methodological 'rigour' (ibid). This was the climate in which this research was designed.

Given that some of methods and instruments were designed for both this doctoral study and the evaluation for funders, Arts Connect West Midlands, this research design

is attentive to this methodological challenge. In particular, it seeks to address these challenges to ensure a clear theoretical framework and in-depth qualitative methods (Mowlah et al., 2014:39). Using *The Imagineerium* project as a case study of art-making, this thesis research was designed to address the key research questions, noted earlier:

- In what ways does *The Imagineerium* project foreground and articulate the practices of art-making in children's education?
- What structures does *The Imagineerium* project require and propose that might be valuable to children's education?
- How can participants' experiences of *The Imagineerium* project be conceptualized to inform future practice?

In the subsequent sections of this chapter, I discuss the kind of case study research I undertook and my insider/outsider researcher position to the project (3.1). Having clarified the fit of a participatory methodological approach, I expound the methods employed, discussing these in relation to the phases of the research timeline. This section (3.2) constitutes the largest section of the chapter and is subdivided temporally and typologically. The final sections of the chapter discuss how data was analysed and the sampling, access and ethical considerations that underpinned the design.

3.1. The character of the case

This is an exploratory case study, which employs multiple, mixed methods, particularly multiple qualitative methods in order to investigate a project, which was constructed alongside the research. The case study draws on, and is in part shaped by, my position as an insider researcher, as well as many of the tenets of participatory action research (PAR) methodology.

My research sought to understand how *The Imagineerium* project, as a particular experience of art-making, might be an educatively significant experience for children and

the implications this might have for educational practice. This 'practical interest … to clarify, understand and interpret the communications of "speaking and acting subjects" …[signalled a focus] 'on interaction and language [in order]… to understand situations through the eyes of the participants … [and] social facts in their cultural significance and as socially determined' (Cohen, Manion and Morrison, 2011:32). As a unique and emergent phenomenon, this was an 'intrinsic' (Stake, 1995:3), 'exploratory' (Yin, 2014) study into 'the particularity and complexity of a single case' (Stake 1995 xi). It 'investigates' *The Imagineerium* project as 'a contemporary [complex, social] phenomenon in its real-world context' where the 'the boundaries between phenomenon and context may not be clearly evident' (Yin, 2014:2) and where a 'holistic … perspective' (Ibid: 4) is desired.

Gathering empirically robust representations of how a variety of different people, children particularly, respond to and learn from experiences over time is complex and arguably requires a methodology which is equally varied, responsive, layered and dynamic. In *The Imagineerium* project, imagineers' and children's expertise, interests and preferences were recognised as shaping their and others' experiences. Furthermore, the spatial, temporal and social contexts afforded by the practice of art-making likewise were deemed significant. In seeking to understand how an experience of art-making might affect children's learning, it was important to recognise the intersecting influences of individual, social, schooling, and art-making contexts in haptic, social and cognitive ways. My research approach was thus 'participatory, multi-perspectival, collaborative… looking through eyes of as many participants as possible' (Cohen, Manion and Morrison 2011:30).

My approach to this research design was informed by a number of factors. Firstly, it sought to recognise and respect the live, varied, and potentially stochastic, character of creative, art-making processes. It sought to be adaptive and echo the dynamic of the live project under study and the range of different behaviours and practices of the participants. These issues reflect generic, and subject specific, concerns with research of this character and in the arts. These concerns are that some methods can flatten and evade the complexity and fluidity of the phenomena they research (see, for example,

Bolt, 2004; Belfiore, 2009; Challis, 2014). Participants in arts research often, according to Clements (2007) and Matarasso (2009), feel alienated and even betrayed by evaluations which fail to fully engage with the complexity and character of their experiences. My study is attentive then to the work done in participatory arts to sensitively examine 'the voices and practices …[of] artists, thinkers … and participants' working in the field of participatory arts (Cunningham, 2014: 15-16).

A further factor related to researching young people. The design sought to be open with children about the research dimension of the project, such that they were aware and involved as 'active researchers' (Kellet, 2005) and were part of 'documenting together so that we can find out how to do this well, what you can learn …. and what might be valuable for other children doing commissions like this' (Kathi, project field notes). This approach reflects advice that 'researchers should view and treat children as capable, competent people who can contribute ideas and knowledge to researchers, and who should be informed and respected' (Harcourt, Perry and Waller, 2011:11).

Art-making, as a practice, also shaped the research design. Schön (1983: viii) talks of 'a kind of knowing in practice, most of which is tacit' as typical of professionals. He suggests that engineers, such as those involved in *The Imagineerium* project, rely on improvisation learned in action, rather than theoretical knowledge learnt in academic contexts. Bourdieu and Waquant (1992:222) extend the context beyond professionals arguing that 'a number of modes of thinking and action, and oftentimes the most vital ones, are transmitted from practice to practice, through total and practical modes of transmission'. This 'scientific habitus' or 'an embodied rule' (ibid: 223) points to a need for the researcher to likewise observe closely and immerse themselves in the context, in order to get a 'feel for the game' (ibid) they seek to understand. Children, positioned in *The Imagineerium* project as co-researchers, needed the tools to help them attend to such tacit learning. The introduction of individual practice journals, drawn upon in Chapter Five (5.4) and discussed further in Chapter Six were key in this respect. Creating drawings and diagrams of designs together on large paper, generated opportunities to practice thinking visually and collaboratively and to question as participants and observers.

In recognition of the exploratory character of the research, the design therefore also attended to Bourdieu and Wacquant's notion of 'reflexive sociology' reshaping and developing responsively to findings. In an emergent project such as this, they argue:

> [t]here is no way to acquire [a mode of perception] other than to make people see in practical operation or to observe how this scientific habitus … "reacts" in the face of practical choices – a choice of sampling, a questionnaire, a coding dilemma, without necessarily explicating them in the form of formal precepts. (Bourdieu and Wacquant 1992: 222)

Davis and Sumara (2006:135) echo the idea in their account of curriculum design, suggesting that trial and error is a natural process generating 'internal redundancy' revealing 'randomness and coherence'. This dynamic shaping process applies also to the design of this research, where multiple methods were explored and employed to investigate multiple aspects of *The Imagineerium* project, with some proving more fruitful than others. The relevance of this point to my study is discussed more fully in methods (3.2). It follows therefore that the research design, rather than being fixed before the process, emerged and was formed qualitatively by the issues raised through analysis. This emergent design is reflected in the structure and form of the thesis. In subsequent chapters two distinct approaches to synthesising the data are apparent. Chapters Four and Five reflect an ethnographic approach to analysing data. Chapters Six and Seven draw upon such analysis, framed by anthropological and sociological accounts of art-making and education, to articulate the character (Chapter Six) and structure (Chapter Seven) of art-making as an educative site and practice.

As the prologue has communicated, I began this research at least as a partial 'insider' to the community I was studying, having prior professional relationships with all the artists, some of the engineers and two of the schools. The research opportunity grew from an invitation to advise on the design the project, based upon my experience of advising, developing and critiquing action research based, creative learning programmes as director of Creative Partnerships Coventry. My skills here and the trusting relationships I had established with head teachers and artists were recognised as helpful to the development of *The Imagineerium* project both at the outset and beyond. Additionally, my experience as a teacher and teacher educator meant that I had 'knowledge of the

relevant social interaction required for … making meaning' (Shah, 2004:556) of the culture and behaviour of children in schools. As a former drama teacher I was attuned to the significance of non-verbal communications, which had particular value in pursuing the 'in-depth' character of this qualitative study and which influenced my choice of field notes as an instrument, in which I recorded observations.

Whilst neither a teacher nor costumed imagineer, so not a 'complete member' of the project's emergent community of practice, I was an 'active member researcher' (Adler and Adler, 1987, cited in Corwin Dwyer and Buckle, 2009), an 'insider/outsider' in effect. Following Mercer's (2007) rejection of a 'dichotomy', I proposed instead that a continuum best describes a researcher's positionality which will alter 'as situations involving different values arise, different statuses are activated and the lines of separation shift' (Merton, 1972:28). Such an account reflects the different relations I had with different imagineers, teachers and children as well as areas of expertise or experience. Regardless of the 'fluid' (Berger, 2015) nature of my insider position, it reflected a value for the kind of knowledge that might be gained from this 'social situatedness' (Lave and Wenger, 1991). This position gave me a unique insight into stakeholders' experiences of the project and the practice-related issues that emerged throughout. I was able to manage children's and teaching assistant's engagement in data gathering within the project and to capture and probe behaviours and reflections in the moment. This position enabled 'direct, intuitive' engagement and 'empathic understanding' (Merton, 1972:15).

Critiques of the insider suggest they may be vulnerable to the being 'overly-influenced by the customs' (Merton, 1972:30) of the community and thus less able to see and interpret its significance. This cannot be denied, but neutrality is never possible for the researcher, 'our biographies ... emotions and identities challenge a value-free objectivity' (Hartas, 2010:10). My commitment to a particular conception of arts-based creative learning which is democratic and participatory in character, frames not just my perspective, but that of other participants who, having worked with me, may have been influenced by such commitments, or at least connected with me through recognition of

shared values. This perspective framed and also shaped the participatory, and partially embedded character of the research methods discussed next.

3.2 Methods

3.2.1 A participatory approach

As discussed above, the study draws on key tenets of participatory methodology (Berghold and Thomas, 2012), also termed participatory action research (PAR) methods (Kindon, Pain and Kesby, 2007), in seeking to engage the multiple and different perspectives and modes of apprehending and sense-making of the young people and adults involved. Using the term 'partners', Berghold and Thomas (2012:2) articulate the commitment of researchers using participatory methods to 'the significance, and the usefulness of involving' participants in the shaping of both focus and instruments, of valuing the 'individuality and self-determination of the research partners'. This research enquiry did not emerge from articulated 'questions and issues that are significant for [all] those who participate as co-researchers' (Reason and Bradbury, 2008:3) in that children were not explicitly invited to shape and address the questions. It was shaped by and evolved with the community it researched, and drew directly on the preoccupations expressed by imagineers, teachers and children in relation to art-making, sciences and learning. As such it was exploratory and responsive in its design (Kindon, Pain and Kesby, 2007).

So, whilst traditional instruments such as questionnaires and interviews were employed, they did not characterise the study as traditional researcher-led practices. They were designed both to generate data for quantitative narrative analysis, which contextualised the study, and a little comparative analysis of before and after responses to the experience, but significantly they informed the shaping of subsequent instruments. Responses in questionnaires informed what was probed in interview and what was attended to in observations recorded in field notes. These in turn informed the design of

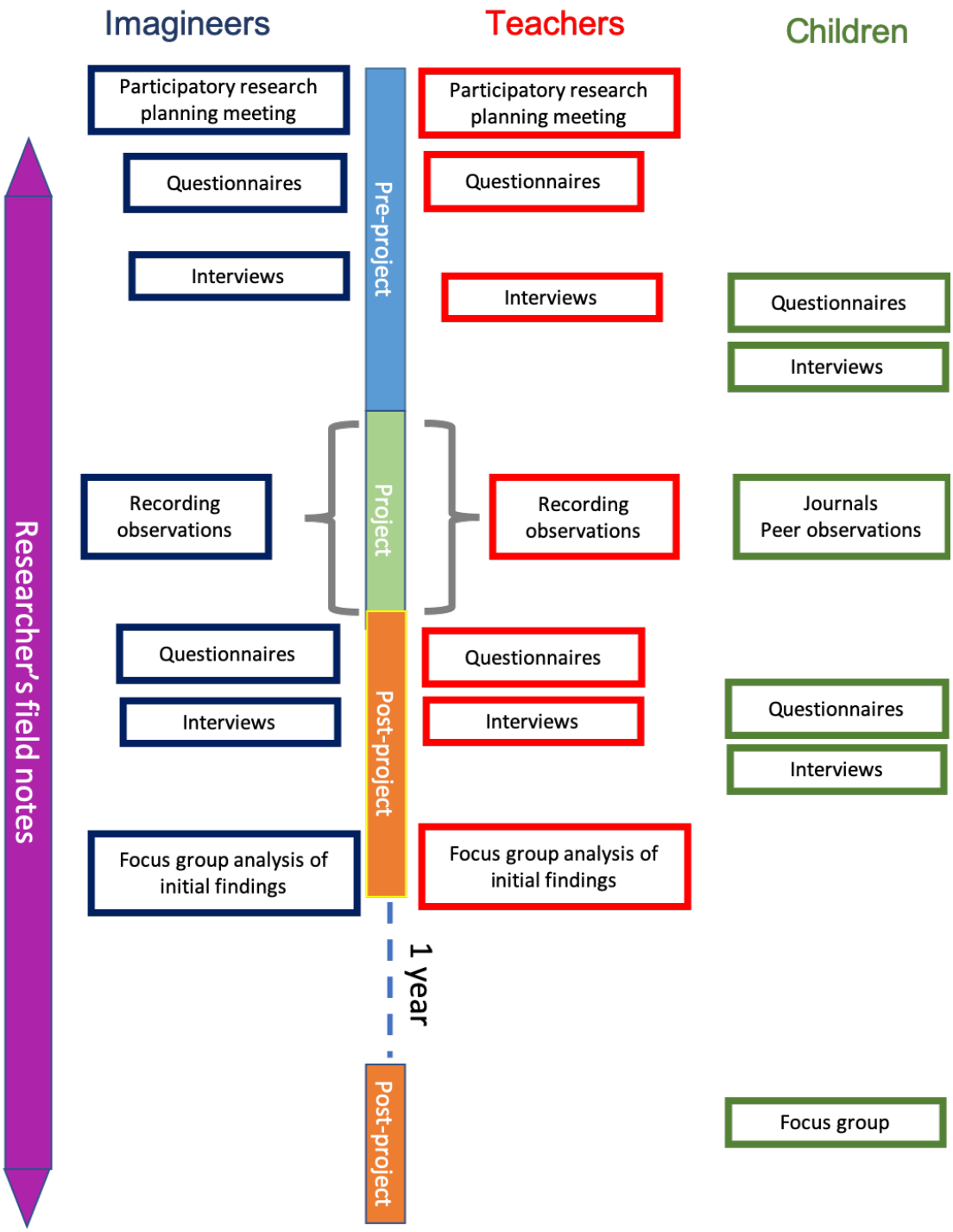
subsequent post project questionnaires and interviews. The focus group with imagineers and teacher, described more fully below, enabled a collective review and development of initial findings, stimulating a 'reflective practitioner' mindset in all participants (Schön, 1983). Schön's description of tacit 'reflection-in action', was noted earlier as natural to professionals such as engineers (see Bourdieu and Wacquant, 1992:222-3 cited above). My research design sought to recognise and build awareness of this tacit habit to prompt 'reflection on action' (Schön, 1983) as important for understanding their own and each other's responses. This was important not just for children but also for artists, engineers and teachers who were all skilled practitioners in different contexts, accustomed to the practices of making in the arts, in engineering or education. Each inhabited uncommon ground from the other, embodying different traditions, processes, skills, materials and ways of thinking, as well as different power relations.

My research approach was then participative *in character* recognising that 'negotiation processes must be continually engaged in' (Berghold and Thomas 2012:6) between partners / participants and that regular collaborative planning and review are embedded and natural to practice. Central to the choice and enactment of research methods was the endeavour to enable the voice of all partners and participants as they engaged with the project task, as well as also attending responsively to the context in which it took place and how that might affect feelings and behaviours. In the following sections, I outline my research plan and then the phases of that plan, discussing the purpose and character of each method employed.

3.2.2 Research timeline

Data gathering took place over an 18-month period, with an 11-month gap between penultimate and final data gathering. Pre-project, project and the first phase of post-project data collection lasted seven months and took place between February and August 2014. This period is indicated in *Table 1* as the blue, green and orange sections preceding the dotted line. Final data gathering, denoted below as the orange section following the dotted line, took place over two weeks in July 2015.

f. Table 1: Research activity timeline



Each method informed how the next was enacted, a point which becomes more strongly evident in subsequent sections 3.2.3-3.2.6. Discussions and participant responses at the participatory research planning meeting shaped how draft questionnaires were refined,

questionnaire responses shaped draft interview questions, and these, plus the varied observation methods trialled by participants within the project all informed what was attended to, photographed and recorded in researcher field notes. Likewise, the focus group with imagineers and teachers post-project both reviewed initial findings and generated new data which informed the focus groups with the children.

Table 2 details instruments used, time period and scale of data gathered with, from or by participants. My research field notes are not included here simply because they embrace the entire time period and draw on all instruments.

g. Table 2: Data type collected in relation to sample size

	Postcards *pre/ post comparison*	Questionnaires	Interviews	Observations	Photos and Video	Journal	Focus groups
1: Feb - July 2014							
Imagineers		6	6			6	
Children	72	72	18	72	18	18	72
Teaching staff		4	3			4	
2: July 2015							
Children						18	25

Green text signifies an identical tool used pre and post project for comparison. Questionnaires and interviews were conducted pre and post project but were not wholly designed or analysed comparatively, as discussed below.

3.2.3 Pre-project: Initiating a dialogic and participative mind-set; field notes

A collective participatory research planning meeting took place with adult participants, three class teachers, two engineer imagineers and three artist imagineers, in February

2014. This followed a series of less formalised meetings with groups to stimulate thinking about their interests in what the project might affect and how such change might most easily be evidenced within their daily practice. The intention was to generate a feeling that the adults were active 'partners' (Berghold and Thomas, 2012) and could shape what we were to learn from the project. This seemed important when head teachers had committed their staff to the project, rather than the staff electing themselves. It was equally so for engineers or artists, who whilst more invested in the project aims, were unfamiliar with this kind of evaluation practice. The invitation, to identify what change they would like to see as a result of the project, signalled that individual perspectives and interests were important to the research process. Likewise suggesting that such data gathering be undertaken by them and become an embedded and natural aspect of how the project was designed, encouraged imagineers and teachers to own and self-direct enquiry into their practice and the learning of the project. At this collective meeting, participants articulated, debated and refined their foci, identified the instruments they might employ for data gathering and the occasions when they could gather pre/post or pre/during data as befitted their foci.

Teachers' interests centred not upon curriculum content, but on children's learning behaviours, particularly engagement. All wanted to improve children's curiosity, and persistence with one teacher also choosing to focus upon developing collaboration. They proposed gathering data through observation of focus children (either by themselves or teaching assistants). Imagineers' foci and means of recording reflected both interests and practice: Jane, for example, was interested to see if the project might stimulate 'a process by which we achieve a new aesthetic out on the streets' (pre-project interview) where young people's design ideas were authentically shaping the work of Imagineer Productions. She elected to use a visual journal. Roger wanted to see if the project could teach 'the principles of engineering in an attractive way' (pre-project interview). He was less clear how to evidence this but in practice talked about it in post session reflections which I recorded as field notes. Sarah wanted to see 'what children could learn about science through physical theatre' (pre-project interview) and elected to record snippets of observed or heard evidence in her diary.

My own field note taking began in this phase and continued throughout the project. The 'differing views of what field notes are' (Emerson, Fretz and Shaw, 1995:xi) suggests a need to clarify the purpose and procedure which characterises my own use. My decision to use them was in order to 'improve the depth of qualitative findings' (Phillippi and Lauderdale, 2018:386). Reflecting the participative character of the study I wanted to be fully present in the experience of the project in order to see 'the broad patterns of activity rather than ... tracking day to day routines and processes' (Emerson, Fretz and Shaw, 1995:xii). My recordings therefore were not a 'continuous description of situations observed (Burgess, 1991:77). They can be characterised roughly into three phases. First, are *background*, contextual notes which relate to the period before *The Imagineerium* project was being planned, largely recorded in 2013 during exploratory discussions following 'Godiva Awakes'. These inform the analysis of core elements of the project design conducted in Chapter Four. Second, there are entries which relate to the *pre-project,* planning phase comprising contextual data notes taken and reflections on project planning meetings and discussions. Third, there are within project *observations* recorded live during sessions, following reflections or after view of video data throughout the project. In subsequent chapters these are specified as background field notes, pre-project field notes and project field notes respectively. Pre-project and project field notes capture non-verbal behaviour, speech, contextual information and thoughts about data which appeared significant and might form a focus for more systematic observation. I used both a physical notebook and electronic notes dependent upon context. Making quick hand-written notes in a notebook suited live events. Reflections post event, and post review of audio-visual recordings or interview transcripts were sometimes recorded electronically. Field notes were a means to signal emergent themes and patterns. I made notes on relationships between participants, on the significance of practice, of spatiality and thus of site. Their form was often literally as staccato notes, and thus whilst they inform my analyses they are only occasionally apparent as data, for example from informal moments such as media events around the Festival of Imagineers, or in the form of behavioural details such as in ' "add-back" critical non-verbal content to interview …. transcript' (Phillippi and Lauderdale, 2018:386).

3.2.4 Pre-project dialogue: questionnaires, postcards and interviews

My choice of methods and particularly the design of instruments sought both to foster a participative culture and employ tested methods. This latter point reflects my earlier discussion of the need for arts researchers to attend more to the rigour of their research. I chose to use questionnaires, a form of survey, which are widely recognised as a valuable means of obtaining 'people's views and attitudes about social situations' (Hartas, 2010:258). My pre-project questionnaires (one conducted with imagineers and teachers, one with children) sought to particularly ascertain 'views' about and 'attitudes' towards learning; how it is best stimulated, and (for children) perceptions of themselves as learners. It also sought to get an indication of preferred 'behaviour' (ibid:262) in relation to learning and schooling. Attention was paid to wording to avoid bias and ambiguity, and pilots were conducted with children in parallel classes. Questionnaires for adults were tested with several artists and engineers. Despite this measure, not all problems were adequately refined to completely avoid ambiguity, as subsequent interviews revealed.

An online questionnaire (see Appendix B a.) of imagineers and teachers, undertaken in February 2014 before the project, sought to ascertain beliefs about the arts and engineering and working with young people to stimulate learning. These were designed to capture a sense of the values and beliefs of each person and to provide a basis for a conversation and thus deeper insight. They combined a mix of closely directed questions, multiple choice, ranking and open questions. This mix was purposely chosen to capture instinctive as well as more reflective responses. An example of closely directed questions are questions 2-4 which asked for up to 5 words to describe the skills and personalities of artists and engineers. In questions 16 and 17 participants chose from a drop-down list of options to answer questions, such as 'what matters to you most during working sessions with children?' Open questions probed values, such as 'How, if at all, do you think that your practice feeds children's curiosity?'.

A written questionnaire was completed by children (Appendix B b.). This likewise sought to ascertain children's preferences and interests, which might shape their receptivity to

the different aspects of the project. It used mainly multiple choice and Likert scale questions to ascertain children's interests, and enjoyment of and feelings about themselves as a learner. These responses also informed group interviews. Children were also asked 'What do artists do?' and 'What do engineers do?'. These questions were printed on a postcard, with the original Wesselman drawing, of Godiva (see Appendix B c.). This was completed pre and post project at the same time as questionnaires.

Postcard questions and questionnaires were thus undertaken to ascertain the preferences and beliefs that artists, engineers, teachers and children held about art-making, the sciences and learning. Whilst they constituted a blunt instrument, they were expedient given the, as then unknown character of imagineering practice, and the tight time frame of project (set-up following funding agreement). Emergent themes were then probed through interview.

Reflecting the constructivist paradigm of my research design, interviews were conceived as 'literally an inter view, an inter-change of views between two persons' (Kvale 1996:2). Unsurprisingly, in this light, these became a rich data source for analysis. Having initiated the project with a collective participatory research planning meeting, adults were attuned to the idea that their beliefs, practices and voices mattered to both the research and the project itself. The emergent nature of the project generated curiosity and a desire to explore and discuss what might happen. Semi-structured interviews enabled a balance between the structured exploration of planned aspects and an informal conversational approach (Cohen, Mannion and Morrison, 2011). They explored expectations and ambitions for the project, informed by responses to the online questionnaire (Appendix B a.) and earlier discussions; for example, in separate early project planning discussions with artists, engineers teachers and at the participatory research planning meeting. These sought to ascertain imagineers' and teachers' views about how they seek to engage and motivate learners (and how they facilitate children's ownership of learning, if they do seek to do so). Interviews, particularly with teachers, also explored if, and how, creative learning skills are developed.

All interviews with adults took place in February 2014 (see appendix C.a) within their workplace at a time convenient to their schedules. These took place at Imagineer Productions for Kathi, Jane and Phil, at Imagineer Technologies for Nick and Roger and in rooms neighbouring youth theatre workshops for Sarah and Mark. Teachers were interviewed in their classrooms after school. All appeared willing and happy to talk and gave freely of their time. Prior relationships with Jane, Kathi, Sarah and Mark enabled an ease and directness in discussion, but both Phil and Roger were also open from the outset to airing their ideas and were responsive to probing questions. Interviews ranged from 25 – 65 minutes in length, dependent on the fullness of response and the directions in which interviewees wished to develop discussions. All teachers were compliant and appeared interested from the outset, with interviews becoming more conversational and fluid as they progressed. We had met and discussed the project on at least three prior occasions at this point and I felt that I had built a sound rapport with each teacher. However, whilst teacher C was cooperative, they appeared a little less at ease than teachers A and B, who offered greater detail, with teacher B giving one of the longest interviews.

Group interviews were also conducted in February 2014, with the six children identified by the three teachers according to the sampling criteria (reflecting a range of levels of attainment and confidence, see 3.4.), so with 18 children in total. Questions (see Appendix C.b) probed the responses of the questionnaires further. I sought to establish in what subjects, situations and contexts children felt they learnt well and enjoyed learning. I probed what motivated them and why, what pedagogies appealed, the habits of collaboration they were familiar with, and their engagement in imaginative and logical problem solving. I sought to uncover when and how, in school, they felt confident and competent in their learning. These were relatively short interviews of around 20 minutes and were also about building relationships and trust. They were conducted in two schools with all six pupils together, one in an open space within the library and the other in the staff room. In the third school, on the advice of the teacher, they were conducted with two groups of three pupils in a vacant small teaching room. Whilst my position of power, as an adult interested in how children learn, undoubtedly framed our discussion, children generally appeared willing to talk, and to share details about school, teachers,

themselves and each other. Given the spread of personalities midst the range of 'ability' it is unsurprising that some of those identified by teachers as children who 'find learning challenging' were quieter or more concise in their responses than their peers when discussing in the groups of six. I sought, as Stewart and Cash (2011, cited in Stewart and Shamdasani, 2015:78) advise, to 'draw out group members who may be hesitant to express or defend opinions … inhibited by the give and take of a free-flowing interaction'.

As an interviewer and teacher I believe I have 'both personality and training' (Stewart and Shamdasani, 2015: 86) to make me an effective interviewer such as being 'genuinely interested in hearing other people's thoughts and feelings', 'animated and spontaneous', 'expressive of their own feelings', 'empathetic', and able to demonstrate a 'sense of humour' (Langer, 1978 cited in Stewart and Shamdasani, 2015:87). These characteristics seemed important in coaxing teachers, with whom I was forming new relationships, and children with varied confidence and competence as learners, to articulate their ideas to articulate their ideas. Nonetheless, having completed my second set of interviews with two smaller groups of three (rather than one of six) and elicited more from children by doing so, I endeavoured to repeat this in the third, but time and space rendered this impossible. In retrospect, I might have sought to set this up from the outset in all three schools.

3.2.5 Project activity: Journals and field notes (photos, video and observations)

Core project activity took place between March and April 2014 and comprised half-days in school for four weeks, a full day at the Imagineerium space in the fifth and a design presentation and selection process in school in the 6th week. This period involved intensive data gathering by all participants, both individually and collaboratively, in varied forms. From May – August 2014 engagement was more occasional. Phil and I visited the classes to consult on the detail of the design, taking a first draft technical drawing based on the model as a basis for discussion and refinement of movement and the intended effect. Children also visited the Imagineerium space to advise on and take part in some aspects of the build process. Some children were involved in media events; some

attended a presentation to parents about the project; and those who chose to be part of the final event were involved in several after school and holiday time rehearsals for the performance event. Data gathered during this period was largely through researcher's field notes.

Just as adults had been initiated as partners into this participatory research culture, children were invited to help imagineers in documenting what we are learning in different ways. In the first project session eight children, selected by imagineers and teachers from those who put their hand up wanting to be chosen, were invited to take on roles as documenters. Each role was denoted through the use of iconic props and costume items. The different roles sought to capture different aspects of the project. Labcoats and magnifying glasses signified a 'scientist' perspective, a large sketch pad an 'artist', an ipad camera denoted 'paparazzi' and a microphone and notebook a 'journalist'. Kathi's intention was that different children would take on these roles each session, but this was only carried through into one subsequent session in one school due to time. Nonetheless, this first session communicated to children that their perceptions, thoughts and feelings mattered and that they were part of contributing to the research. It also communicated that it was important to know and understand things in different ways. The experience of recording a fellow child talk about what they understood or valued in an activity, or of writing one's own feelings and ideas in a journal communicated to children that the personal and affective mattered. Taking photos of physically enacted ideas or sketching an idea signalled that visual and embodied practices mattered. It reflected a view apparent amongst researchers using visual approaches that 'visual methods are inherently participatory' (Hall and Wall, 2016:214). The idea that holding a camera also gives 'different permission to look at things' (Tarr and Kind, 2016:261) was also recognised as a potentially empowering role.

When Kathi decided that children evidencing 'in role' as investigators of different sorts was not manageable and discontinued the practice, I took this idea forward in a different way. Using my own enquiry focus of how *The Imagineerium* project might develop children's broad learning capabilities, I focused on asking children to evidence seeing each other developing as curious, imaginative, resourceful and persistent problem

solvers. I created some questions and prompts (See Appendix D.b) and used the beginning of a session to prepare six children to continue the documenting role the project had begun with and to observe their peers. This was done in a conversational way, with me modelling using a written example I had noted from an observation in a previous session. Children had been discussing how the rainclouds on their design could have openings for gold coins to fall out signifying Godiva's generosity. I had recorded the context and the voice of one child and modelled for the children how this would be if I were a child in that group. My example to them was 'When we were discussing the clouds raining coins, Arzu said "What can we make the golden coins from so that they won't hurt people when they fall?" ' I invited children to think back to doing or seeing something similar in another session, so that they had time to ask questions and check understanding both of what was expected and how to record it. Where children appeared to recognise, or be familiar with a particular kind of behaviour, I gave them that particular focus for their observations, so that they began the task with a sense of confidence and ownership. Some wrote down what they saw and heard. Others were invited to take photo evidence in response to the same prompts. Being chosen for a role seemed to generate positive interest per se but if children indicated an interest in a particular recording medium, as with the question, I tried to ensure that they could follow that interest. Teaching staff asked for a similar structure for their observations. We discussed observable behaviours which might be proxies for or indicate identified desired changes in learning behaviour (curiosity, collaboration, persistence) and I created example prompts, which some wanted in observation templates, others used in their own journals (see Appendix D c.).

Additionally, children kept individual journals which were framed as imagineer tools. The 'gift' of a physical, hardbacked journal adorned with the Godiva drawing by Franz Wesselman was given to children on the first day of the project. Sarah, Phil and Kathi showed the sorts of notes and sketches they recorded in their 'journals' to help them think through and record their making projects. At times they took photos, jotted down ideas in their journal or brought in a drawing or model they had developed following reflective activity. The use of journals by children signalled behaving and thinking reflectively like an imagineer and journals became desired and valuable objects during

the project. Within sessions children could record ideas as notes, sketches, diagrams or collage as they liked and in schoolteachers encouraged both continued design development and further reflection on sessions. Prompts for such reflection were proposed to and developed with teachers (see Appendix D a.) and entries form part of the data analysed in Chapters Five and Six. Journals reflected the framing of the project as an enquiry, which everyone had valuable insights into. Thus, children, teachers and imagineers were conceived as 'hybrid artist-researchers' (Challis, 2014:141) using working instruments, which were also research tools. Embodied, affective and relational insights, gained through the physical process of making together (Sennett, 2008; Eisner, 2002a; Charny, 2011) were valued as well as cognitive ones.

In addition to being present in all sessions, my note-taking during the project also involved gathering video and photographic evidence. A tripod with a static video camera recorded all school sessions. This was useful in analysis to check my felt and field note perceptions of sessions in spatial, relational and dynamic terms. I also used a small hand-held camera (flipcam) which enabled audible records of imagineers' whole group talk and behaviour, and a selection of children's group talk and behaviour. Reviewing non-verbal behaviours and exact words spoken informed the construction of vignettes in Chapter Five. Photographs were taken as much, if not more, by children as by adults and were useful in revealing what mattered to children. My own photographs reflected the range of activity of the project and whilst not a primary data source, visual methods, increasingly popular in social science research (Banks 2001; Margolis and Pauwels 2011; Pinks 2013; Rose 2016; Spencer 2011; van Leeuwen and Jewitt 2000), enhanced my analyses and informed my interpretation of the project as an emergent community of practice.

3.2.6 Post - project activity: questionnaires, interviews and focus groups

Post-project, a similar approach was taken of completing a questionnaire (see Appendix B d.) followed by interview. In imagineer and teacher online questionnaires some questions were repeated directly, such as closely directed questions related to skills and

personality traits of artists and engineers, and selections from a list of 'what mattered in working with children'. Some open questions were re-phrased into past tense post event, such as 'when and how were you effective in feeding children's curiosity?' One new open question was added to probe the impact of the project asking if anything in the project 'has changed or will change your own professional practice?'.

Post project questionnaires with children reviewed children's interests and a sense of their learning in relation to different aspects of the project. A first post project questionnaire (Appendix B e.) was conducted in April 2014. This comprised Likert scaled responses to each activity within the project. Open questions sought to probe personal significance and any changes. A second post-project questionnaire (Appendix B f.), conducted in June 2014, comprised scaled responses to all aspects which had appeared significant for children from the analysis of the April survey. A shorter questionnaire was also one element of the focus groups conducted in 2015 (see Appendix B.g).

Post-project semi-structured interviews took place in April 2014, in similar locations, times and to the same pattern as pre-project interviews of probing responses to the questionnaires. All interviews were audio-recorded. Prompts for interviews with teachers and Imagineers can be found in Appendix C.c. Within project observations, undertaken by teaching staff and imagineers in various forms, informed and enriched post-project interviews. Having built relationships with the children throughout the project I decided to interview them individually post-project as I felt I could gather richer data this way. This decision was supported by the teachers who negotiated separate rooms where conversations could be recorded. In one school this was an IT room, in another a school hut and in the third a small classroom. Most children were talkative and seemed relatively at ease. Prompts for these interviews can be found in Appendix C.d.

Focus groups are recognised as a 'versatile' (Stewart and Shamdasani, 2015) means of exploring views, attitudes and feelings. The 'iterative' (Hennink, 2014:98) character of focus group discussions allows researchers to 'contest or qualify earlier survey data' and thus can affirm and deepen, adding new 'meaning to reports of attitudes and behaviours' (Bloor, 2001:11). My use of this method drew on both the participatory character of the

research and the questionnaire and interview data collected. In June 2014 a focus group was designed for adults following first analysis of interviews. Over 50 quotations, from all interviews, were selected, printed in large font and curated as a working 'wall' of reflection for annotation: affirmation, challenge or comment and discussion. Responses to a series of questions regarding project design, learning and other apparent themes were stimulated through large paper activities using stickers, coloured pens and post-it notes (see Charny, 2011). Opinions and voices were recorded by participants through positioning a sticker or writing thoughts, firstly individually and silently, then discussed with further annotations made during and after discussion. Discussions were at moments whole group, but often in smaller twos and threes and people circulated the activities differently. I designed this focus group event with Sue Challis, who was evaluating the partnership dimension of the project. Our dynamic as two experienced qualitative researchers both enthusiastic, empathetic and interested in participant responses, but with different foci, generated good debate both live and on paper. Our moderation combined a mix of direct and indirect questions (Stewart and Shamdasani, 2010:40) to probe participants' sense of previously expressed ideas: the value of the project for children's learning; the project design in relation to extant and possible curriculum structures; embodied and practice-based learning; the significance of the spaces used; of expertise and resources.

A year later I conducted a focus group with children which also sought to probe initial analyses, to test impressions and also see if any of the effects and ideas had lasted beyond the project. Seeking to echo the participatory approach of the project, I used a combination of activity, conversation and questionnaire to probe their experiences. The richness of data generated at this time, and in this way, was significant in shaping the character of this thesis. It also affirmed the value of a participatory model of data gathering. These were conducted with groups of 4 or sometimes 5 children of the same gender, in July 2015 (see Appendix C.e for discussion prompts). The decision to conduct these in gender groups was to explore whether gender might have been a factor in children's responses to engineering and the arts. From the 2014 analysis, I had recognised that children's experience of *The Imagineerium* project appeared to have stimulated aspirations and reflections about who they might become. It was unclear as

to whether, or how, culturally gendered expectations had affected these, so I decided to work with children in single sex groups to explore this aspect. The focus groups involved three elements. The first involved activities related to future aspirations. On a table I spread out 25 images of adults (females for the girls and males for the boys) in work-like situations (caring, professional, public service, creative, STEM roles). Each child was given a set of coded post-it markers and asked to move around, look at all and sticker any they could imagine themselves trying or being in the future. I encouraged quick first responses in relative quiet but after a while, if discussion developed I didn't discourage it, and after a while invited children to share their thoughts about the decisions they were making. From this children created a pie-chart account of their adult life aspirations, annotating with influences and we talked again about decisions. The second activity was a brief questionnaire, testing key aspects again. These were conducted silently and written individually, but conducted in stages beginning with two open questions which were discussed before children continued with the other questions which might otherwise have shaped what they said (see Appendix B.g). These probed what children thought the project was really about and also what had mattered to them. Finally, we reviewed and discussed together the ideas which had emerged during the session. The varied means and the use of activities, as well as the different kinds of talk enriched and informed the final more probing conversation where peers, as much as I, were curious about each other's ideas, feelings and views.

3.3 Analysis

With so much varied data, several kinds of analysis were undertaken in both a sequential and iterative form to draw upon the varied data sources. Firstly, scaled responses in children's questionnaires were analysed using SPSS to review the degree of interest, appeal of elements and perceived efficacy of learning. Open questions were recorded and coded qualitatively. These trends informed the design, analysis and interpretation of the interviews. I transcribed all interviews: twelve imagineer, eight teacher and thirty-six children interviews. Children's interviews were coded in terms of characteristics from

questionnaire and interview data. This was aligned with school data about children's gender, age, ethnicity, language spoken and deprivation indicators for patterns, and outliers. NVivo was employed and generated a large number of codes which were then reviewed and combined[7]. This coding formed the basis of the initial analysis of themes. Whilst analysis of questionnaire responses provided a sense of the broader educational preferences and interests of the whole cohort, interview coding gave a fuller sense of this. Adult interviews were enriched by their participation in data collection which, whilst not necessarily providing rich data for my research, heightened their awareness of factors that affected children's behaviour. Interviews thus formed the framework for qualitative analysis from other sources, which enabled me to 'thicken' (Geertz 1973) these interpretations. Children's journals, photos taken by various participants, reviews of audio recorded project evaluation sessions, video footage and my field notes were all systematically reviewed in relation to emergent themes and thus formed part of this 'thickening'. The iterative nature of probing through several questionnaires, interview and then focus group also provided a check on early analyses. Not all sources are directly reported in this thesis. The iterative and multiple source data gathering meant that ideas were often echoed across sources and were often repeated or more succinctly summarised by individuals in later interviews or focus group sessions.

Whilst my field notes enabled me to record non-verbal behaviour of individuals from interviews, video was 'particularly good for capturing a range of non-verbal interactions which were more difficult to record in conventional field notes' and can be 'watched repeatedly' (Thomson and Hall, 2016:121). The facility to review generates more likelihood of responses which were 'not anticipated' (Hall and Wall, 2016:219) being noticed. Video and photo data, both photos taken myself and by children 'documenters' were potent in conveying a sense of children's commitment to the art-making commission, to behaving *as if* Imagineers, as well as less successful moments. The significance of physical and spatial arrangements of people and practice, in revealing a

[7] Coding was discussed with a fellow PhD student, Dr Sue Challis, researching evaluation models and, in relation to this thesis, evaluating partnership working between imagineers.

sense of agency and playfulness, although often apparent in field notes, were also and perhaps more persuasively apparent in visual and audio-visual data. The importance of journaling for children is evident in sketches and annotations as well as writing.

3.4 Sampling and access

As discussed in the Prologue, this research into *The Imagineerium* project grew out of previous relationships and roles. Jane was aware of the broad character of my proposal to undertake doctoral studies and invited me to study this new project. Jane and Kathi at Imagineer Productions recognised and welcomed the need for my doctoral studies to extend data collection beyond that funded by my contractual evaluation of *The Imagineerium* project. They had previous experience of supporting the data collection of a doctoral student and thus ensured that all contracts for imagineers involved an expectation of data collection, which enabled easy access to imagineers. My own and Roger's prior relationships with the schools, and the offer of a fully funded project in return for research data collection likewise ensured teaching staff and student were aware of an agreement to and positioned to engage in the research.

The three schools invited to the project were, following funders priorities, located in and had on roll, children who, almost exclusively, live in areas of high multiple deprivation. According to the English Indices of Deprivation 2011, 92% of children were living in the 10-20% most deprived wards in the country; the remaining 8% were in the 30-40% most deprived wards (Coventry City Council, 2011); the socio-economic aspects of art-making however are not a key analytical frame for this research.

The schools were known to at least one of the imagineers. All of the schools had been involved in a Creative Partnerships programme, two for several years, the third was known to Roger, a governor at the school, as also being interested in developing engineering as a form of problem-solving using arts and sciences. The teachers in each of the year 5 classes however were new to this kind of work and were typically selected by the head teachers to develop their insight into such practices.

Samples were purposively identified at all levels: school, teacher, children and adult imagineers and involved 4 teachers, 6 Imagineers and 72 children aged 9-10. The research was located in year 5 (9-10 year-olds) for several reasons. Prior experience in trialling new pedagogic approaches in upper primary year groups suggested that year 4 upwards offered a better site for research as children were more established with the expectations of the Key Stage 2 curriculum and phase. Additionally, recent government curriculum reform (proposed from 2014 and required from 2015) had brought content area previously positioned in secondary education (in year 7) into year 5: for Physics this included understanding how mechanisms operate and make use of natural forces. Data was gathered from all children to provide an overview of trends.

A further sample was identified of 18 children (six per school). In each school these six were proposed by the class teacher who identified two children, a boy and a girl, who satisfied one of the selection criteria:

a. typically access learning easily
b. typically find accessing learning difficult
c. for whom the ease of accessing learning is varied: either due to differential enjoyment, behaviour and /or achievement across subjects or other personal reasons.

Focus groups in 2015 comprised 17 of the 18 sample from 2014 (one had moved schools). The additional eight children were those whose 2014 data suggested they might enrich the research, either by giving an insight into apparent significance / change through the project, or a resistance / distancing at some stage.

3.5 Ethical Considerations

Any research design, especially one involving children, poses ethical concerns. As Lewis and Lindsay have noted, the 'recognition of the need for, but also the complexity of [ethical concerns of research with children] has grown' (1999:16). Commonplace

understanding, that the social structures in which children encounter adults generates inherently unequal relations between children and adults which can has negative implications both for children and the validity of data, has underpinned a shift in ethical guidance and an expansion of methodologies (Christensen, 2008; Lewis and Lindsay, 1999; Tisdall, Davis and Gallagher, 2009:1). This is heightened particularly, as in this study, when the researcher is as an outsider to the school (Corbin Dwyer and Buckle, 2009). Literature in the field advocates participatory and mixed methods, whereby both choice and mode of voice are increased. It advances attending to both the social and cultural contexts of the research and the kinds of questions being asked; and enabling children to be 'reflexive participants' in the process (Christensen, 2008:3; Tisdall et al. 2006; Tarr and Kind 2016). This participatory frame characterizes my research design.

Children were positioned in the study as 'agents' (James and Prout, 1998; Kellett, 2005; Uprichard, 2008) helping the adults understand how the model being piloted worked. Their role had status and invited them to consider that apparently negative things mattered as much as positive things; that opinion and feelings counted. Discussions, journal entries: visual and written, interviews, and peer research observation generated a varied sense of children's involvement. They were aware of the project as an enquiry into how learning (in its broadest sense) happens and how 'imagineering' might help in that learning. I was known to the children as the one coordinating our collective enquiry and met the children, before the project began, in every project session and on several occasions afterwards. They knew me on first name terms and a conversational mode typified my interchanges with children, to aid the sense of collaboration. Efforts have been made through the design to build relationships gradually over the lifetime of the project with the children and to be on first name terms to feed a sense of familiarity. In many cases with focus group children, due to Press and public events which required rehearsals out of school time, I have been in repeated contact with parents which has aided trust. Although discussions with children have embraced their personal interests, no sensitive issues were anticipated. I hold a certificate of clearance with the Disclosure and Barring Service (DBS) and I am also an experienced teacher and so adept in conversations with children.

A further potential challenge emerges in the selection and interpretation of children's words and actions during analysis. Where possible, I used an iterative process with children, sharing with them my impressions from previously gathered data, inviting revision, clarification and re-positioning – involving them as editorial assistants in some respects.

Utilising guidelines proposed by the British Sociological Association (2002) and British Education Research Association (2011; 2018), the study received appropriate approval from the university and consent has been sought from all participants involved in the research. Head teachers gave ethical consent for children's involvement via the information sheet and form (Appendix A.a and A.b). Their consent gave permission for questionnaires and interviews to be conducted, for access to the work children produced out of the project, for photographing and video of children and access to some data regarding gender, ethnicity and deprivation. Parents were made aware of the project and its research element through information which went home in letters, the invitation to complete a postcard sharing their views and impressions of the project for their child, an invitation to a presentation about the project and the public event in the city. A 70% return on the postcard and 30% direct involvement in presentations session, suggested that parents felt informed and were supportive of both project and research.

Teachers and imagineers received the same information and completed the same consent form giving consent for their journals, questionnaire and interview data to be used in this research. As discussed in the prologue, since this project and through publications, websites and events there is wider public awareness of *The Imagineerium* project, rendering anonymity for key players almost impossible. Consequently, permissions have subsequently been obtained from imagineers to use their real names in the thesis (see Appendix A c.). Schools however are unnamed, and teachers are referred to by letter (Teacher A, B, C and D). All participants were made aware that they could withdraw consent or involvement in the process at any time without the need to give a reason.

All data has been saved on password secure computers. Confidentiality has been ensured through changing names and obscuring identifying details so that no child, teacher or school is identifiable in the final dissertation. Whilst names appear in the following chapters these are pseudonyms. In Chapters Six and Seven, quotations from children's interviews in 2014 are labelled by their pseudonym and simply the term 'interview,' to clarify the data source. This signifies a post-project interview as these provided significant data. Pre-project interviews proved to be valuable largely as context. Where a date is given this is to signify that the source was other than a post-project 2014 interview. Interviews with adults are described as pre or post-project as these were all conducted individually and only in 2014.

I have argued, in this chapter for the suitability of a participatory methodology which characterises this exploratory case study and the multiple forms of data collection involved in researching *The Imagineerium* project. The next four chapters of the thesis draw upon the range of data gathered in this way. The analysis, representation and discussion of data are organised in four chapters sequenced to progress from an ethnographic analysis of the particular case towards a more theorised analysis of the principle characteristics which might have significance beyond the case. Chapter Four offers a 'thick' (Geertz, 1988) ethnographic analysis of the context in which *The Imagineerium* project was conceived and developed. It draws upon my background field notes which pre-date the project planning phase, as well as data gathered pre-project during planning or data gathered later which reflected back to this phase to illustrate how the site and design of the project was predicated upon the characteristics of an art-making community of practice. In chapter five a series of rich 'vignettes', which collectively convey a sense of the experience of the project have been constructed from field note observations of project sessions, live and video recorded. Their analysis is informed on occasion by field notes, questionnaires, interviews and journal entries to convey how children responded to the experience. Chapters Six and Seven draw on these vignettes and analysis of post-project data to propose the practice and site of art-making in *The Imagineerium* project as educatively valuable.

Chapter 4 Design principles of *The Imagineerium* project

This chapter analyses how *The Imagineerium* project emerged from, and was conceived and developed, in ways foundational to a 'community of practice' (Lave and Wenger, 1991). It argues that the art-making children engaged in during the project was modelled upon the histories and principles of Imagineer Productions' emergent practices and those of the engineering communities they engaged with. These formed an emergent community of hybrid artist-engineer 'imagineers', whose practice formed a context for *The Imagineerium* project design. The chapter draws significantly upon field notes discussed more fully in Chapter 3 (3.2.3). Background field notes were gathered before the detailed planning of *The Imagineerium* project began; other field notes draw on discussions during and after the project. These draw on observations of practice and the physical environment which characterise the project design, and pre-project planning discussions.

I begin by considering how the history of Imagineer Productions generated and characterised an emergent community of imagineers within which *The Imagineerium* project gestated. In 4.1, I focus upon their project-based partnerships with engineers, particularly, as indicated in the prologue, through the conception, development and realisation of the 'Godiva Awakes' project. In 4.2, I consider how Imagineer Productions' earlier history as a company rooted in community arts practices also characterised this emergent community of imagineers. I follow this, in 4.3, by reviewing a key characteristics of arts practice which underpinned the design of the project. In 4.4 I introduce the physical 'spaces' used and adapted throughout the project which inform the idea of art-making as a site. The chapter forms an introduction and backdrop for the analysis of the experience of the project in Chapter Five and for the theorisation of that analysis in terms of advancing an argument for art-making as a site (Chapter Six) and as a structure (Chapter Seven) for education.

4.1 An emergent community of imagineers

As outlined in the prologue, the conception of 'The Imagineerium' as generative and educative for professionals, young people and the community, grew from a partnership between artists experienced in creating site-specific, large-scale and community events and a range of engineers with mechanical and technological expertise. This partnership was already forming into an emergent, practising community before 'Godiva Awakes' was conceived. Before the idea of *The Imagineerium* had even been conceived, I had witnessed events produced by Imagineer Productions, with engineers' support, for example in staging the Mystery plays they had worked together to create a means by which to appear to flood the cathedral ruins. Conversations with Roger and Jane in the months before the project, clarified and detailed some of this history further. Their partnership was intensified through the process of imagining, developing the proposal for, and winning, a national Cultural Olympiad Award, to undertake the three-year project, 'Godiva Awakes' 2009 -2012 (background field notes, 2013).

The project idea was, theatrically and symbolically, to 'reawaken' the spirit of Godiva. The myth reveals Godiva, wife of the Earl of Coventry, demonstrating justice, tolerance and courage when she agreed to ride naked through the city streets to persuade her husband to reduce the taxes on the city's starving poor. In 2012 a series of projects were run with youth groups regionally to explore and interpret Godiva's social equity values for current times. Each culminated in expressing their own hopes for the future. These were gathered in a 'Book of Intent' and taken by Godiva's on her journey from Coventry to London. Godiva thus needed to be re-imagined, designed and constructed as an appealing, and arresting figure that could be central in a range of performative events as discussed with Jane and Kathi (background field notes, 2013). This emergent community of imagineers gathered the skills and expertise of their practices around the problems which appeared throughout the task before them.

A first challenge was to realise the artist's vision of cyclists transporting and animating a six-metre tall Godiva as if on her horse. Other challenges related to the logistical

requirements of using public roads. The design had to ensure that Godiva's vehicles could safely stop, pass under bridges, up gradients, within the height and width of public spaces, so as to limit the amount of disruption to traffic and be stable in the wind. Engineers' expertise was vital to lead on such problem solving, but required artists' aesthetic vision and insight into performative dimensions, such as how Godiva might stand and walk amongst the public, how Godiva's eyes, colour, shape and movement, could engage the gaze of those who saw her. This mattered to the project because Godiva needed to communicate empathy and an understanding of the importance of social equity that her legendary courage symbolised. That she was manifest as a mechanical giant puppet, asserted not just the cultural and social significance of the project, but also its economic importance for a region characterised by manufacturing industries engaged in different kinds of mechanical invention (clocks, bicycles cars, radio). Jane, Kathi and Roger all discussed how the engineers and artists involved spoke of learning, through the process, about how to solve aesthetic and technical problems. Nick was an untypical engineer having a background in film effects which was significant in helping the attunement of other engineers to this hybrid practice.

The ideas, values and aesthetic qualities of the design and movement were led by artists but became the business and the interests of engineers too, just as artists became fascinated by the processes, and materials, that the engineers advanced (background field notes, 2013). Engineers tested ideas through trying out and calculating the efficacy of these ideas mathematically. As they worked with artists their work became more responsive to and 'inspired by the ideas of the artists' (Roger, pre-project interview). Generating the undulating movement of Godiva's foot as if from the ball of the foot to the heel, for example, was a challenge which required repeated discussion, prototypes and negotiation (Kathi and Jane, background field notes, 2013).

Developing a Godiva that was aesthetically pleasing, inspirational and mechanically effective became the task which rallied and motivated artists and engineers alike and fostered this new community of practising imagineers. At any one time the mastery and expertise of one, or a few members of this emergent community might be pivotal, for example as they used CAD to simulate Godiva's gait (ibid), with others more peripheral

and learning from them, but this mixed team was important to the project as a whole. The demand of the task at any one time might prioritise the particular strengths of particular participants.

'Godiva Awakes' rallied significant local support and interest[8] as it recognised and celebrated the inventive manufacturers of the region and particularly Coventry. The artists and engineers involved appeared to enjoy their association with this high-profile project, discovering more about connections and differences in each other's making processes. In pre/post questionnaires and in focus group meetings Kathi and Roger reflected on how 'Godiva Awakes' had initiated this. Collectively, pre and post project questionnaires provided insight into how imagineers viewed each other's skills and behaviours. They suggested that 'Godiva Awakes' had attuned artists and engineers to each other, with connections being apparent, albeit nascent, before the project: engineers and artists considering themselves and each other to be 'innovative', 'imaginative', 'passionate' and 'determined' (imagineers, pre-project questionnaires). There were descriptions of artists as 'creative' and 'emotional' and a more 'serious', 'practical', 'problem solving' view of engineers (ibid). However, post project, sharpened perhaps by the educative purpose of *The Imagineerium* project and by the process of working more closely together, these had been deepened, and detailed. Artists were valued for 'energising', being 'enthusiastic' and 'inspiring', and for demonstrating 'openness', 'positivity', 'adaptability', 'communicative' and 'interpretative' skills. Engineers were valued for their ability to 'visualise' ideas, for their 'expert scientific knowledge', their 'methodical' and 'structured', 'goal-orientated' approach to tasks (imagineers, post-project questionnaires). The term 'experiment', discussed in one post project session, was recognised as connoting differently for artists and scientists. Whereas the term might signify open, explorative practice in art-making, in engineering it signified the repeated testing of a particular process in pre-defined ways.

In 'Godiva Awakes', Jane and Roger considered that the combined scientific and artistic

[8] 17 engineering companies, 57 businesses, civic partners, 2,500 community participants in live events, 11,000 community participants engaged in formative elements and 540,000 civic and community audience.

knowledges, and expertises of engineers generated a re-visioning of what skills, knowledge and mind-set might be involved in the processes of 'making', 'being creative' and inventing (background field notes, 2013). Both artist and engineer companies found that their aspirations, practice and ways of thinking about future business had been altered by the experience of 'Godiva Awakes'. The formation of 'Imagineer Technologies' in its wake was evidence of this. It signalled an interest and belief in the economic viability of an engineering technology firm interested in bespoke innovative work for and with cultural as well as industry partners. Seven years on, and in a period of austerity, the company is still buoyant; working on film and cultural contracts including ones from Imagineer Productions and Highly Sprung, whose award winning Urban Astronaunt's 'flying machine' was conceived and built following the collaborations of *The Imagineerium* project.

With shared interests in community and education, Imagineer Productions and Imagineer Technologies began consultations with local partners across education, STEM, the arts, engineering and business, testing and developing the idea of *The Imagineerium* project. These partners met to vision the idea, as detailed in the prologue (Imagineerium visioning meeting 6/7/2013). The meeting revealed interest in the project as a means to generate the 'frameworks and opportunities for young people to learn experientially how arts and science processes can connect' (ibid), to promote the habit of inventiveness, by positioning them as commissioned partners alongside professional artists, engineers and teachers, and to contribute to real projects in their locality. The process was intended to 'feed and harness the creative minds of young people … to guide and reframe the application of their analytical abilities' (ibid) but also, in the light of the 43% STEM skill shortage of the region (Engineering UK, 2016:9), to 're-energise the appetite for engineering' (Imagineerium visioning meeting 6/7/2013). It aimed also to foster mutual recognition of a need to grow 'creative scientists as much as we need artists who understand' sciences (Neelands et al., 2015: 45). Here children would be presented with a commission as 'young Imagineers' to imagine, design and make models for tricycle-powered animated structures to be part of a city cavalcade launching the first of the city's 'Festival of Imagineers'.

The reality of resourcing the vision, however, was not so trouble-free. Nick Martin, the lead engineer on building Godiva, and crucial to the hybrid imagineer identity forged by 'Godiva Awakes', was part of initial planning but was unable to be involved in the project delivery due to a business contract which took precedence over this education project. I understood from discussions (Jane, background fieldnotes) that, had he been involved, the cost of Nick's time which exceeded an arts budget, was to be subsidised by Roger through Imagineerium Technologies. The economic viability of *The Imagineerium* project therefore was problematic at the outset. Phil, who replaced Nick, brought a more self-directed training in engineering, developed through the world of theatre, entirely fitting to the demands of *The Imagineerium* project brief but less scientifically rigorous. Roger was able to stimulate the interest of fellow engineers of a similar age, but, whilst wonderfully enthusiastic people, these were all older, middle class men, not necessarily ideal role models for younger girls and boys (Archer et al., 2013). Furthermore, finding interested female engineers and costing younger engineers was challenging. The real cost of an engineer's time far exceeded the budget typically awarded to a cultural organisation.

There was one exception on the project: a younger woman, who ran a youth theatre group and was fascinated by Imagineer Productions' work. She was interested enough to negotiate a couple of days from her engineering employer to join the wider team in the Imagineerium based days. Whilst personally interested, her employer has not since felt able to support the project and the project budget cannot afford to buy her out. Additionally, post 'Godiva Awakes', which placed unanticipated demands upon Imagineer Productions (background field notes, 2013) the company were forced to restructure. Jane became CEO and Kathi, like the three other directors, became contracted. This was a new relationship which Kathi was experiencing during *The Imagineerium* project. This shift of role generated tensions at times in the early planning process as to whose ideas should lead the way forward (ibid).

The Imagineerium project thus emerges from the histories and communities of Coventry, a post-industrial city, home of the first safety bicycle, famous for car manufacture and the Godiva legend. The image of the reinventive phoenix, on the city council's crest, is a

significant metaphor for a city which not only rebuilt itself post war but retains a strong engineering industry, continues to adapt its manufacturing intelligence to new contexts and is undergoing a process of regeneration. The city was then engaged in a bid to become City of Culture in 2021, and the metaphoric and literal characterisation of Coventry as a city of imagineering had particular appeal. *The Imagineerium* project was also conceived as a potential model for STEAM (science, technology, engineering, arts and maths) education, with particular focus on creative engineering as a city interest. This educative model was thus shaped as a potentially trans-disciplinary, situated way of learning, as modelled by an emergent community of practising imagineers.

4.2 Rooted in community art-making: people, places and community

The community of imagineers that 'Godiva Awakes' generated was also significantly shaped by Imagineer's roots in community and participatory arts. CEO, Jane, began her working life as a community artist (background field notes, 2013). Even before the formation of Imagineer Productions, her collaborations with Kathi echoed the democratic and socially generative values and character of community and participatory arts discussed earlier (see Chapter Two). Their participatory work engaged community groups and sited events outside traditional performance venues. Jane and Kathi had years of experience of running carnival in the city and working with disadvantaged community groups ((background field notes, 2013). Their choice of public, city centre locations for carnival and 'Arts Alive' festival events (discussed in the prologue) reflected notions of 'platea', discussed earlier as 'rooted in the common experiences … of the people' (Weimann cited in Lin, 2006:284). They sought to affirm the voices, relationships and creativity of ordinary people by siting the 'extra-daily' (Barba, 1991) theatricality of performance in spaces where 'daily' behaviour is more expected and usual; thus creating liminality (Turner, 1982), a sense of fluidity between the habitual daily and the possibility of imagined performance.

Spaces thereby became 'active [meaning-making] components' (McGregor, 2004:349),

signifying both symbolic and literal resonances to a community. Likewise, the Festival of Imagineers event, the culmination of *The Imagineerium* project, provided an imagined world of performances interacting and temporarily connecting with the everyday world of the people. This enabled behaviours (social, personal and political) to be re-framed and re-examined through performance by advancing a 'counter-perspective' (Weimann cited in Lin, 2006:284) to the dominant one. For a moment, children were seen as young imagineers, capable across the arts and sciences, full of potential, rather than the 'empty vessels' of traditional models of education (project field notes). Here, 'the interactivity of the platea meant that characters with little social authority were, in fact, more theatrically privileged' (Linn 2006:284) to express their ideas. Observations of Imagineer Production's practice, both within this project, but also earlier observations over a number of years on other projects, reflect a desire to resonate with and give voice to the communities where projects are sited (project field notes). *The Imagineerium* project was conceived in the same ilk, with the identities, practices and interests of imagineers being rooted in the 'democratic imagination' (Greene, 1995:6), which characterises both the practice and literature of community art (Meade and Shaw, 2007; Matarasso, 2007; 2015).

A grounding in participatory arts and in enabling such collective action may, in part, explain the developed relational skills of imagineer artists. Matarasso, for example, whose experience of artists' practice is emphatically rooted in the community / participatory arts traditions, emphasises such skills as common to artists. He draws on the work of Douglas and Freemantle to suggest that artists are 'inclusive, collaborative, connected…. good negotiator[s]' (Matarasso, 2012:6-7). Such behaviour was evident in imagineers' planning for sessions which were led and shaped by artists (pre-project field notes) and in all project sessions (project field notes) where engineers deferred to the artists. After sessions they spoke of Kathi, Sarah and Mark as being more expert, of them 'being good with young people' (Roger, project field notes) in facilitating and in 'seeing what was needed … and knowing what to do' (Phil, project field notes) so responding to the needs of the whole group, both adults and children.

Matarasso's work suggests that such expertise is present because they are practiced in 'being with people, working together, responding, interacting' (Matarasso, 2012:6-7). These were the assumptions with which the project operated and appeared to be implicitly understood as the role of the artists by all participants. Whilst rarely explicitly discussed pre-project, these skills were evident in all sessions, and were often commented upon afterwards as 'what they are good at' (teacher D, project field notes), a core identifying characteristic of their practice. They were described as having 'at least half a dozen' ways of 'engaging' and 'steering' (Phil, post project interview) the energy in the room, as 'open [and] sharing' (Phil, post-project questionnaire), 'observant [and] sensitive', (Roger, post-project questionnaire), 'charismatic and engaging' (teacher B, post-project interview), generating 'ease' and 'fun' (teacher focus group; children's focus groups).

Similarly, Meade and Shaw highlight the significance of such skills and practices. They suggest that artists, like the imagineers, experienced in working in participatory contexts, ensure that 'the arts provide a site[9] where political and pedagogical roles and relations can be renegotiated and re-imagined' (Meade and Shaw, 2007:414). The desire to effect social mobility at the heart of the pedagogy was evident in planning discussions with the teachers where Kathi advanced the idea of the teachers 'as if imagineers; learning with the children' and where 'children's ideas lead the work' (pre-project field notes). The point was also noted by Sharp and Dust (1997) and Thomson et al (2012) from studying artists working in schools, that working 'as if' art-makers both requires and generates a particular kind of *culture*, a point I discuss further in Chapter Six. Thomson et al (2012) imply that art-making with artists can generate a space, and thereby foster a culture, where boundaries are more porous and fluid, where the familiar can be re-framed and the familiar newly framed. This constitutes an 'invited disturbance' (Trowsdale, 2005:36) to typical school routines, which, as the term suggests, was recognised and intentional in the project design.

[9] Whilst Meade and Shaw (2007) do not expound, their use of the term 'site' it appears to echo the sense I suggested earlier in Chapter Two, which embraces the physical and symbolic spaces; the enacted practices, pedagogies and lived culture of art-making and art-makers.

The schools in this project invited imagineers in as a disruption of more regular schooling, a reframing and thereby a means of expanding learning possibilities. Imagineers spoke of 'trying things out' (pre-project field notes) of needing to 'break the roles' (Kathi, pre-project interview) children typically played in school, with a view to expanding their sense of their own capabilities. Engineers' likewise expressed their intention to help children 'test ideas' (Phil, pre-project interview). Whilst that might be through 'materials' and be focused on 'discovering the principles' (Roger, pre-project field notes) of engineering, both Roger and Phil's expressed views, which align with Ingold (2013) and Sennett (2008), that the physical act of making is also one of self-making, that children would develop self-esteem and belief through mastery. They saw themselves as modelling this as a complement to the artists, thereby giving permission and encouragement to children to act in similar ways. This modelling very deliberately demonstrated and affirmed both the importance of learning through practice and of how it is developed interactively. I return to the role model of imagineers within analyses of behaviours in Chapter Five and more explicitly in Chapter Six.

4.3 Drawing on theatrical art-making in the project design

The Imagineerium project was intentionally modelled on Imagineer Productions' art-making processes, interwoven with those of engineering designers, following the experience of 'Godiva Awakes' (pre-project field notes). The idea, for example, of children having journals and sketching ideas (their own and their group's) directly echoed that of Jane and Kathi journalling their own ideas and sketches and then sharing these with Franz Wesselman, an artist who drew their ideas for Godiva. Likewise, childrens' group development of 2D and 3D models as protoypes which informed a technical drawing (here hand drawn, but CAD for 'Godiva Awakes') followed the stages involved in the process of creating Godiva. The final idea of children pitching ideas reflected the regular habit of Imagineer Productions assembling visual designs and making presentations in order to win bids (background field notes, 2013).

The negotiated design process, led by children's ideas, was shaped by the collective values and beliefs of the imagineers; that children are innately curious, imaginative, and capable, but also with individual strengths and interests (pre-project field notes; pre-project interviews). Kathi suggested that 'children are more liberated and free. They still have that essence… that truthfulness about them' (pre-project interview). Focal in these discussions was the shared view, unsurprising for people who work in physical forms, that 'you learn by doing' (Mark, pre-project interview; Kathi, pre-project interview; pre-project field notes); that doing is a mind-body learning process (Merleau-Ponty 1958/2005; Wilson 2002; Bresler, 2004; Claxton, Lucas and Webster, 2010; Ingold 2013). In planning they spoke of wanting the children to 'uncover [things] together' (Sarah, pre-project interview), to recognise that 'feeling unconfident' (ibid; Mark, pre-project interview) and 'challenged' (ibid) at particular moments 'on the journey' (Sarah, pre-project interview) was a necessary condition of living and learning. These views reflected those of Dewey (1938) and (Lave and Wenger 1991).

Imagineers voiced a desire to design learning which would allow the adults 'to read' the children as individuals and 'respond' (Kathi, pre-project interview) to their dispositions and interests through the social interaction and the collaborative practical problem-solving inherent in art-making. Of equal significance was the importance of the design to 'excite' (pre-project interviews; pre-project field notes) the 'imagination and potential' (Kathi; Roger, pre-project interviews) of every child. The intention, evident in pre-project discussions, (pre-project field notes) was to use theatre to frame the project as a commission to these newly forming communities of young imagineers, positioning children within a world at once real and imagined (Kathi, pre-project interview). This theatricalised framing of imagineering was recognised as a 'hook' which 'surprises' (pre-project field notes) and 'feels fun' (ibid; Mark, pre-project interview). 'It's our job to keep inspiring … to help unlock, to engage every child … [so that they] express themselves, explore, question, try, do, be' (Kathi, pre-project interview). The aim of the imagineers from the outset was to 'romance' (Whitehead, 1929) learners and foster curiosity, because 'when you're genuinely curious there's an energy … to want to know more' (Sarah, pre-project interviews).

Imagineers' expertise in performance shaped the design of the project, particularly at key moments. The details of how 'performance' moments might be realised were not discussed at length in project planning, but were effected both through Kathi's direction (with ideas being communicated via email) and the tacit understanding of artists who have worked together and are able to improvise (project field notes). For instance, the arrival of imagineers at school on the first day drew upon site-specific theatre and upon street theatre traditions in re-appropriating school playgrounds for performance and implicating children in that imagined world. This is discussed further in Chapter Five in the first vignette. Later on in the project, when children came to Imagineer Productions' art-making base, the Imagineerium, the visual and performative aesthetic of the company were evident in the theatrical way Godiva was lit, positioned, and animated to music to create a theatrical encounter. Likewise, attention was given to the workshop spaces to make visible the elements, materials, tools and stages of art-making for children, in a not dissimilar way to that used by Reggio Emilia's creative recycling centre (Remida n.d.). This is discussed further in Chapter Five in the last vignette.

In addition to clearly theatrical elements, the project design drew on a drama education model, itself an adaptation from participatory forms of theatre, Heathcote's (2004) 'Mantle of the Expert' (MoE). Although not explicitly discussed between imagineers as MoE in planning meetings, it seemed to be one Kathi was familiar with, perhaps from her experience of teaching in schools. The principles of the form, once mentioned by me, were ones she considered 'natural … what you do in drama' (Kathi, pre-project field notes). The term 'mantle' was chosen by Heathcote to communicate the sense of how the qualities of expertise surround the children, but are not the child, they are 'worn', as a cloak might be. Mantle here denotes 'qualit[ies] … of leadership, morality, responsibility, ethics and the spiritual basis of all action' (Heathcote, 2009 cited in Aitken, 2013:35) which give rise, in an imagined context, to exploration, discovery and generation of new knowledge and understandings.

Working in teams, children were required to lead, negotiate and achieve the brief set, including elements such as managing the ethical requirements to use materials responsibly (pre-project field notes). The approach was one where children were being

framed as young imagineers, 'behaving … "as if we are experts" ', so that they would be 'thinking from within the matter of concern' as opposed to 'thinking and learning about things' (Heathcote, 2004:5). This shift of perspective has two significant dimensions for my analysis of the imagineers' design of the project. Firstly, the re-framing of 'as if' in MoE enables children to suspend disbelief in their real capabilities; the adults create the conditions and experiences whereby children can show or develop enough mastery to assume the 'mantle' of whatever expertise the project requires. Secondly, it invites them to behave 'as if' an expert by taking on a role, standing in the shoes of, and thus 'undergoing' (Dewey, 1938; Ingold, 2013), thinking and feeling one's way through an experience. The effect is to reduce the distance, or to increase the relational proximity, between child and 'the matter of concern' and foster an emotional commitment to an educational experience which is not necessarily assured when learning 'about things' (Heathcote, 2004:5).

Together these dimensions can foster children's sense of having new capabilities and an improved conception of self in relation to the challenge posed by the imagined scenario. This was an aim articulated by the imagineers who wanted to make children feel important as imagineers (for example, Kathi, pre-project field notes). As Edmiston (2003:225) suggests 'power and authority relationships are changed …[so that] students' sense of their personal and shared authority … become more secure and more extended while at the same time aware of others' authority'. Edmiston draws upon the conception of 'community of practice', outlined in Chapter Two, as useful for 'viewing the classroom as a space for collaborative activities [rather] than for individual accomplishments' (Edmiston, 2003:224) or, perhaps, following Lave and Wenger (1991), that individuals and their achievements are developed through, by and with others. Heathcote emphasises that, when the fictional frame of MoE positions children as imagined experts and actors within the collective endeavour, it 'introduces the "now immediate" time of theatre' (Heathcote 2004:5), which creates an urgency and importance to the task. Here, whilst a MoE-like frame feeds the project, the commission of *The Imagineerium* project is not all fiction, and not all aspects of MoE fit the project. The imagineers they encounter are at once costumed actors in role and real makers, drawing upon experience and training as engineer, artist or both.

Sarah and Mark, for example, are playing imagined roles as time travellers in their opening performance in the playground. However, this imagined role is grounded in their authentic professional roles as skilled, expert performers, able to elegantly lift and support each other, hold an audience's attention, improvise and choreograph movement. The fiction, here of time travelling imagineers arriving at school with a mission that they need young imagineers help on, is blended into a real cultural production task being undertaken by a community of practising professional imagineers. The challenge they undertake is an authentic one, with a real deadline and urgency. Where the imagined world might afford children opportunities to imaginatively try out taking on a role impossible in the real world, professional and educational standards of health and safety as well as quality mean that some dimensions of ownership of this project are not open to children. They are invited to work alongside artists and engineers, to learn as they take a part in the community of practising Imagineers. However, the need, for example, to keep children safe whilst learning manual technical skills presented a challenge in terms of the level of autonomy in use of equipment. Using a supported slow drill, a hot gun, or a sharp knife is potentially dangerous and concerns for safety, rather than for a sense of equality, characterised discussions and informed decisions that some tasks needed to be undertaken by an imagineer, or at least under careful one-to-one supervision. In Chapter Seven I note that children talked of having done something when in fact they had typically stood alongside and watched an adult imagineer actually perform the task. This suggests that children felt like 'doers' (Heathcote 2004:5), which was key to *The Imagineerium* project design, that children would take some responsibility for decisions and experience 'trial and error and learning from failure' (ibid).

Heathcote argues that a sense of responsibility develops because the design of MoE means children are 'serving the needs of their clients' (here the commissioning Coventry City Council) which imposes a 'dignity of standards and feeling that their work is important to others as well as themselves' (ibid). The project design requires children, in teams, to be responsible for delivering completed designs to a deadline in order that the selected one can be built in time for the August Festival of Imagineers (pre-project field notes). The idea generation process and use of physical theatre, which is at once true to

artists' processes and reflects the 'element of play inherent in all the work' also builds belief in the routines and tools of the organisation, and of the teacher (here imagineers) 'modelling behaviour and attitude' (Heathcote 2004:5). Both the playful and the systematic process of idea generation that imagineers model are important to the process of imagining an inspiring structure and performance, designing and learning how to make the structures strong and able to withstand the vibrations of movement. These factors are real elements of *The Imagineerium* project. Children are initiated into the practices of imagineers. Imagineers are professionals, working to a commissioned brief, but part of this brief is to help develop young imagineers. Children are therefore, as young imagineers, planned to be legitimately positioned as 'peripheral participants' in relation to a community of practising imagineers: which 'takes as its focus the relationship between learning and the social situation in which it occurs' (Lave and Wenger 1991:14).

As Heathcote describes, learning is planned for and operates in a MoE model as 'a flowing system' likening it to 'a river, [with] tributaries feeding in, and an estuary where all the different aspects of the work achieved come to a conclusion of wide and inter-related understanding of the many strands of enquiry and skill' (Heathcote, 2004:3). Her account reflects the character of the dialogue in planning meetings where aspirations were for children to learn skills, to construct and deduct understandings to inform each other, co-developing and feeding the development of the habits of mind of an imagineer. This, imagineers believed, reflected 'how we do things', (Kathi, pre-project field notes) and 'how we learn' (Jane, pre-project field notes). Their account reflects that of Lave and Wenger whereby the development of skills, knowledge and understanding, is both inherent to and a by-product of the core task.

4.4 Spaces and sites

In this last section, I discuss the range of spaces used and adapted throughout the project for the purpose of art-making and how imagineers sought to characterise them as such.

They comprised playgrounds, classrooms, school halls, other (often in-between) school spaces, Imagineer Productions' workshop spaces and also the city centre. This overview account sets the scene for the next chapter where a series of vignettes reveal the significance of particular uses made of spaces.

As a designed disruption to how children experience schooling, it was important that the project began in a school location. Kathi spoke of this as a deliberate intention, to 'surprise' the children with 'a time travelling machine ('travellator')… and a performance … in an ordinary school space' (pre-planning field notes). In a practical sense the playground was the only possible space to cycle this 'travellator', a moving vehicle of three tricycles enclosing a three-metre tall, one metre square platform, into a school. But the physical location of the playground also had a significance for the project's intentions representing an 'in-between' space between formal schooling and wider life. The point of liminality suggested by this choice is taken up in Chapter Six in discussion of art-making as a site for learning. Likewise, the movement from playground to classrooms required children to experience the necessary disruption of the default use of the classroom. In a planning meeting, teachers had suggested clearing the space ready so as not to waste time, but Kathi, as lead imagineer, was clear that this did not fit the logic of the Imagineers' arrival: that they were unexpected (pre-project field notes). Additionally, the active experience of clearing the space of tables and chairs clearly signalled that something different, and collective, was about to happen and gave children time to adjust to this intention. Over the project period as a whole, the use of the classroom space was not consistently arranged as an open space, but the typical 'grouped tables were used differently' to default schooling (project field notes). The collective task required a different physical, relational and intellectual engagement between children, a point which is pursued in Chapter Five where each vignette notes the effect of different use of physical space, and vignettes 5.4 and 5.5 explore this particular point. This reordering and different use of space meant at times that, for example, two children might be using a group of tables typically used by six, in order that they might generate a space which could house large paper, resources for building and over which they might stand, lean and kneel to work together (project field notes).

At times the project moved to hall spaces (or in one case the playground) signalling the need for larger spaces, where fluidity between the collective, groups and individuals, engaged in physical action and the use of larger equipment is possible. These different uses are noted in vignette 5.3 where children explored scientific concepts through physical theatre. Such a description might appear similar to how spaces are used in Physical Education lessons and this is indeed a useful reference point, signalling the active and physical character of the practice but it was also qualitatively different (project field notes). This is taken up in some of the vignettes in Chapter Five and discussion of art-making spaces in Chapter Six. Other neighbouring, less tightly purposed or bounded spaces, in the school often afforded a value for groups engaged in particular tasks. Corridors, understairs, cloakrooms, open areas between classes which might be used by support staff and individuals or groups were adopted at times for a group to explore, for example a movement, or a mechanism (ibid). In one session a range of materials were laid out and investigated for possible functional and aesthetic value to designs. Here these kinds of small spaces created an intimacy as five or six children touched and discussed the qualities of materials in relation to ideas and purpose. It also legitimated a come-and-go, free-flow movement between resources, people and spaces, perhaps more common in early years schooling (ibid).

Rather than a re-appropriation and adaptation of school space, the physical Imagineerium space offered an experience of an authentic art-making space. It is an industrial warehouse, the former powerhouse of the Daimler car industry, located centrally in the city, near the canal basin. This location is significant as a historic site for the people of the city and also easily accessible by foot or vehicle by young people as well as professionals. It has elegant arched windows within a brick skeleton, which are at odds with other units on the small industrial estate. Daily access is through a metal door, which crashes loudly in use, set within the larger metal rollered opening. From here the three maker spaces of the building can be accessed. Wide bare wood doors open to the workshops on the right, metal steps lead up to an open rehearsal space, but immediately facing, a third of the building, formerly housing the winch of the loading bay that lifted car parts from and into canal boats, reaches to the full height of the building. This space can just house a standing eight metre-tall Godiva. The strong metal frame can also

provide an ideal frame for rehearsing aerial performance work, as for 'Godiva Awakes'. One industrial air heater can blast warmth in the downstairs workshop; although this fills the air it makes no impact on the concrete floor. Some heat filters upstairs to the rehearsal studio, but it is a cold space (project field notes).

Costumes from carnivals and events, hang on rough wooden and mobile metal clothes rails lining the walls of the upstairs rehearsal studio. Likewise, large open shelves line almost every wall of the main workshop space, housing materials, recycled and found 'stuff', some in boxes, others simply demarcated in section. Colour and texture assault and excite the eye. Some prototypes and models from previous projects are arranged and reveal stages in the maker's work in progress, but the central area is tall worktables, strongly constructed, with structurally supportive shelves underneath, from bare wood. The surfaces bear the marks of previous projects – paint, pen marks are obvious and typically materials related to work in progress adorn the tables. Children are reminded by the imagineers that this is a 'professional', albeit a 'messy', 'working space' and that some tools are 'out of bounds' (project field notes) for their safety, but they have access to all spaces and over their time at the Imagineerium, get to work in all: the workshop, around Godiva, in the studio and outside. Within the workshop, each group has a worktable and a whiteboard as a location, a station for their making, but are given permission to move around, to use the floor, to move to an appropriate space as the task they are engaged in dictates. They are given freedom to use most materials, invited to ask for advice and help from imagineers who collectively encompass the expertise of engineers, scientists, designers, visual artists, directors and performers. A separate table houses a selection of tools which imagineers operate or closely supervise, such as hot glue guns, sharp knives, saws and small hand drills (project field notes).

The professional practices of the imagineers characterise the work and work ethic into which children are inducted. Yet this induction is not formal, but warm and collegial. This warmth is aided by the behaviours of the imagineers, led by the artists, who chat to children whenever possible in those in-between times. Collaborative art-making is the modus operandi and the context in which the engineers' and artists' skills and expertise are developed. A time is agreed for lunch, at which point fold-up chairs are put out and

groups congregate to eat and chat, but otherwise there are no formal breaks to the working day. Safeguarding concerns, which recognise the open access to the building, limited toilets and the potential appeal and danger of the mechanised Godiva and other equipment has generated the adopted practice of children informing an adult when they are going to the toilet. Overall the rhythms of the day follow the needs of the practice and the task (project field notes).

Children who chose, and whose parents supported them to do so, also took part in the final performance event, the city's first 'Festival of Imagineers' in Broadgate Square, Coventry city centre. Here the children's designs, realised in full-size, formed Godiva's cavalcade. Public attention in the square was focused for a few minutes on the small performance pieces developed by the children to complement their animated design idea. As a public space in holiday time, this necessarily brought parents, families and imagineers together. In one school almost all children took part, in another a group of twelve, largely girls, performed and in the third, where a sharp cultural divide between school and out of school hours exists, only one boy was involved. He performed with children from a neighbouring community who took over and rehearsed roles developed by his peers in school.

These spaces, and their use, within and without school were designed intentionally to signal learning as an activity not limited to school. They also signalled that the variety, fun and novelty of learning experiences could be developed through such choice and use. This chapter analysed how the history and practice of the emergent community of imagineers, formed a context for *The Imagineerium* project design and how its conception and development echoed that of a 'community of practice' (Lave and Wenger, 1991). The use and adaptation of physical 'spaces' throughout the project, which inform the idea of art-making as a site, is developed in the next chapter in a series of selected vignettes of project activity. Through analysed fragments, chapter five explores how the project foregrounds the practices of art-making as educative for children, pointing up the themes which are then discussed further in subsequent chapters.

Chapter 5: Experiencing *The Imagineerium* project

This chapter focuses on the children's experience of *The Imagineerium* project. It comprises a series of vignettes of key moments, selected and analysed to draw attention to particular aspects and themes which resonate with the argument I am advancing through the thesis. The chapter then addresses primarily the first research question, exploring how the project foregrounds and articulates the practices of art-making as educative for children, which is pursued further in chapter six, but also signals structural elements which form the second research question and are pursued in chapter seven. Narrative in character, the account interweaves present tense description of vignettes with reflective analysis. Analyses draw on a range of data gathered: primarily, from my own field notes taken during the project phase or from reviews of video after the event, from interviews, questionnaires and journals. The chapter comprises six vignettes, selected to reveal the different ways in which art-making is characterised, located and structured and how the young people involved responded. As such, and in recognition that the project was neither enacted nor experienced identically in each school setting, vignettes, voices and characters typically reflect moments from the project in a particular school but have been constructed to capture nuances common to all three. As such vignettes might be recounted from data primarily gathered in one school. The use of the present tense in the vignettes reflects anthropological practice to generate a sense of 'being there' (Geertz, 1998), a feeling of the immediacy of the experience.

5.1 A theatrical 'invited disturbance'

On a chilly winter morning in February, children arrive at school and gather in the playground, chatting to friends and playing games. In their midst a strange vehicle appears. Cogs, wheels and clockfaces adorn the central structure on which stands a woman looking through binoculars. Three tricyclists, similarly costumed in brown wax coats, boots, beige trousers, white shirts, waistcoats,

red neck scarves, goggles and caps, are responsible for its movement. A fifth stands perched on the bar between the back tricycles. Children step aside in surprise. They watch with fascination, sometimes smiling and giggling but seem unsure as to how to respond. The vehicle stops and some of the cyclists dismount, looking around. They seem concerned. Two consult a map and each other whilst also looking around at the landscape. The woman on the structure does not dismount but surveys the area, and the children, through binoculars and occasionally asks a question out loud as if to her fellows: 'Does anyone know where we are?'

The two with the map move a little away from the vehicle into the area where children are congregating, but largely look out at the grounds and again at the map. Occasionally they make comments or ask questions to the children. 'We're on a special mission' or 'We've been travelling such a long time.' A few intrepid individuals step closer and one of the cyclists questions them. 'We're looking for "mount" "fields" ', she says deliberately. 'There's a mount here and a field there', she adds pointing at the map and then looking intensely at the hump of grass beyond the playground. She asks 'Do you think this is it?' Some children giggle, no one speaks, although one mumbles 'I don't know'. A few adults appear and join the children. One asks the children what's going on and what has happened. The children are bemused, some point but rarely speak. A bell is sounded and most of the children are ushered into the building. One of the adults and about twenty children have remained and they are joined by another adult and a few more children. Perhaps reassured by the presence of the adults, more of the children move closer.

The woman, still holding her map, tries her questions again with another group of children. This time they look at each other as if willing each other to be the first to speak. One child launches in. 'This is Mountfields' he replies waving his arm around vaguely. 'It is?!' pounces the woman excitedly. The news energises her and she relays the information to her peers. They consult and decide to address the congregation,

> We've been told that there are some very special people that can help us with this important task that we've got to do … We've been travelling a very long time and through time – we started a long time ago. We're on a special mission … – Can anyone tell us what time it is now?

Most are reticent, giggling nervously to each other, but some children cannot resist the pressure of the direct address and the eye contact with these strangers and a dialogue ensues in which the time, date and year are confirmed. They announce that they are looking for a particular group of 'imaginative children'.

> We are the imagineers! (pointing) Number 3, number 2 and number 1: Sarah, Mark and Kathi are artist Imagineers; and these are the engineer Imagineers number 4 and 5 – Roger and Phil…. We're on a very important mission and we've been given this chest and suitcases and told we are not allowed to open it until we find Mountfield school, year 5 (children cheer; imagineers look surprised) And that's you?!'

As this last piece of information is confirmed the imagineers are jubilant. They whoop, 'Yes!' says one, 'Fantastic!' another, they hi-five each other and some start to circulate midst the children, asking 'Can I just shake your hand?... Hello… Very pleased to meet you' whilst greeting children. The chief imagineer verifies the news with the children by showing them a label on the largest chest stating the school name and year. 'And the label says Mountfield school, year 5 (children cheer again). So shall we go and find out what's inside?' Children respond quickly and eagerly, with many keen to help with carrying boxes and suitcases in. Many of those who are not carrying anything skip or run alongside those carrying, opening doors or just beaming, looking at each other with a mix of shared pleasure or slight incredulity of the experience. Others, still unsure, follow after.

The appearance of imagineers cycling a quaint vehicle was unusual as the beginning to a school day, or to a learning experience per se. The approach piqued children's curiosity, prompting them to wonder what the event might signify. Spoken and written reflections affirmed that this appearance had stimulated pleasurable wonder and anticipation. As Maarika announced quite dramatically: 'When I went outside and saw the big time-travelling machine my level of excitement went from 5- 58' (journal entry). This excitement was stimulated by the novelty of 'walking to school when we saw the travellator coming along and [the imagineers] asking me questions' and then seeing it 'come into our playground' (Kiran, interview) realising that this was 'for *our* class!' (Abaar, interview).

Children were unquestionably drawn towards the imagineers. Eye contact and physical positions indicated rapt engagement (project field notes). Imagineers' naive questions, about location and time deliberately suggested a vulnerability, signalling the possibility of an equal and collaborative relationship between adult and child, reflective of

Heathcote's 'mantle of the expert' MoE (Heathcote, 2004; Aitken 2013), discussed in Chapter Four. A MoE-like drama frame fed the imagined context for the forthcoming commission, willing children to believe in the imagineers as time travelling inventors, who practice in Coventry. Children were invited to suspend any disbelief, to accept their implicated role in the drama and to begin to use 'their social and cultural imagination to create a shared imagined world' (Edmiston, 2003: 222.) where they might discover new capabilities and possibilities for themselves.

The 'larger than life' characterisation of the imagineers, their costume and slightly comical introductions as time travellers, who identified each other by number, signalled a playful sense of the extraordinary, but one which Thomson et al. note as 'profoundly serious in … intent and effect' (2012:17). Adults who are dressed in relatively 'uniform' but eccentric ways, who get lost, who cannot read maps, who need children to realise a task set are unusual and thereby amusing. But the disruption, the inversion of role: the incompetent, needy, 'uniformed' adult, in need of the competent, 'expert' child was central to the educational purpose of the project. Thomson et al (2012:17) note that a hallmark of artists, is the gently disruptive 'affordances' (Gibson, 1979) they draw upon and create, which expand children's sense of what is possible to do, be and become. *The Imagineerium* project starts here to suggest a liminal space as it fluctuates here between the real-world of school and the 'not quite yet' learning dynamic of the imagined world where children are learning the behaviours and skills of imagineers.

> [t]he imagined world does not replace the everyday classroom world, but rather begins to be created alongside the everyday world [allowing all to] interact in both worlds simultaneously and … move back and forth between them. (Heathcote, 1975, cited in Edmiston, 2003)

This theatre-based character of art-making and its educative significance is taken up and developed further in chapter six.

This vignette captures the initiation of an 'invited disturbance' (Trowsdale, 2005: 36), an orchestrated event in which both the schools and imagineers were complicit. The schools involved were known to welcome arts-based project. These head teachers and teachers tended to see such projects as ways of usefully disrupting habits in order to

introduce new experiences, insights and perspectives to their children. Whilst well intended, such disruption was at once exciting and unsettling for children, albeit to different degrees for different children, as was evident in children's journals and reflections after the first session. Alongside the felt, and expressed, excitement, many reflected some sense of nervousness about what the imagineers and their commission signified for them, both as people and possibilities that were unknown: 'I was quite nervous about working with people I don't know' (Maarika, journal entry). A number of children, particularly the higher achieving, articulated this as a fear of not being skilled or knowledgeable enough to meet expectations.

> 'I was a bit anxious because I didn't know how it was going to go and what would happen next, if you had to know something before, or were they going to ask you lots of questions … what the imagineers would expect from you' (Hema, interview)

In most cases the feeling was temporary and appeared for some to have been 'part of it' (Adila, interview), intensifying the pleasurable feelings. This latter point is echoed in Maarika's expression of concern being followed immediately by the comment 'but I actually enjoyed it' (Maarika, journal entry). Hema's likewise noted that her worries 'only lasted for a session because I started to know the people, what they were like …' (Hema, interview). Indeed trust seemed to be quickly built with the imagineers and meant that whilst children might feel 'worried at first' they 'soon picked up confidence' (Darius, journal entry). The words 'fun' and 'excitement' were the most frequently written and spoken when reflecting on the experience. Anxiety was more marked or continued longer amongst the higher attaining children. Azaad, like Hema, 'thought I might make a mistake. … I was, like, quite scared and a bit anxious' (interview). However, whilst Hema's concerns dissipated within a week or so, Azaad's did not.

5.2 Initiating young imagineers into the community.

In the classroom, imagineers ask the children if we can 'make some space?' and in minutes tables and chairs are stacked and all are in a circle. Kathi ceremoniously lifts up a small chest. 'Shall we open it?' she asks prompting children to shout 'yes!' excitedly. She does so and quickly circulates the room so that everyone gets a glimpse at the scroll inside. Some sharp intakes of breath and 'ooh's can be heard as children peer in. Kathi slowly lifts the scroll and unrolls it, looking one moment at the scroll and another at the children. 'It's about our mission!' she stage whispers, leaning in towards them conspiratorially. 'This is your challenge' she says and starts to read. As she reaches the end she sighs loudly. 'That's a lot of words isn't it? Shall we just go over that?' A number of the children nod or speak agreement. As she starts again saying 'to imagine, design and create a unique, moving performance vehicle' Sarah interrupts 'What does "imagine" mean?' she asks. 'What do *you* think?' Kathi asks the class, accepting all suggestions, but allowing time for thought. 'Thinking in your head' and 'thinking up something' are suggested. But the suggestion of 'dreaming of something that's never happened before' generates more approving noises. 'Does that help you number three?' Kathi asks. 'Oh yes, thank you' Sarah replies. In the same way they explore other words such as 'design' and 'unique. Some children have become less engaged, they watch but are not contributing. One is rocking from foot to foot, another hugging himself. They appear tired of standing….

A while later Kathi reveals a second scroll, a 'story scroll' which she hands to Mark who announces with a playful smile that he knows 'a brilliant way of telling the story!' Sarah gestures the children to sit down as Mark tells them they are now in a 'whoosh' which he explains 'doesn't care if you're tall if you're short, if you're a boy or a girl … all it cares about is that the story is told.' He launches immediately into the storytelling convention. 'Once upon a time there was a woman'. He gestures to Sarah who enters the space and adds 'who was very old'. Sarah mimes walking as if leaning on a stick. Once this has been seen he adds 'and had a bad back'. Sarah holds her back and Mark quickly adds 'and could speak French'. Sarah says 'Bonjour, comment ça va?'. Mark's tone of voice becomes chatty again as he says 'So you can see how the story happens. And she stays there doing that…' Mark watches in silence for a moment as Sarah continues, 'until I say whoosh whoosh, whoosh and whoosh and then she returns to her place.' Sarah steps out of the circle and back to where she was.

Mark makes strong clear eye contact as he talks, reassuring children that a tap on the shoulder or look will clarify when they are to join in. He pauses theatrically, opens the scroll and carefully enunciates 'Once upon a time there was a beautiful forest' and taps seven boys to go into the middle 'with big tall trees'. As Sarah joins them, modelling, they copy her stretching their limbs to create tall interesting tree shapes. She whispers guidance to them 'let's spread out', encouraging them to use the whole of the space. Mark starts a soundtrack, which helps focus attention and build atmosphere. 'And in this forest lived lots of animals…' Children watch in anticipation as he names the animals and taps each child. Laughter ensues as he names the first animals. 'The elephant, the hippo' he says aloud, but calmer and with a paced, regularity as 'the deer, rabbit and squirrel' appear. Sarah models a possible action simply as each child steps into the space. By the time all the children are in the space, there are smiles everywhere as they move, giggle and respond, some more self-conscious, but all involved. The first whoosh sends all back to their places, but the eyes and bodies are now alert and keen for the next stage.

This time girls are selected to form the forest. A small girl is selected to initiate 'the smallest of flames …. which soon grows … until the forest is engulfed by a raging fire'. Sarah works with her, quietly suggesting ideas to her and then to rest of the girls who join but are initially a little self-conscious and small in their movements. Mark adds detail 'orange, red and yellow flames, twist and turn… slowly at first but then faster'. This is an action that needs to be maintained, so Sarah actively feeds their commitment, weaving in and out through the group of girls. In some girls the movement develops a little but remains reserved, the 'flames' small; others are drawn in and commit more. Other children enact birds who 'flew away from the forest' or animals who 'fled their homes'. At the introduction of 'the humming bird' Mark's storyteller voice shifts momentarily to a chatty, informal tone as he asks, off script, if 'anyone knows what a hummingbird is?' One girl informs the class that 'it's a bird that flaps its wings so fast that it makes a humming noise'. 'Yes', he replies, 'and is it a big bird? 'No' she and several others reply, 'a tiny one'. 'Tiny' he echoes slowly pinching his fingers to emphasise the smallness of the animal that will, in the story, make so much effort to help.

As the story progresses, the behaviours are more collaborative. Children appear to relish taking on a role, being alongside and supported by each other. Boys are less reticent and are making stronger eye contact with each other. Smiles fill the room. By the time Mark suggests that the 'animals' echo his 'Don't bother!', to belittle the Hummingbird's efforts to fetch water to quench the

fire, the chorus is loud and strong. In the final exchange between the elephant, played by Zabia, an academically low achieving girl and the hummingbird, played by a volatile and frequently disengaged boy, the class engagement is such that their single voices (the last read directly from the scroll) are properly attended to. The hummingbird's 'I'm doing the best I can' is felt. In fact when the boy, proud of his role, mistakes Marks 'then he carried on' as text to be repeated, the laughter which it prompts is warm and collegial. The children all seem to recognise both the significance of the key words and the humorous error. There is a tacit sense that they are becoming involved in collective work; that they are establishing their way of working together and are comfortable in it.

If children had thought the scenario in the playground a one-off novel and theatrical event, it mattered for the project that the educative affordances this theatrical introduction had signalled, continued as they moved to the classroom. Sarah's questions continued her MoE-like modelling from the playground of the behaviours and attitudes of imagineers as curious and collaborative. Children experienced their ideas and views being needed and valued. They experienced thinking and developing an understanding as a group. The inversion of status between adults and children and the legitimacy of asking questions was exaggerated by Kathi's 'Does that help you number 3?' to which Sarah, number 3, confirmed 'Oh yes! Thank you.' As Heathcote suggests '[t]he language is always now, immediate, colleagueness, and task orientated' (Heathcote, 2004:7). Sarah's behaviour highlighted how imagineers modelled discovering this commission alongside the children, as if the content was unknown to them. Sarah's naivety, in her Rancèirian low status role, allowed children to assume, show and grow the mantle of expertise (project field notes).

The use of space furthered this sense of equality. Standing in a circle in an open space enabled everyone able to see and hear each other, to value each other and be valued (Miller and Moran, 2007). In addition to attending carefully to children's answers, imagineers signalled their interest in engaging with and learning from the children in other ways. A smile or gesture towards a child who offered to speak, repeating their words verbatim 'upgrades [a suggestion]… by repeating' (Wagner, 1979:69), a technique

that Heathcote advanced, signalled the importance of children's contributions and investment in the activity. Such actions, holding eye contact or making encouraging sounds, were ways in which imagineers 'edged in', signalling that 'wherever you are is alright' (Wagner, 1979:34). Taking the time to focus on the details, on key words in the commission, gave children time to absorb the ideas and understand what was being proposed. The need for such reassurance was apparent in some children's non-verbal communications at the end of the first reading of the scroll. Whilst many children sought or maintained eye contact with imagineers, suggesting an engaged readiness to be part of the commission, there were also a number of nervous glances away from the eyes of imagineers and peers (project field notes). In its equality, the circle was also an exposing space, making it difficult to hide. One teacher suggested that concentrating on the spoken word for a length of time would have challenged children for whom English was not a first language. Another commented that they were 'not used to standing for such a long time' and were possibly tired (project field notes).

The clear signals, the supported actions and inclusive nature of the hummingbird story whoosh activity generated little opportunity for or likelihood of resistance from children. Whilst some were more hesitant and self-conscious with first roles and needed encouragement, they were swept along with others and found themselves within the experience, strengthening their commitment to the task almost without thought. Production quality was not the focus; what mattered was being there and doing it together. This emphasis on 'sociality' that art-making with others typically fosters is something that Thomson et al. (2012:17) note as significant, and is central also to Lave and Wenger's (1991) account of how communities of practice operate. Mark's storytelling was largely improvised. He did not read the text verbatim from the scroll but used it as a reference, instead drawing on oral traditions (establishing the setting and then detailing) drawing on his experience of improvising in and writing for physical theatre performance. He fed, watched and responded to the children's behaviours. So when he suggested the elephant and rhino as the first animals, he appeared to do so deliberately. The choices invited and prompted giggles through which he could build a relationship, and signal that 'playful' (Thomson et al., 2012:22), instinctive reactions are to be encouraged. His smiles and laughter with the children, communicated that having

‘fun’ (ibid:27) and relating to each other matters and is part of doing and learning. When he signalled that the spoken words are those of particular characters to be repeated by the children playing those characters, if some are late in reading the signal and do not join in immediately, others will cover, so the form is forgiving and supportive.

The sense of enjoyment was perhaps unsurprising as 78% of children (boys and girls similarly) suggested that they enjoyed drama before the project. But the form of the ‘whoosh’ allowed for different degrees of engagement. Simply being present, however peripheral the participation, is legitimate (Lave and Wenger, 1991) and still important. If an idea requires development or repetition because a child misses a signal to enact something, or doesn’t quite grasp the idea, the words or guidance can be revisited gently, playfully, expressed in a different way, with further detail. ‘Mistakes’ are common and part of the playful, readiness to have a go, nature the project seeks to foster. Children and imagineers giggled, smiled and gently bonded as a community. Discussion after the ‘whoosh’ indicated that the experience of enacting the story enabled children to easily grasp the significance of the hummingbird story. Most children put their hands up to propose what the story might mean, suggesting that it was telling us that as imagineers they needed to ‘keep on trying’, ‘don’t give up’, ‘try your best’, ‘don’t be judgmental’, ‘it doesn't matter how small you are just keep on trying’, ‘persevere’ and that ‘it teaches us to work as a team’ (project field notes). Form and content worked together here: participating as a member of a community, acting out in a circle and the message of the story to ‘keep on trying’ functioned much like the ‘social contract’ (Neelands, 1998: ix) in the drama classroom signalling and enabling mindfulness in playfulness. By sitting in the circle, by participating in the drama supported by the imagineers, children were made aware that they are ‘safe to experiment, risk, fail, bend and stretch the rules’ but also that they must ‘think about what we do’ (ibid). Children were invited to discover that being ‘creative’ and interpreting guidance is fun and adds interest, but also that ‘tak[ing]… our work seriously’ (ibid) and honouring the ideas, meanings and feelings of others also matters.

Through the allegory of the story, children readily identified what conditions and behaviours were needed to enable their learning. The niave persona that imagineers

enacted, as if unsure how to interpret the story, positioned the children as central in understanding and setting their own agreement to try their best, to keep on trying when things got difficult and to work together as a team. The 'contract' was marked in the moment by the award of hummingbird badges - a sign of their novice imagineer roles. The badges were worn throughout the project and typically cherished by the children, many keeping them safely in their drawers and pinning them on imagineering days. This metaphoric introduction to 'behaving like an imagineer' had a unifying and motivating effect on the children, building their investment in the project.

5.3. Doing, moving bodies and knowing

In the school hall, Imagineers have assembled various simple machines: a tricycle, wheelbarrow, a make-shift wooden and rope stretcher, a large-scale pulley and a cam machine. As children arrive Sarah is circling on a scooter and explains that she and Mark are exploring 'different ways in which we could make the performance vehicle move'. 'We're thinking "Is this a good idea?" and "What could be better?" so we're really asking "How can we improve it?"' says Mark. He critiques Sarah's idea of the scooter for using only half of the potential energy in her legs. Instead he suggests, with a wink at the children, that he has a better suggestion. Moving at speed he enlists two boys to tightly hold the ends of a rubber exercise band. From his pocket he extracts a soft ball, which he holds in the middle of the band as he stretches it backwards. The action pulls the boys off balance momentarily and he teases them, much like an actor might play with an audience member on stage as part of a live show. As he launches the catapult and the ball flies through the air, he suggests this might be the performance vehicle. Children laugh – they appear to enjoy and understand the pantomime. Sarah, mock-indignantly, points out that the idea of launching a vehicle with people on it into the air, to land on a hard surface is ridiculous. The children are attentive to the game but, as spectators in theatre rather than players. Whilst they follow physically and with their eyes, they are largely silent.

Sarah asks the children what vehicle they think would be best. The tricycle is proposed. Sarah asks the children why this might be good. 'You'd use both legs', says one boy and adds 'it's using the whole body, not just legs'. She tries it and affirms his suggestion 'It's actually easier on my legs

than the scooter too – and it's got three wheels which can keep me balanced.' Once the bicycle has been established as the focus, Marks asks. 'But how does the bicycle move?'. Children offer ideas: 'the pedals', 'the pedals make the wheels go round', 'your legs power it', 'you make the pedals go up and down and the wheels go round'... Sarah and Mark pursue the responses until the words 'push' and 'force' have been spoken. 'What are forces?' Mark asks – soon push and pull are established and gravity is mentioned. A number of children can explain it as what 'keeps our feet on the ground' and 'stops us from floating' but responses to the question 'Is gravity a push or a pull?' generates a mixed response and a number of blank faces. Mark asks children to jump and asks what gravity is doing. The attention, whether to sensation or watching, or maybe a mix of both, enables children to say with assuredness that gravity pulls.

Working through the body is the focus for the next series of activities. Fast hand rubbing and the smell of burning skin allows children to recognise friction, a point which is returned to later in exploring the pulley. As they move to the whole body, Sarah and Mark talk and demonstrate each idea, sometimes inviting individual children to show, for example, how a push could start or stop movement, or change the direction of a movement. In two of the schools, it is noticeable that boys volunteer, answer questions and also move physically closer to the imagineers, with girls contributing less and staying further back. One girl, Oja, slightly hidden behind others dances from foot to foot as if trying to summon up the courage to speak, or in the hope that adults will notice her and draw her in. Previously she has shown no such difficulty in asserting a voice amidst boys, but not at this moment. When working in pairs however this behaviour is noticeably different. Exploring how using a pull and push can alter a person's speed, direction and shape, there are smiles and laughter from the girls, and especially a serious playfulness between them that has not been apparent up to this point. Mark introduces the challenge of a bent or outstretched arm to introduce the idea of the value of the length of a lever in making a movement more or less easy. Some children are wide eyed as they try and then feel the significant difference.

Sarah asks the children to 'find a partner and stand in a space'. With Mark she models how children are to 'stand opposite each other', with 'feet about a metre away from your partner'. At each stage of action, they narrate the details of how they are doing movements as they model them. Placing palm to palm at shoulder height, they lean their body weight in towards each other, forming an inverted V shape. Next they step closer towards each other, feet touching, and hold hands firmly over each other's wrists 'so that your hands don't slip and you stay safe'. Keeping their bodies quite straight and tense, they lean back, pulling away from each other to form a V shape. Sarah

advises that they are seeking 'a point of stillness', a counterbalance where 'the weight is equal' between their push or pull. Children commit to the activities to varying degrees. Some echo the tension in torso, legs and arms that Sarah and Mark modelled and achieve stable positions easily. Most translate some, but not all, of the advice heard or observed. The readiness of individuals to try to sense and feel the desired position affects their ability to achieve a firm and stable structure. Many children betray a nervous look away, when they first make physical contact, and particularly eye contact. Often they simply need to share an embarrassed laugh and then seem able to commit to and enjoy the activity. For others the signs of discomfort continue longer. Maarika is unwilling to trust giving her body weight to her partner until Kathi partners her. Even Kathi and Mark's encouragement is not enough for Adrian who politely attempts the task for a second or so but does not commit to any of the activities. A friendly and chatty boy usually, here he avoids the necessary eye contact and looks uncomfortable. Less than half who attempt the 'superman' flying activity, placing their pelvis over the back of a kneeling child and holding their body tense, are successful. Children have more success with pulling away. Over time, with practice, success improves. Despite difficulties there is a sense of pleasure in what they achieve through sensing through the body.

The opening scenario continued and extended the slightly 'performed' stream of consciousness mode that had been apparent in the first session in the playground (see 5.1). Mark and Sarah were again in an 'extra-daily' (Barba and Savarese, 1999) heightened performance mode, playing curious imagineers stimulated by scientific enquiry (project field notes). The focus upon science emphasised 'teaching as performance' (Pineau, 1994), reflecting the popular instrumental use of the arts in schooling (Colucci-Gray et al. 2017). Here theatre 'romances' (Whitehead, 1929) the learner, its novelties generating an attractive hook into learning, fostering a 'wide awakeness' (Greene, 1995) to learning through experience. In theatrical terms children were firmly positioned as ensemble players in the drama, following the lead players, but physically on set and participating in shaping it. The tone of the opening encouraged the 'serious play'-like (Thomson et al., 2012: 17) ways of thinking and behaving that they sought to develop in the children. When Mark stated, 'We're thinking … "what could be better?" ', he was inviting the children to do the same and coaching the behaviours of an

imagineer: being inquisitive, imagining, thinking critically, working practically and playfully (project field notes). Whilst this question was rhetorical, it modelled the process of posing and debating a question with oneself such that when children were later asked directly they were ready to respond. The staged 'problem' of how to move the performance vehicle which opened the session located children back in the real task of the commission as well as introducing the significance of experiencing to understand; doing as knowing (Ingold, 2017). Seeing the scooter and bicycle whilst discussing energy efficiency and stability affirmed this and introduced the physical science of forces. The catapult moment, although also attuning children to the playful mode of imagineering, demonstrated the importance of both imagining extraordinary *and* practically testing ideas. These were all behaviours, ways of doing and thinking, that children were witnessing, absorbing, and being eased into in the community of imagineers.

Boys' stronger knowledge, interest or confidence in science, was evident in their edging towards the imagineers, putting hands up and volunteering to be part of demonstrations (project field notes). Such behaviour may in part reflect culturally gendered expectations; boys and girls separated as they assembled in the whole class circle. But it also echoed questionnaire results, where 51% of boys as opposed to 25% of girls reported enjoying science 'a lot', and reflected research suggesting that science can appear difficult and more of a male thing (Archer et al., 2013, 2014). Girls who put hands up and volunteered to take part in demonstrations later self-identified as 'different' (Louise, interview) from others in being 'sciency' (Louise and Almira, interviews) and 'interested in learning' (Oja, Louise and Almira, interviews), a phenomenon also apparent in the research (Archer et al., 2013, 2014). Increased interest and confidence was evident in many girls (but also some of the less confident boys) when they were active themselves during pair work, as opposed to whole class activity. Girls' exhibited stronger eye contact and appeared more confident with a trusted partner (project field notes) suggesting that relationships, physical and emotional, were important in generating a greater sense of ease in working physically together, in sensing and thereby discovering an idea (project field notes).

The enactive mode of the imagineers as physical theatre performers, advanced bodies as significant in learning, emphasising physical sensations as intelligible. Attention was focused on the visceral and sensate dimensions of enacting, with the dynamic shifting between doing and saying, modelling and talking to make ideas explicit and signal the importance of *experiencing* and *feeling* as vital dimensions of understanding (project field notes). Imagineers were aware of the affective nature of this practice and of the need to gradually attune children to the sensations and senses to build their confidence (Mark, pre-project interview). Rubbing their hands together fast and deducing from the smell of burning skin and the sensation of smoothness that this was due to friction introduced the idea of associating science concepts with sensate experience. Questionnaire data suggested that 80% of children found learning about science through their bodies effective and enjoyable. Interview data echoed this with one child stating in one session that 'it wasn't his thing' (project field notes) that he 'was a bit nervous about it' (Adrian, interview). He 'missed the part of this session where the step by step introductions were done which might have given him confidence, but his tendency to attempt physical tasks quickly, once and then to step away, even when encouraged by working with imagineers suggested that he was uncomfortable with his physicality' (project field notes). Maarika, rated these sessions highly in questionnaire and interview, but in the first session seemed 'tentative and self-conscious' (project field notes) suggesting perhaps that the practice of becoming familiar with such activities was important.

Imagineers circulated, worked with children, offering a confident model to practise this less familiar way of learning which 'seems to help children's confidence …. to sense the weighting and possibly the science' they were learning (project field notes). Touching, looking eye to eye as they supported each other and trusting their body weight to the other was evidently an unusual and often challenging practice. The nature of 'the task as a scientific test' (project field notes) appeared helpful here. The imagineer's talk focused on the idea of 'sensing the equalising forces of push or pull', of feeling for 'balance', 'stillness' and 'stability' (project field notes), thereby drawing attention away from touching and being physically close to others. Whilst this aided learning scientific principles it missed the opportunity for recognising how the affective experience informed the scientific. Children talked about the experience in terms of learning: of

understanding how bracing and the tension material strengthens a structure and helps balance forces. Madhila spoke of bracing as 'pulling [mimes leaning backwards with hands forward and clasped] … and the difference between a floppy body and a rigid body [mimes soft and tensed arms] (interview). The context of being asked a question in school by an adult will have shaped the kinds of responses, possibly resulting in children focusing upon what was understood and editing out any process, any experience of feeling physically unstable as prompting understanding.

Being close to each other to test and feel for balance and stability involved direct eye contact and looking. The vulnerability of such intimacy was evident in children tending to be more successful, at first, in pulling away rather than pushing toward each other (project field notes). Whilst pushing towards might have felt less risky in the body, eyes and faces were closer together here than in pulling apart. In this image, even where faces are further apart, two girls who were friends and worked well together began looking towards their hands after a few moments of constant eye contact, perhaps finding the inescapable intimacy of the gaze difficult. Despite the challenge, such eye and physical contact during mimetic actions appeared to facilitate trust and help these children

h. Children sensing pulling equally to find stability

attune to each other. Such mimetic action appeared to be significant in facilitating sociality and stimulating empathy (Wulf, 2011; Iacoboni, 2008; Tomasello 2014; 2016;

Taipale 2015). Just before this photo was taken, these girls had experienced a moment of feeling unstable. One had stepped back with one foot, an instinctive widening of the base to make her feel stable and safer. This was not uncommon and it appeared that such moments of discovering together how to physically stabilize was both psychologically as well as physically supportive.

Where children were able to be trusting and confident, being physically co-dependent was both a positive relational experience and a way to recognise the scientific principle. Working together physically appeared to be significant in developing relationships and children's 'ability to cooperate and collaborate together' (teacher D, post-project

i. Zabia 'feeling' physically strong feeds a pleasurable sense of confidence

interview). Later, where the focus was upon building strong structures for their designs, the work likewise began through the body, with children feeling how triangular shapes, and holding the body in tension, strengthened the structures they made. A memorable moment was when Zabia, typically unconfident in and challenged by learning, often expressionless, 'sensed the strength of her own body's structure as she stood with feet wide, resisting the testing pressure of another child's push. She appeared to tense her body further, increasing her rigidity. A smile crept across her face as she felt, through her body, her structural strength of the wide triangle shaped base' (project field notes). The effect appeared to be emotionally empowering for her. Another group of five boys used this understanding of triangles as strong bracing shapes to create a pentagon-based

shape that resisted the test of pressure from any direction. Their pleasure seemed in part to be in being successful through working together. They were five who, more usually would be separated to work well and, had been praised for using such a simple idea so well (project field notes).

Working with their bodies seemed to help children to employ this physical understanding when they subsequently investigated the large mechanisms Imagineers had brought in (wheelbarrow, stretcher, large-scale cam, large-scale pulley and bicycle). Here they began to echo imagineer practice, talking and doing interactively. On occasion, perhaps prompted by an imagineer, they readily simulated the movement of a mechanism with their bodies, as in when one child rotated like a cam pushing another away as their projected arms passed, or another lay on his back cycling emphasising the push action of pedalling (project field notes). Having open space also seemed important. One hour when neither hall or alternative large space was available and activity moved back to the classroom, even with tables and chairs moved, the readiness to engage whole body reduced and, almost signalling a return to more 'default' (Thomson et al., 2012) behaviours.

5.4 Team design: the challenge of doing it together

In the classroom, design teams of five or six children and an Imagineer are sat around three tables forming one large rectangular surface. Large rolls or pieces of paper are central, almost covering the entire table. Children have their journals open showing their design ideas and their key idea drawn onto the mini-cyclopedia platform template given to all children. Quietly they study their designs for a few minutes, following Kathi's direction to 'think about its most important features … and how it comes to life' in preparation for giving a one minute 'elevator pitch to excite the others in your team about your idea'. Her positive and purposeful demeanour and words communicate a conviction that the children's ideas are 'brilliant'. As activity begins children are looking fully at each other and listening as each person explains their design idea. Kathi's timekeeping ensures that in five or six minutes all ideas are expressed. The time pressure and focus of task appears to help

children express ideas coherently.

Many of the drawings are rooted in what is familiar: cartoon characters and robots are popular. Not all children have considered movements, but following the model of peers who have, and the respect that imagineers' give to all ideas through their attentive and respectful behaviour, children quickly improvise and invent in the moment. Such improvising tendencies is evident from the those with limited drawings or details on drawings but also in nervous eye contact of speakers. Those who express clear ideas about movement have often thought about the mechanisms involved and annotated sketches or drawn additional versions of structure, action or view. Saying it out loud in a time limit reveals the speaker's concept and thinking. The nods, engaged faces and non-verbal affirmations, suggest where appealing, original and imaginative thinking is recognised - at times apparently surprising the speaker themselves. Once all ideas have been heard and seen, and each other's reactions have also been witnessed, commitments to particular ideas start to develop.

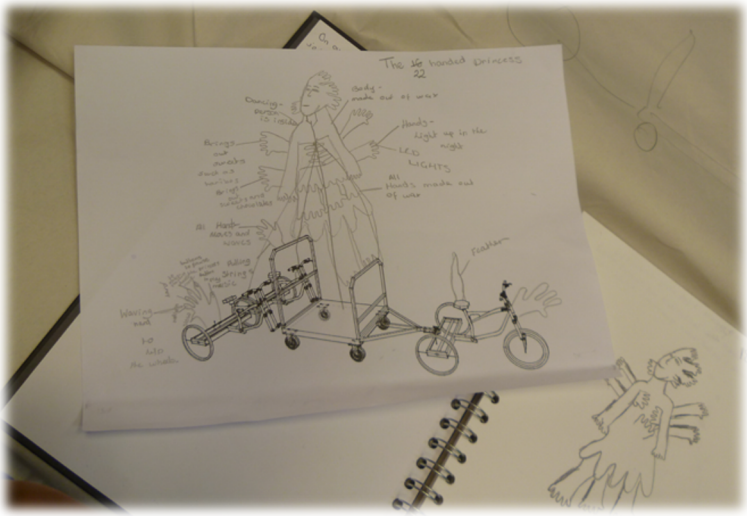
The process of negotiating a collective design is different at each table, and whilst located in the appeal and level of development of individual ideas, relies on imagineers' questioning skills. Imagineers help children to draw out and articulate thoughts, to consider and recognise the potential in particular ideas, or how connections between ideas might be seeds for something not yet fully present in any one design. Sometimes one child's idea is largely agreed as being the strongest to pursue, albeit informed by elements from others, or one is a catalyst for drawing together elements from other's ideas. Occasionally no single idea emerges in such a way and the imagineer has to begin the negotiation of a new idea. However it happens, there is an ebb and flow of children speaking and deferring to the imagineer to lead the difficult process of taking forward and leaving behind particular children's ideas. Humorous ideas feature strongly: eyes that light up, squirting water, dispensing sweets, sound effects.

j. Hands constitute and hold the whole body

At one table Earlene's drawing emerges as the design idea the group are drawn towards. It is a strong, simple outline of a female, whose head and body are constructed through the shape of

hands. Earlene speaks quietly, self-consciously that her drawing is a '16-handed princess'.

When questioned about movement ideas for the design she is silent at first then, suggests tentatively that the hands could 'wave' and 'give out sweets'. Her unsureness is read as an invitation for others to develop ideas. Roger notes the mechanical hands doing different actions, which was key to Maarika's design, and helps Maarika explain how these could move with strings and levers. Xander suggests there could be mechanical hands on the bike. There are discussions of materials like wax that could be moulded. Roger asks 'what else do hands do?' 'Helping hands' says Darius which triggers an association with the values of the school; there are 22. The group vote to develop a 22-handed Princess as the group design. Xander however has been vocal and excited about a different idea: his and Darius' humorous cartoon ideas. He argues repeatedly that the Princess will 'be very hard to build' whereas his idea 'will be easy' and 'fun'. When all others vote against him he persists with a series of ideas suggesting that the hands of the princess could introduce features of others' designs such as his own and Darius' comic ideas. He is unwilling to accept others' view that such humour is incoherent with the core idea of the proposed Princess design as 'helping like Godiva'. Darius, rather than supporting him withdraws and cradles his head in his arms on the table. At moments a teacher, and later Kathi interject suggesting aspects which might appeal to him and draw him into the idea. Maarika, often voluble in this group, is quiet. Whilst others have accepted the editing or discounting of their own ideas, appearing more excited by the agreed team design concept, they cannot help Xander in his struggle with his attachment to particular ideas.



k. Annotations reflecting group development of Earlene's original drawing

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The opening task, and way in which it was set by Kathi seemed significant to the resulting engagement that it generated. Momentum and focus were generated by the time-bound

‘one minute’ task ‘to excite the others in your team about your idea’. The commitment to complete the commission on time added an authenticity to the urgency. The implied belief in children as valued and effective members of this community of imagineers was communicated also by the respectful ways in which imagineers modelled attending to children’s presentations. Children’s nods and eye contact echoed the seriousness of adult imagineers as attentive listeners (project field notes).

The children needed to, and mostly appeared able to look directly at each other, and at each other’s work, to explain their ideas, to listen, to entertain possibilities and to make judgements. Their readiness and focus ‘pleasantly surprised’ teachers (project field notes). The presence of imagineers, adults whom the children had come to value, and a higher ratio of adult to child than typical in schooling, was noted as a factor in the mood created around the tables (ibid), which Kathi had stated she intended to be, ‘focused and purposeful’ (project field notes). Imagineers created ‘a sense of a world of work’ (teacher B, post-project interview), where the structure of having thinking time to consider what to say and then listening, for one minute to each other at the outset, like adults in ‘a work meeting’ (Kathi, project field notes) seemed to set the tone for reasonable and methodical ways of attending to each other’s ideas. Whilst tables are often, physically arranged in groups, their use appeared different here. Aided by the large paper, which children were invited to draw and write ideas and details on, the tables appeared not as the connected spaces of individuals working alongside each other in their personal journals, but became the meeting room table of a team working together on a project (project field notes).

Whilst orchestrating discussion, and modelling an equal consideration of all ideas, imagineers resisted doing and deciding for. Instead they encouraged children to affirm decisions and reminded children to write and draw out proposed ideas on the big paper. Children were typically ‘thoughtful and considered’ (teacher D, project field notes) in what they said, reflecting the character of reasoned explanation that characterised the process. They listened, made connections and often built upon ideas. Children often modelled generous support for others’ ideas, admiring and affirming qualities in children who were typically quieter. Earlene for example was shy and less assertive than her

peers, and children enjoyed affirming her idea and seeing her pleasure in it being developed (project field notes). However Xander's experience as a lone voice, in his group's design decisions was not unique. In most groups the voice of at least one quieter character remained less heard. Yet Xander, unlike some children, remained engaged, contributing ideas, listening to others, persisting with alternative possibilities when his argument for more humour was not accepted. He behaved in ways typically valued by educators as creative; he imagined, persisted, adapted and sought to collaborate and yet whilst Roger commended his repeated suggestions of ideas and encouraged the group to consider them, none were taken forward in the final design (project field notes). The potential for his deeper engagement with and learning from the project, had the group explored his ideas, remains unknown and the recognition of his valuable creative behaviour was also missed. Other children exhibited less effort to advance their ideas, or had not committed to developing a persuasive idea. Less is known of their experience.

The imagineers reflected on these moments as constrained by the educative frame of the project, by time, skill and the reality of limited resources. Kathi talked of the conflict between the project's desire to 'value every child's ideas' when the 'authentic' nature of cultural production was where 'one person' is commissioned and 'it's their ideas' that drive the work (post-project interview). Sawyer has argued that even when it appears that one person is driving, it may be that the role is one of orchestration and that the creative idea itself has been developed through group activity (Sawyer, 2007). Such an argument may explain the overall sense from children, that the process was essentially collaborative, one of 'combining all of our ideas' (Dakota, interview), even when some children's original ideas were advanced and others not. It may be that Dakota was reflecting the democratic character of group discussion where contributions from individuals to the core idea shaped the developing group design. So, for example, whilst Earlene's original drawing was still recognizable in the final realisation, the ideas behind the design evolved to become those of the group. Earlene stated, 'I felt they were improving my idea'. So whilst the choice of hands as the shaping character of the design, hands which held the body as well as formed it, appeared to me to be significantly revealing about Earlene, she suggested that they 'never really had a meaning until the group started talking about it' (Earlene, interview).

Her response reflects that of young children who, in play, typically invent a story together through, not before, playing a role, negotiating and adapting the rules they had established a moment earlier in order to develop the story. This same habit, noted by Sawyer as an improvisatory and creative habit, was evident in children collaboratively changing previously agreed ideas as new ones emerge and are deemed better. Sawyer argues that creativity is an interactive, group process, and notes that Csikszentmihalyi's (1997) research into 'flow' (the state of immersion, optimum focus and learning) 'found that the most common place people experienced flow was in conversation with others' (Sawyer, 2007:22). Indeed, he suggests that even 'the insights that emerge when you are completely alone can be traced back to group collaboration' and 'a string of successive ideas each spark lighting the next' (ibid: 4).

That is not to suggest that the process was easy. As the example of Xander reveals, commitment to an idea in which a child had invested, or emotional maturity, was often in tension with the need to for a collective design idea. The negotiation skills of teachers and the facilitative and making experience of imagineers were vital in helping children to give up ideas or adapt ideas. because as Adila commented, 'we had … different ideas and we all wanted our ideas to be put in' (Adila, interview). Children were inexperienced in negotiating with each other in such emotive terrain where, like Xander, children were so invested in their own ideas. Interestingly, a year on, one of the girls interviewed talked about learning to 'think together' (Jasmeen, interview) through the experience of the project.

5.5: Identity, ownership: the individual and the team

It is the last school session before children come to the Imagineerium to build their designs. The session begins as Kathi, with a purposeful air talks to all of the teams each gathered round tables. They are tasked to 'be clear' and 'sure' about their ideas and to discuss the 'details' of their design

decisions they have agreed together in preparation for being separated to take on different roles. They are advised to 'record this information in your journal'. The main ideas, movements and purpose are not new foci, but there is a new emphasis to consider 'how the people performing around the vehicle can make the meaning of the vehicle even stronger … what do the performers and the cyclists represent?' Talk is supported by other Imagineers who echo this sense of a time deadline and the importance of being focused on the task…..

From each team two children have been invited to take on a particular responsibility for one of three aspects of the design. Some are developing the movement vignette which will be performed alongside the design at the festival. Others are researching and identifying the materials needed, structurally and aesthetically, for the design, creating a 'mood board' which will define the 'look and feel' of the design. Others are scaling up the drawing of the design, identifying a structure and starting to build a scaled model for the design.

In the hall Sarah and Mark have a group of children rehearsing a 'chipping' carnival movement sequence. Sarah's group are following her attentively through rhythmic, whole body side steps, jumps, turns and sweeping gestures. Mark's group is practicing side bounces, windmill arms and circles. Each has an idea or a spirit to it: the playful monkey, the turning bird, celebration…. Children are focused and moving energetically. They stop for a moment and Mark talks of carnival 'mas' where devils sweep away the old and bring in the new. They talk of the size of the movement and how symbolic costumes such as 'devil' headdresses, wings and flags signal playfulness and herald celebration of new ideas. In their pairs they try out movement motifs or select some of the moves they've just used that they think suit as the basis for their performance design, trying out ideas, with support from Imagineers. Adila, usually quiet, is animated and expressive, signalling when she receives an idea from the tree of ideas with her whole body, with large gestures and wide eyes. Tyrone, also previously a less animated member of his team here appears fully engaged, delighted to learn a lift jump with Sarah to create the momentary effect of a crow flying.

In a space outside the classroom, gathered around a suite of tables outside the classroom on which material samples have been laid Kathi is inviting the children to explore materials, asking questions about their properties and suggesting how, when and why imagineers use these in their designs. They have looked at solid metal, wood and aluminium identifying the properties and values of each for their design structures. Kathi shows an example of a 'mood board' which combines samples of both structural and covering materials suggesting the desired look and feel of the design. 'These

would be materials for the structure underneath the design' she says pointing to sample of wood and metal', … Now she holds a long thin flexible pole and asks, 'what do you notice about this?'
'It's bendy' replies one.
'Not strong enough' comments another.
'Maybe not for your structure', says Kathi, 'but what might this be useful for? Has anyone got any wavy movements in their designs?' Soon the children are excited about flexible materials which will help hands wave, birds and dragons wings flap. In one school Jane runs this session and models how texture can be built by combining solid and flexible materials, an idea which then influences the creation of the trunk for one groups' tree design. Soon after children are looking and feeling the material more closely exploring now the texture as well as colours, noting ideas in journals and then assembling samples on their board. 'I'm choosing this because its shiny and will reflect the light' Malwina explains to me. We discuss why that might be useful to suggest the reflection of raindrops. 'This is my thing' says Maarika as she gathers and glues her board. 'I'm into design and stuff, so I really wanted to do this…'

In the classroom tables are almost entirely covered with large squared paper. On the example Phil has written the ratio of 1:5 and also a maximum 3.5 metres, a safe height for structures below street lights for the procession. 'How tall will the highest point on your design be?' he asks 'How many metres and centimetres?' Children look blankly. '900?' says one. 'Yes, affirms his partner'. 'Let's measure that then' says Phil. Soon they are on the floor measuring 900 centimetres, lying down to mark the point with their body before taking another measure. Before they get to the fifth measure they are laughing. 'It's massive!' one child voices, initiating a discussion about the sizes they really want. At another table a pair of boys are stretched over the scaled paper. One is measuring the width and height points for the other who is drawing the cupcake design from their sketch. At a third table Roger is talking through the possible structure bases he has brought as examples for the designs. 'They're not the right shape', says one. The idea of the structure as a frame within the design rather than exactly echoing the whole shape is difficult to grasp.

A few hours on and the teams are back together sharing their work with each other. Nadia proudly shows her group the 2D scale drawing attached to the structure, proudly turning it so that they can see that 'there's levers so the head can move'. Her partner Oja is impatient to show that 'the wings also move up and down at this pivot point'. In another group Hema is showing her mood board. 'We've got aluminium for the structure, but we'll use foam to cover up the hard aluminium to be a

shape more like a body. This blue silk will go over that to soften it, and that will move in the wind a bit, then the dark green thicker stuff is for the scarecrow's dungarees.'

The significance of being able to do 'my thing', as Maarika asserted, of owning a 'specialist' role was apparent both in observation and in comments afterwards. Imagineers drew on their observations of children's interests and where these were recognised or correctly anticipated appeared to deepen commitment to the project and help them recognise the contribution that they brought to the group. For others simply having the responsibility to make decisions and design and thus be important to the group seemed to matter. This seemed particularly true for Zabia, a child who typically struggled with schoolwork and for whom schooling was thereby typically a directed experience. 'We - only us, me and one other person, we only get to choose the colour and design … we were choosing them' (Zabia, interview). For Mason the discovery of what mattered, happened by accident. He was asked to join the performance group, a proposal which seemed a good fit for an active child, but he struggled to focus in improvising. On his return to the classroom he found teammates struggling to fix the wheels on the trolley model. In an instant he focussed, identified the process and parts and had achieved the task. Afterwards he reflected 'the day I made the good wheels … I thought I'm enjoying this. I'm good at this … I'm good at engineering' (interview).

For a few children the responsibility caused some anxiety: whether they would be capable of the task. Azaad was concerned because 'I didn't want to like get a fool out of myself' (interview). It was difficult to know who else this might have been true for and also whether the different use of space or the openness tasks such as creating a 'mood board' or movement sequence of structure might have felt overwhelming. There was an intensity in each space, with typically two adults working with between five and ten children, where each had a group responsibility. Some children appeared to need more guidance and more one-to-one attention. Phil and Roger often seemed overstretched to work with five different pairs of children, each on a different model and experiencing challenges in their processes.

There was a palpable sense of energy as children adopted the rhythms and materials which characterised the movements in all sessions. Whether this was exploring how a whole-body movement could express an idea, or investigating the properties and aesthetic appeal of materials, drawing an accurately scaled design or securely connecting the parts of a structure, the sensory quality of activities was apparent. Children were using hands, eyes and whole bodies to position themselves around tables, spaces and each other for their making task. Dialogue happened through materials as much as through words. Trying an idea and seeing how it looked and worked was more common than explaining in words alone. For most children, this interactivity appeared to generate a willingness and readiness to explore, to have a go, which fostered a sense of energy, of purpose and determination (project field notes). Children rarely sat down and this physicality seemed a significant factor in lifting the children's spirits and interest, particularly, though not exclusively in the movement groups, reflecting recent medical research into the positive effect of physical action on mood; that whole-body physical action can displace anxiety (Boeker et al., 2008).

Working with a particular imagineer who children recognised at having expertise in performance, design and making or engineering seemed important in enabling children to recognise and value the expertise of artists and engineers. There was a sense of relishing that expert insight and of enjoying asking questions of them and talking about some of the details of their process, becoming more knowledgeable about and familiar with processes and technical terms such as 'chipping' and 'mas' in relation to carnival terms; of 'zotefoam' and 'kite cane' as light, waterproof and flexible materials; of cross-bracing structures with strong but flexible materials to ensure a stable structure able to cope with mechanistic movement (project field notes).

5.6: Becoming an imagineer

There is a moment of quiet as children step through the metal door of the Imagineerium and are greeted by Godiva, animated by puppeteers and accompanied by her ethereal music. There is a

gasp, a 'Wow!', a moment or so of silence as they drink in the experience, necks crane as they stare up at her wide eyed and open mouthed. 'She's looking at me!' says one child and others insist she is looking at them too. Some stay rapt, just looking, whilst after a few minutes others are full of questions and want to know 'how does she move her eyes?' 'who is moving her arms?' how is she doing that?'. Children are invited to operate her eyes with remote control, perhaps to sit with Mark puppeteering on the rig and move her head or arms, but also to walk round her, to discover how she was powered and what mechanisms create the movement of her arms and legs.

In the workshop space Jane sets the brief for the day. Using examples from several of her own projects she shows them 'my process of developing my design ideas', from researching first ideas and getting inspiration, to sketches, gathering and assembling a mood board and a small-scale model of the idea. Her account brings together the children's work from last session. As Jane's design was originally a static model, Phil and Roger are simultaneously working on the development of a prototype to animate a part of her design so that the model aligns to the children's project brief more closely. Phil has a kite-like structure as a light wing which he and Roger show and discuss possible lever and axle mechanisms that could generate movement. They model and demonstrate the kind of conversation they might have in developing the model in this way. Jane summarises that the task by the end of the day is to have a completed model and to be ready to pitch their idea to the imagineers, just as she, Phil and Roger have to them. A timetable for the day is given and each team is assembled around a workbench and whiteboard, supported by an imagineer to set their own local tasks and deadlines within the common timetable. A carousel of performance rehearsals interweaves the intense and focused activity to build the 3-D structural models with mechanisms.

The focus and energy from last session is revived and almost without any direction or support, children appear purposefully engaged. Not all groups maintain this focus. Some struggle to clarify leaders and roles, some children drift after completing one task rather than moving on to the next before an imagineer redirects. There is a mix of flow and stop-start in the rhythms. One group that didn't like the prototype structure developed the previous week for their tree are struggling to work out what to do to progress their design. Jane shows them how layering can change the appearance of materials and has suggested that they look at unusual twisty shapes to see what they can do to suggest bark. Twenty minutes later inspired by twistable concertinaed vent hose, one of the materials indicated by Jane, they have changed the appearance of the design significantly and the group is purposeful and engrossed in tasks. The two boys in the image below were often

l. Boys engaged, collaborative and persistent: working out how to solve multiple objectives

disengaged, one frequently in arguments. Here they are engrossed in working out how to shape the top of the tree and create openings for mechanical birds, apples and leaves. The movement of the wire is proving problematic. But they are persisting, engaged, working together, independently of the adult nearby. In the edge of the image a fellow team member is drawing out the new ideas alongside them. Aesthetic and practical judgements inform their discussion, as to how twisted, bendy, high and strong sections are. Each group has a rehearsal time for their performance piece. Time feels like it is passing quickly. Mid-afternoon Jane is helping the groups assemble their displays of their design, journals and props for their pitches. 'They are exquisite!' says Sarah with genuine delight as she re-appears from the performance space and the children appear to grow in pride.

Children often looked unsure as they set eyes on the brick and metal warehouses which form the industrial park where the Daimler building, the Imagineerium space is sited. They appeared subdued as they stepped through the clanging metal door. In reflecting after the event, some girls spoke of how daunting this had seemed. They commented on the 'hard grey metal' (Jasmeen, project field notes) which contrasted with 'the colourful, bright, shiny materials' (Malwina, interview) and the workshop 'full of colourful arty stuff' inside (Jasmeen, project field notes). All children reported that experiencing the Imagineerium space was the best part of the project. For many, seeing Godiva mechanically animated was the highlight. 94% of children rated highly 'seeing creatively engineered products like Godiva'. They relished the creative character of the Imagineerium as a physical space which had significance for them as the place 'where

Godiva and the Hummingbird was made' (Abaar, interview) and as a resource-*full* space where they 'felt creative' (Adila, Malwina, Jasmeen, Hema, Adrian, Abaar post-project interviews; focus groups 2015). The challenge of the 'messy' (Gryskiewicz, 2008:100) and 'unpredictable' (Runco, 2007:178) nature of creativity felt more possible, and full of possibilities here. Children enjoyed being able 'to use different spaces' (project field notes), 'special places …. and so many different things that you could use' (Malwina, focus group, 2015) and the freedom and control to choose and decide certain elements. 'We were allowed to use whatever we wanted … sometimes we get to do art at school but we're not allowed to choose what we want to do - [in the Imagineerium] we were allowed to use different materials and not just drawing' (Adila, interview).

Recalling the moment of meeting Godiva, one boy paused as if reimagining the moment, and said: dramatically 'she's BIG! And you get to see her for real. You get to see her, like, moving around!' (Karl, interview). Abaar said 'I was speechless after I saw her' (interview). Her size, 'taller than a house' (Abaar, interview), and the quality of her eye movement which made each child feel like 'she's watching me' were repeated comments (project field notes). Almost every child (97%) rated seeing Godiva and other imagineered inventions as of high interest in the project describing her as 'amazing' and 'cool' (post-project questionaires and interviews). The word 'inspirational' or 'inspired' was used repeatedly about imagineers who had made her (interviews).

This day appeared to be focal in children's felt and reported accounts of the project, with model-making at the Imagineerium as the most popular activity of the project (post-project questionnaires) enabling an intense and fluid experience of making, 'as if' imagineers. Some children gravitated towards particular imagineers and children could be heard advising each other to 'ask Kathi' or that 'Phil will help you' (project field notes) reflecting their awareness of the different specialist skill sets of imagineers. Whilst not a major finding, gender differences were noticeable with some children. Some boys were fascinated by the engineers, and girls by the maker artists. Some boys toured the walking rig and Imagineer Technologies' engineering space and brought questions specifically to Phil and to Roger. Adrian said 'I liked learning the technical stuff about building – Phil and Roger taught me a lot' (interview). Likewise girls sought out Kathi and Jane for advice and

support from designer makers, 'I learnt lots of things from Kathi she taught me to gluegun padding to shape a belly' (Maarika, interview). In addition to specialist skills of each imagineers, they also recognised imagineers collectively as 'skilled', 'quick', 'doing it', 'helping', 'full of ideas' and 'inspirational' (interviews).

In their analysis of artists working in schools, Thomson et al. (2012:8) talk about the 'third spaces' that artists generate, of the 'sociality' of such 'meeting spaces' and of the 'mobility' that characterises them. As discussed above, the imagineers use of space and climate they generate both in school spaces and the Imagineerium echo this sense of sociality, of meeting, where the human relationship is recognised as a primary motivating factor in engagement. This was evident in the heightened interest children demonstrated the moment an imagineer was in sight – in anticipation of the forthcoming activity. Increasingly, children would congregate at any possible opportunity to talk to an imagineer who would typically be responsive to the children's interests and forthcoming about themselves their work.

The Imagineerium space appeared to have resonance beyond its physical properties, perhaps in a similarly 'liminal' way to the mantle of the expert frame that surrounded the design, it was also simultaneously 'real' and 'unreal' - a metaphoric and shape-shifting space. Here playful work in which the relational is central in a shared enterprise to produce inspirational work for performance events - events which will have resonance locally and beyond. That the project was grounded in the 'real world', beyond school, celebrated publicly, was significant for children. Many professed afterwards that they had not quite believed the promise that their ideas would be developed to a full-scale build and made public in their community. One child summarised, to the nodding heads of his peers: 'We got to do some work outside from the school. Like make our ideas…. make it for real' (Karl, Interview).

These six vignettes and analyses have provided a taste of a range of salient moments in the project and have signalled ideas and themes which are taken up further in chapter five in which I discuss how the experience of art-making in *The Imagineerium* project might be considered educative.

Chapter 6 - Art-making as educative experiences

Introduction

Chapter Five sought to characterise children's experience of *The Imagineerium* project through the selection and (re)construction of a series of moments. In addition to giving a sense of 'being there' (Geertz,1988), they highlighted themes which are taken up in this and the next chapter to develop the key arguments of the thesis. Here, *The Imagineerium* project is analysed in terms of art-making as a site and a practice and what this might signify for education. Chapter Seven takes up an educational lens, arguing how *The Imagineerium* project as an art-making site, structures and cultivates learning in particular ways.

This chapter is concerned with how art-making, in *The Imagineerium* project, has educative value. I argue that the symbolic forms, practices and spaces of art-making and the art-making generated in the project both required and afforded a culture conducive to education. The children involved appeared to flourish in this culture which suggests not just its importance as a site for education but also a particular way of doing education. Children involved in *The Imagineerium* project tended to have a positive view of the arts (91% art; 82% drama pre-project questionnaire). Within project comments revealed a perception that art, creative writing, design and drama were considered less about 'right and wrong' and more 'about what you think' and 'what you like' (project field notes), with the implication that this was a positive and pleasurable quality. Children's project reflections are consistent with this account, including their valuing having choices to develop their own ideas and interests, their level of autonomy, that their feelings mattered, and of pleasure in the highly embodied and symbolic character of art-making.

The Imagineerium space, as discussed in 4.4, houses and places particular equipment, furniture, materials, and people in physical arrangements conducive to art-making both generally and in relation to the particular needs of current projects. Whilst structure is

not the focus of this chapter, the geographical arrangements of the space in relation to imagineers' practices and purposes requires mention here as these shaped childrens' experiences. Navigation of the geography of this space was designed, and gives rise, to particular kinds of social behaviours and interactions, activating a particular view of how people can, do and might move and what they might need as they perform the varied possible experiments and tasks of art-making. They reveal and shape the mindset and expectations of those who occupy and navigate them. Imagineers' ways of being, behaving, thinking and doing are revealed in the tall workbenches which require standing for active work. They are revealed in the eclectic and wide range of materials and equipment, the open spaces and in other projects in various stages of development. They constitute, evidence of experiments into how to articulate ideas and feelings in sensory forms and materials, in ways which also function for their purpose. This dynamic mix of core, constant elements regularly re-arranged and renewed in relation to current projects emphasises the significant of the present moment of making, and of being present in it - an attractive vibrancy. This constitutes the culture that imagineers collectively, consciously and subconsciously create.

For young people who are novices in such practices, the site offers opportunity, through practice, to be gently coached in working to these values, to explore and test these attitudes and behaviours as they practice. Here art-makers model their own practice and facilitate for learners what Coleridge once noted as a key principle of art: the 'coincidence of form, feeling, and intellect' (Paley 2008:215). Here the physical practice of art-making situates the enquiring mind and engages the emotions of the individual through the experience of art-form. No one dimension is privileged over the other, but all are interdependent and matter. By foregrounding the culture of art-making, *The Imagineerium* project frames how the sciences are encountered in a particular way, inviting children to attend to sensory perceptions and broader social and human contexts.

In 6.1 I discuss how theatre-making, in both imaginatively framing children and attuning them to behave, as 'young imagineers' also, modelled and communicated ideas about learning. In 6.2 I consider the culture generated for children by the practice of art-making

in the project and further in 6.3 draw attention to the significance of doing, of feeling, of the materiality and aesthetics involved in art-making, of having freedoms and choices, and demands and possibilities afforded by collaboration. In 6.4 I, consider how journals contributed to this. The final section of this chapter, 6.5, extends the focus upon art-making as an embodied activity and probes how the children's responses to *The Imagineerium* project suggest the significance of such sites for education.

6. 1 Attuning to art-making through theatre

As we saw in 5.1 (pp. 117-9), a 'performance' launched the project. Arriving with a set (the 'travellator') and props (chests and suitcases), costumed actors improvised a script around a scenario of being imagineers who had been travelling across time on a mission in search of imaginative children. These sign-systems of performance (Esslin, 1988) reframed the playground as an imagined and imagining space in which extraordinary things might happen. Such an occurrence in a school playground was unexpected, and its 'unusual, novel' (Runco and Jaeger, 2012) character heralded creative activity.

Drawing upon and adapting theatre conventions familiar to immersive (Biggin 2017; Machon, 2013), street and site-specific theatre forms (Mason 1992), the imagineers drew their 'audience' towards them, into the world they were imagining. Through role-play with each other around the children, and then directly with them, imagineers were attuning children to the aesthetic and conventions of live performance. Through such attunement they were signalling art-making as a possible behaviour, and that there were particular ideas and meanings signalled through the use of theatre form. As Sarah performed poring over a map and speaking thoughts aloud to the 'audience' of children that 'There's a mount here…. and a field there', she was improvising responsively, 'gaug[ing]' her timing 'according the mood' of the group (Mason 1992:96), extending her gesture and pauses to attract attention. Attuned to her intent, Mark modelled taking notice and attending to her. He joined her and engaged in the same performed role-play of confusion. This was not ordinary behaviour. It was, as Barba and Savarese (1991)

helpfully describe, an 'extra-daily' performance, where an actor's physical training to hold in tension 'oppositional' pulls within their body, plus their craft of proxemics, arrests the attention of the audience. At different moments, Sarah similarly attends to Kathi who stands raised on the travellator as if on a stage, simultaneously 'oppositional', at once rooted to the spot and reaching her gaze into the distance through her telescope as she performs scanning the horizon for signs. She watches slowly and carefully, giving time for children to recognise her puzzled expression before she finds a space midst the children, with the travellator as backdrop before she begins this performance.

Using socially recognisable signs, enhanced through a slight theatricalisation, the imagineers communicate non-verbally to the children how they might respond: to watch for signals, to listen carefully, to engage if they wish. The children's giggles signal that they recognise this as not ordinary, daily behaviour. Their experience of playing, and possibly of performing, or at least of witnessing others perform no doubt enables them to recognise that this is not daily behaviour. They may not be able to articulate in words, but their behaviour signals that they do recognise this as heightened and enacted behaviour, a performance of kinds. This is some kind of liminal space that they have yet to make sense of. The directness of the actor's address to them and the intimacy of proximity appear to both engage and challenge children. The actors are aware that the children's experience of such site-specific, incidental and immersive theatre may be limited. Clear signals about what is expected are needed as well as time to allow children to become confident enough to engage in this new and as yet undefined space. Occasionally an individual might hazard a response, but the performance does not rely upon children roleplaying with equal engagement. When they do respond, the responsibility is to the actor to affirm the value of the contribution, and thereby reassure the wider group, who typically identify with the volunteer, that this is a 'safe' enough thing to do (Mason, 1992:96). Often a lone response is not followed through, as a child falters in confidence. Sarah uses eye contact as well as words and gestures to draw in surrounding peers and affirm the child who has taken the risk of interacting. Here theatre as an art form, is the medium of communication, offering particular 'affordances and constraints', which generate a 'distinctive demand' and help children to 'learn how to think within a medium' and to 'think in new ways' (Eisner, 2002b:8).

Such drama or theatre is at once recognisable and strange to the children. They know how to play and pretend, but they do not know these people and were not expecting either them or theatre to happen in their school playground. This designed intention to make the familiar 'seem unfamiliar' (Brecht, 1964:43) to 'appear strange' (p.91) familiar in political and socially motivated forms of theatre, operates similarly for the children involved in the project as it might for a theatre audience. It prompts children to ask themselves questions about what this occurrence might signify, causes them to attend to the signs and seek to interpret what they see. In reflecting on what happened on that day, children frequently alluded to the costume, props, 'set' or (acting) behaviour of the imagineers, often with a sense of being unclear quite how to describe it, or what it might signify. 'They were dressed in (*falters*) old (*?*) Englishmen's clothes…. They had a treasure chest and I was thinking what was inside' (Madhila, interview). Here Madhila, struggles to find the words to describe the clothes, but they have clearly resonated with her and she has noted that these were not ordinary, that they imply a sense of role or occasion. The suitcases and boxes have, perhaps through the subsequent experience of them revealing further objects which were used in the first session, been imbued with new associations, and have become in her mind – as if in a story or drama – a treasure chest.

Most of the children interviewed echoed this sense of excited anticipation and curiosity about what this occurrence might suggest. A number of children spoke about feeling 'really excited to know what [the travellator] was' (Malwina, interview), or 'really eager to like find out what was going to happen' (Aazaad, interview) and why there were 'lots of boxes to take to our class' (Abaar, interview). Children's comments suggested that they had been working hard to make sense of 'something' (the travellator) 'coming into school … in *our* playground' (Kiran, interview) which they 'found really exciting' (Adila, interview), 'a big wow' (Dakota, interview), because they we 'weren't sure what was going to happen' (Oja, interview) but had a sense that '*something* was going to happen!' (Abaar, interview).

A key purpose of the performance was to generate curiosity and thereby form an attractive invitation to children to engage children in the collaborative activity of making

and behaving 'as if' imagineers. At moments the project appeared to deliberately position the children as spectators, but they were always more than this. They were, as Brecht advanced, always at least 'witnesses' (Brecht, 1964), implicated in the scenario and roles they experienced. The context of schooling emphasises the significance of witnessing as an active, rather than passive role. This social context frames children not as spectators but as participants present peripherally and unwittingly at first, in an emergent community. They might be considered an 'accidental audience' (Schechner 2003: 220), a role which Schechner argues fosters closer attention than might be expected of an intentional theatregoer. Prendergast (2008:95) notes that 'witnessing is an act of presence and testimony, of authentication and memory-making, of evidence and seeing. Witnesses are necessary, not extraneous to the process in which they are implicated.' Children's comments, such as Maarika's 'Wow they're coming to our classroom!' (interview), often reflected an implicit awareness that they had become actors in something.

This adapted 'mantle of the expert' (Heathcote and Bolton, 1995) immersive form of theatre signalled not only an invitation to the children to be at least complicit in a collective drama, but also inferred that they possessed valuable attributes and skills which mattered to the success of the enterprise. The implied belief and interest in their capabilities lured children into a project which was at once imagined and situated in the real world. Much as a theatre audience might, the children were complicit in the theatrical illusion, entering into and being part of this imagined-real world. As questionnaires attested, all children rated the beginning to the project positively, with 83% of children rating it at highest possible point for interest, with several commenting that there needed to be a higher rating of 'brilliant'.

The wider context of the school was also significant for this theatricalised opening. School is a trusted and valued learning environment for children endorsed by their teachers, parents and society. Whatever caution they might feel personally, the presence of teachers who varyingly wore their 'navigator badges' and role-played some level of being complicit, suggested that this was a relatively 'safe' disturbance to their everyday lives. This exciting disruption, described in 5.1 (p.117-9) as an 'invited

disturbance' (Trowsdale, 2004), thus constituted a legitimate form of education. The talents of these performers who were able to invent and improvise across the fictional world of 'time travel', and the invitation to be part of something in the real world of cultural production might seem extra-ordinary and challenging. But its context suggested that these apparently contradictory frames of the imaginary and real, of the performative and the daily, of the unknown and the known could co-exist, could shape each other. Through the apparently opposite drivers of the playfulness of performance and the urgency to design and make something to a deadline, children were to inhabit and explore this liminal performative world 'as if' imagineers, trying out the roles, imagining, performing, designing and making using different art-forms.

Whilst this theatrical frame was not foregrounded as much in subsequent sessions, its significance and aesthetic underpinned and informed all that came after. An example of this was evidenced on occasions when the children encountered an imagineer, out of costume. For example, on one occasion Phil and I went to visit a class to consult on the planned mechanisms and materials of the design. Phil arrived without the usual bandana, cap and goggles. The children reacted with shock at seeing his hair – he seemed to appear more 'daily' to them without the usual headwear. Likewise, during visits to the Imagineerium children sometimes saw 'uncostumed' Imagineers slipping in and out of the premises and had to be explained away as being on 'other' projects. These examples suggested that costume signalled, to the children, the importance of the aesthetic of theatre shaping the imaginative frame. Perhaps the 'suspension of disbelief' that theatre signals by costume, and taking on a role, drew children in to commit more to the project. Certainly, children were eager and proud to wear badges of the hummingbird (see 5.2 page 127), signs of an apprentice imagineer's costume.

The experience of acting out the hummingbird story, seemed potent, an 'inspirational story [that] made you think about teamwork and helping others' (Nisha, focus group, 2015) about 'trying your best' (Issac, journal) and 'keeping on trying' (Kiran, focus group, 2015). Role-play was central. Imagineers could model behaviours, such as when Sarah modelled the importance of being inquisitive by taking on a naive role and asking a question during the reading of the commission scroll (see 5.2, page 122). Imagineers' role

play constituted an indirect permission giving which children understood. It signalled 'being allowed to' be inquisitive, 'be creative and think ideas' (Adila, interview) and heralded children trying out different ways of behaving for themselves.

Most children appeared to relish the invitation to behave 'as if' imagineers. The enactive, physicality and haptic qualities of doing were both apparent and regularly commented on. Whether acting out in role play, trying out the theatrical carnival costumes, learning the basic 'chipping' movement of the carnival dancer, or making the models, such behaviour was an evident source of pleasure. It was often reported with reference to the senses: whether seeing or feeling, such as Malwina's comment that she 'liked it when they did "tricks", like in the air - and when Sarah performed to test [our structure] on the travellator. I liked the costumes, that we got to wear some and see what they actually looked like moving' (interview). This sensory perception of how structures and fabrics looked and felt once animated by movement appealed to many of the children. They quickly attuned to the sensory pleasure of moving, enhanced by the aerodynamics of a costume that twirled at ease and commanded attention in space. Several boys who struggled with self-management were disciplined, persistent and expressive in such moments, recognising that they were 'good at it' (Dakota, interview; Mason, interview; Hamim, focus group 2015). Another who was often cautious and anxious remembered that 'moving around' was 'fun' and that he had 'enjoyed myself' (Aazaad). Here theatrical elements of costume, movement and sound provided structures in which learning was physically active, social and expressive.

Teachers too noted the huge smiles on children's faces, particularly during movement work. 'They loved the dance, and the fact that they did that with all the costume – they haven't seen, used or practiced anything like that before' (Teacher D). Teacher A noted that 'a lot of children came out of themselves' in these moments. The sense of harmony, engagement and joy was evident in data from all schools, reflecting scientific 'opiod theory' understandings of the positive correlation between physical activity and well-being (Boeker et al., 2008), of the empathy generated by physically moving together (Iacobini, 2008) and responding (Merleau-Ponty 1958 / 2005).

Whilst the project was neither designed just as, nor fully realised as an immersive theatre experience, in the design-rich environment and detailed narrative way that Punchdrunk do, Biggins' distinction between immersive theatre and immersive experience is useful here. Her characterisation of, firstly, environment and space, secondly, narrative and story and thirdly, interactivity and game are resonant for *The Imagineerium* project. Whether the playground, a school space or Imagineerium workshops, the spaces and their geographical use offered an intimate, multi-sensory, physical engagement with varied, often unusual resources in ways which could be considered 'immersive'. The commission entered children into roles as imagineers and into exploring the narratives of Godiva and their city. As such they were invited to experience 'the *sensation* of immersion in place, space and story' (Biggins 2013: 5 original italics) which signalled a pedagogy of 'empowerment, choice or freedom' (Ibid: 2).

These themes - of the affective, visceral and physical nature of learning - and the sense of freedom generated by the experience of the project are evident through the data gathered. Theatre, its form and practice, framed and enabled this, but was not the only factor. The lead 'actors', the imagineers, who facilitated and enacted throughout were considered significant as makers, as particular role models and for their relational qualities. In the next section I explore these ideas further.

6.2 The culture of art-making

Throughout the project, imagineers modelled, coached and emphasised the kinds of behaviours and skills of an imagineer. Children's engagement in the research, as documenters of the process, reinforced this. As we saw earlier (5.1), from the moment they stepped onto the school playgrounds, the naive questioning of imagineers emphasised the value of curiosity and the hummingbird story (5.2) communicated importance of having a go and trying one's best in any task. Thereby the kinds of skills and team behaviour needed was communicated and understood by children who spoke frequently of being and behaving like an imagineer, reflecting a desire to identify

themselves with imagineers. Imagineers urged children to 'think big' and, particularly in early solo and group drawing to 'let your imagination fly', 'share ideas' and 'be open' to other's ideas (project field notes). Their facilitation of groups modelled listening to and negotiating the use and development of individual's ideas. They signalled also that individual interests and fortes were valuable to the team, so that responsibilities could be delegated out and benefit the team. By talking explicitly about 'who has ideas for performance that would help an audience understand our design?' (Sarah, field notes) or 'who can draw carefully and copy this at scale?' (Phil, field notes), or 'who is good at organising what needs to be done? – someone who can keep to the brief' (Sarah, field notes) children learnt both about what a role might entail and also how to question, negotiate, support and at times also challenge each other. In subsequent iterations of Imagineerium projects, these behaviours have been written and form part of the commissioning brief. Here they were emergent and enacted, typically intentionally but also intuitively by the imagineers. These behaviours underpinned and characterised the making children encountered.

Seeing the imagineers in relation to Godiva (see 5.6), as makers and puppeteers, developed children's respect for their skills. In post-project questionnaires 97% (all but one child) rated seeing Godiva at the highest possible level. Seeing Godiva's electronically operated hummingbird prototype and the engineering and making workshops where imagineers work, the theatre designs Phil shared, the carnival costume and float model prototypes that Jane shared and the moments of skilled performance, that Sarah, Mark and Kathi modelled, affirmed the expertise of the imagineers as makers of aesthetically and technically effective work.

Working with professionals: designers, performance or visual artists and engineers was rated highly important by children – as 85%, (artists) 84% (engineers) and 74% (imagineers) respectively. In interview children spoke of feeling inspired both by a particular and by all imagineers' expertise. 'I think they were all inspiring because [they] knew a lot about [falters] so much!' (Abaar, interview). Imagineers were referred to repeatedly as 'professional' (interviews) reflecting children's admiration and advancing the idea of art-making as an attractive, skilled and valued practice. Children developed

such understandings through the lived experience of participating in *The Imagineerium* project, being able to '*see* what Nick has been doing … you *can know the life and art* of an engineer, the things you do in the Imagineerium' (Kiran, interview). This experiential knowing, through witnessing, being alongside and within the making process generated a particular, fuller, kind of 'knowing the life and art' of a practice. Kiran's words reflect longstanding curriculum debates about the inadequacy of propositional knowledge for education (see for example Chappell, 2012; Reid, 1980).

During the Imagineerium day, children could be heard advising other members of their team who to go for a particular kind of help, revealing that alongside generic imagineer skills, they recognised where specific expertise was useful and who they had seen modelling different skills. A number of children identified with a particular imagineer. For some the art form and skills resonated for their existing interest, such as Adrian's history of 'building wooden things' (interview) with his grandfather feeding his interest in talking to Phil about 'pivots and levers'. For some it furthered an undeveloped interest, as for Maarika who reflected that learning from Kathi about 'gluegunning cotton wool onto the sheet to give it padding like a belly' signalled her 'start[ing] to learn more about my decorative side…. I want to do costumes' (interview). Other choices reflected newly discovered interests, which aligned them to a particular imagineer, such as the child who suggested that 'Nick inspired me because he made Godiva … now I want to be an engineer' (Abaar, interview).

These examples reflect the sense of how intertwined making and learning seemed to the children. The conviction with which such comments were delivered in interview also suggested their significance. Children spoke with a sense of ease and competence about making, suggesting an associated confidence in learning this way. The frequent occurance of children reporting a personal significance to their learning, revealed an affective dimension. Scientific terms like 'pivots and levers', skills and techniques 'gluegunning' and 'padding' intermingle and co-exist with more colloquial terms, such as 'stuff','belly' and wanting 'to do costumes'. Memories, interests and moments of self-awareness interweave and frame the making, informing and characterising the learning.

Witnessing makers and making alongside the imagineers appeared to expand children's sense of what being an artist, or being an engineer, might entail. Possibly reflecting their dominant experience of the arts in schools, before the project, 92% of children considered an artist to be someone who draws or paints, with 32% referring to making works of art, but only a rare suggestion that such works might involve materials other than paint or pencil or be in 3D form (pre-project postcards). Only 8% thought an artist might work in a form other than visual (ibid). After the project the focus upon drawing and painting had reduced to 46% with a new notion of design being introduced by 29% of children and terms like performer, actor or musician often being used to describe an artist (post-project postcards). Some children had mentioned artist's qualities in pre-project postcards using generic terms such as 'creative', 'imagining' and very occasionally 'being original'. However, after the project there was a more situated sense of what artists' qualities might be with 'create', as opposed to 'paint' or 'draw' (post-project postcards) being used more often as a verb to describe their activity, suggestive of how the project had expanded their awareness of possible media and forms in which an artist might work, including 3D and performance. 'An artist can do lots of things. They can design, draw, paint, make sculptures, recycling things to make things' (ibid).

Additionally, without prompting, over a third of children, post-project, described artists and engineers in relation to each other. Some thought that they possessed distinctively different responsibilities and roles, perhaps reflecting their sense of what they had witnessed in the project, suggesting that '[a]rtists do lots of creative thinking and think about what material they are going to use for the model. Engineers build structures, models, buildings and much more, [They] think about materials like waterproofing' (post-project postcards). Form and materials as distinguishing factors were echoed in several accounts: 'An engineer creates models which are 3D. They use mechanical objects such as screws and bolts. Unlike artists their models are technical rather than detailed' (ibid). Others sought to find connections. 'An engineer creates mechanisms and builds. An engineer and an artist might seem different – however they're not. Due to the fact that they both create, it makes them quite similar' (ibid). A number decribed artists and engineers with qualities, traditionally associated with the other suggesting that an engineer 'invents something amazing full of imagination and creative', 'builds and

imagines things of beauty', 'thinks of many ways to invent something unique' or that 'Artists are people who are creative and build stuff that has [its] own style' (ibid). Occasionally, they described how the skills and qualities interrelated. 'An artist designs the idea and adds colour and breathes personality into the idea. Engineers make the idea move or glow etc. They breathe life into an idea' (ibid).

Unsurprisingly, most responses indicated a better understanding of what artists and engineers do. As Kiran's earlier comments about being able to 'see' and 'know' imagineering from the inside suggests, the experience of working alongside, being helped by, watching, listening to and seeing the products imagineers had made meant that children developed a felt, experiential insight into what an engineer might do and what an artist might do. Their comments reveal the growth of 'interpretative' (Ross 1989) skills as they made sense in their own terms, with their personal interests and experiences foregrounding. The different emphases in different accounts reflect a recognition of engineers' scientific testing and more open-ended exploration characterising artists experimentation but that both engineers and artists are problem solvers. Likewise, the notion of imagineers having to experience 'a few mistakes' and make 'a prototype (like we did) and then elaborate that to create something great' (post-project postcards), suggests how significant experiencing is to understanding. Learning the procedural craft of the form and engaging with the personally significant expressive dimensions of an art-making process are significant to that experiential development. The children's comments indicate their attunement to artists' *and* engineers' practices as being creative and an emergent recognition and value of the hybrid practice of imagineering where two apparently different cultural practices and sets of knowledge and expertise, relate. Here art-making is a site where new things are conceiveable and where, rather than 'either / or' choices in learning and thinking, 'also' and 'possibly' (Craft, 2000) are 'intelligible' (Butler, 1990).

Children were intrigued by imagineers, who were visually and behaviourally, unlike class teachers and thus opened up the possibility of 'different ways of being, doing and knowing' (Thomson et al., 2012:13). Imagineers' interest in the children, evident in them listening attentively to and engaging in the thoughts children shared fed children's

interest to seek out opportunities to chat, both within and around sessions. Conversations explored out of school activities, ideas from a previous session, connections with family, parents and siblings, typically with children probing imagineers' opinions and imagineers affirming and probing back. A year later a number of children recalled the amount of talk with imagineers, signalling relationality as a positive and valued quality, with a number remembering the detail of what was said. They remembered that they were 'welcoming' (Abaar, interview), talked about 'feeling a lot more' (Almira, focus group 2015), just 'talked to us about stuff' (Maarika, field notes), 'were interested in us' Madhila, focus group, 2015), so that it felt 'like you cared' (Louise, focus group, 2015).

Children also appeared to enjoy the playful repartee and engagement between the imagineers, watching them with rapt attention. The value of this repartee was apparent in the idea generation phases of art-making, modelling collaboratively how ideas might grow and feed from each other. At others it was used deliberately to engage or lighten a moment, with Mark particularly generating a humour that children reflected valuing as 'fun' (field notes; interviews; questionnaires). Imagineers' engagement with each other also reflected the learning happening, in the moment, between practitioners from different sectors who had not worked together before and who were themselves genuinely interested in finding out and learning from each other. As such they modelled the practice of attuning to each other and experiencing the joys and challenges of discovering about how their practices connected, or did not appear to.

This habit of watching, affirming and learning from each other set a positive and respectful model for children. Likewise the instinctive response of imagineers, to be hands-on, to try out making a practical solution in the face of moments of difficulty modelled the same response in children. Adrian's account of why he enjoyed working with Phil reflects a sense of joy in doing and making as the default behaviour. 'You ask him a question and he's on it! [indicates fast action with his hands] Working it out' (interview). He relished that doing was Phil's default way of thinking and that explanation or commentary would be secondary to action. The activities set up for children to explore, research, investigate and trial ideas practically echoed and celebrated the

impulse to do and make. Likewise the desire to learn skills, to hone and craft materials, grew from children observing the imagineers in action. This readiness to engage in the practices of art-makers, to persist and address problems they encountered, to want to know more, to collaborate seemed apparent in most children.

As the day in the Imagineerium space progressed children, alone, in pairs or small groups, were experimenting with new materials and techniques, finding their way through problems. In reflecting on the experience and its challenges a number of children noted that 'it was really hard to do' (Adila, interview) some, like Aazaad, feeling that they lacked the skills, 'it's hard to do the bracing. I couldn't make a strong structure' (interview). There was a sense of surprise at how hard the work was and for some, like Aazaad, the negative feeling that 'I did it wrong' (ibid). Others reflected a sense that such challenges were 'part of it' (Kiran, interview) and that the more they invested in making, the more irresistible it became and so 'the more I tried' (Oja, field notes).

6.3 The materials of art-makers

Questionnaires suggested that making models was the favourite aspect of the project; 89% rated this at the highest level. Comments like 'making the real model was very fun' (interview) from Haroon, a child reportedly typically less engaged in learning, were repeated across interviews and questionnaires and echoed in comments recorded by teaching assistants. A number of adults noted that one child, who teachers professed they struggled to teach 'was completely engaged' (Teacher C, post-project interview) by making. 'He knew how things worked … all of a sudden you could see that he had a real talent' (Kathi, post-project interview). The appeal of making, and particularly making in the arts, as an educational process is not new, but perhaps an argument that it is timely to revisit. Children's comments here echo accounts by Dewey (1934), Eisner (2002), Gardner (1973), Marchand (2016), Sennett (2008) which emphasise the significance of the haptic appeal of materials and of undergoing a creative, making experience (Ingold,

2017). As Gardner reminds us making and feeling are not only foundational related human systems, but pre-conditional to perceiving, to learning in effect (Gardner, 1973).

Observations likewise revealed a delight in: working together to solve practical problems (Marchand, 2016); in building in three dimensions; and in exploring the range of materials that they had access to. The focus and concentration on task was often arresting, 'tongues protruding, bodies exerted as they held, manipulated and explored whether a material might render the effect that was imagined, or surprise and offer up a new possibility' (field notes). The materials available appeared to matter and were mentioned frequently by children as inspirational because there were 'bigger things' (Mason, interview), 'different things' (Louise, field notes), 'so many colours and sorts of materials' (Malwina, field notes) and because they were 'allowed to use whatever we wanted' (Adila interview). Children relished aesthetic feel and appeal of the range of materials which lined the walls of the Imagineerium space. One girl mentioned with glee that there was 'so much stuff …. all shiny and glittery!' (Malwina, field notes).

More generally, as Haroon put it, children 'like[d] using stuff quite a lot' (interview). This haptic experience was one that teachers also valued, noting that the project gave children access to 'skills, resources and facilities that what we can't provide' (Teacher D). This was apparent particularly in the pride children showed when presenting their ideas to others as they used raised platforms, fabrics and lights, adorned with mood boards, props and journals which enabled 'a moment of transformation … There were these exhibitions with little models, that were actually exquisite' (Jane, post-project interview). The value of materials and Jane's expertise in curating and presenting artwork in both professional and community settings was reflected by children and teacher's desire to borrow materials to recreate this quality and character of exhibition when presenting to peers and parents in their school communities.

These were moments where the materials and practices of art-making facilitated an emancipatory and expansive sense of children as capable. Being 'allowed to use whatever we want … different materials and not just drawing' (Adila, interview) was seen as important in facilitating a sense of freedom and possibility, as was the more fluid,

varied interconnected uses of physical space, tools and time that art-making required. *The Imagineerium* project made different, albeit often very simple uses of such spatiality in 'default' classrooms. This was often necessitated by the demands of the activity in hand, such as the physical scale or character of building a structure, or drawing to scale which meant children needed to stand and move around it. Simply reviewing and developing ideas, as a team, required being able to see and hear each other in close quarters so tables were put close together and eyes were up looking at the work or into each other's faces. Art-making thus repurposed 'default' spatial configurations of grouped tables, facilitating a fluidity and variety of rhythms and tempos, as children moved between referencing an individual idea in a journal one moment, collaborative review in another; between drawing, verbally explaining or physicalising an idea (see 5.4). This positive effect of such use of space and time, noted by Davies et al. (2013), suggested that schooling structures might benefit from review in such terms.

Once the permission to use any material was understood, albeit that this might require the help of an adult imagineer, children began to explore, touch, compare and discuss the 'affordances' (Gibson, 1979) suggested by materials, which led to unexpected developments. One child, who had initiated the idea for the design her group reflected that her original 2-D design was rather 'simple' (Adila, interview). Boys in her team had been dissatisfied with the prototype 3D structure they had created (as noted in 5.6) and Adila noted that 'when we found the different materials it started to change quite a lot and look quite different' (Adila, interview). She recognised that they had not thought enough about the qualities of a tree trunk, that whilst roughly cylindrical, it is not uniform, but has bumps and undulations. Finding a wired, concertinaed vent hose afforded curves and turns which looked more like a tree trunk than their original drawing suggested.

This process of exploring physically, holding and trialling different materials, talking to imagineers, appeared to generate a real interest in what qualities, feelings and ideas different materials can afford. Learning from such physical sensations mattered in understanding how a 3D structure could be made to be robust enough for mechanical movement and how to convey the desired 'look and feel' (Kathi, field notes). Later when

Adila's group's model, was being built to full scale, children visiting the Imagineerium got involved in metal beating, shaping rings to form some of the curves of the trunk and in cutting materials to make leaves to layers to develop branches. At this point they were able to reflect on the qualities of their wire (now metal) structure, recognising how much stronger the real structure needed to be, and how different effects are created by layering.

For many children their engagement in making generated moments of rapt engagement, perhaps reflecting the optimal state of intrinsic motivation articulated in Csikszentmihalyi's (1997) flow theory where level of skill, perhaps supported by an imagineer, and challenge are exactly matched. Many of the observations and comments recorded by teaching assistants and peers reflect engaged, enquiring practice as when some children made connections to prior knowledge. 'Is that the same in clocks?' asks one girl as an imagineer suggests a cog and gear movement for an action on a group's design. In another group two girls are debating the best material to combine the colour they want and the flowing movement effect. One, led by colour, wants a thicker material. The other who appears to recognise the unsuitability of the material for the desired movement recognises that attaching such material to the structure will also pose a challenge. 'How are we going to make this hold?' she asks and thereby begins a debate by the group about what material and attachment to use that moves the design forward. Teachers and imagineers noted that, in the Imagineerium space interventions by adults to 'manage behaviour', typical in school, were exceptional. The sessions reflected the 'native and spontaneous culture' (Dewey, 1934:7) of making as a social, purposeful and enquiring practice. The space 'reverberate[d] with the hustle and bustle, expansion and renewal, tempo and industry of the present in experience' (Cannatella, 2008:33).

6.4 Art-makers' journals

The journals appeared to have a particular significance for children, being regarded either as a desired sign of being an imagineer and of some level of autonomy in their

education. Their character as hard-backed, ring bound, plain paged books was unlike the kinds of books used in schools and heralded a use unlike schoolwork, a point noted positively by children and teachers alike. Their use was directed more often for sketching ideas, and when writing, for explanatory or personal notational rather than formal writing. Some of the imagineers talked about and shared examples of their own journals and portfolios, explaining that they often recorded ideas they had in different forms: in sketches, words and phrases, diagrams, collecting and sticking in an image, a fabric or a design. Some showed pages from their journals and explained that they often also wrote, at length about what they had done in sessions, what such experiences had made them think, as well as using journals in sessions to record in the moment ideas. As such journal were modelled as something individual, expressive, potentially private and not open to 'marking' by teachers, which gave a particular significance to their importance for children.

In interview, 17 of the 18 children, explained that they valued the journal. Even children who had not used their journal much to record ideas spoke of it as symbolising a sense of permission, freedom and control. Malwina articulated a popular view 'that you can write anything down and it's yours … you don't have to show anybody' (interview). Many described journals signalling a welcome invitation to be creative. 'As soon as I got mine I thought I can put all my ideas in it - like if I want to be a person who invents stuff when I grow up, I can put all my ideas in there' (Haroon, interview). The focus upon 'being able to draw our ideas' (Adila, interview) to 'put my ideas in my drawings' (Aazaad, interview) was mentioned repeatedly as being an important permission or freedom and condition for their work. It was also as generative of further ideas because 'every time I looked into the journal I had more ideas' (Earlene, interview). Children spoke positively about how the project valued idea generation itself, 'we were able to put down what was on our mind … to show what we were thinking' (Dakota, interview). The significance of the journal seemed to transcend the project with children talking of having and sketching ideas at home that they then recorded or developed in journals. Whilst this habit was not necessarily reflected in the volume of drawing in journals, children regularly expressed such a view. A year later a group of boys repeated this sense of importance. Kacper said that keeping a journal had 'made a huge difference – I still have it in my room' (focus

group, 2015) at which his peers affirmed that they had continued using theirs, with Hamim saying 'I've just got two pages left. I've almost finished the book' (ibid). It appeared that the agency and value for expression that journals generated caused them to have significance.

6.5 The social space of art-making

Whilst the collective and the creative energy of 'group think' (Glaveanu, 2014; Sawyer, 2007) was, overall, reported as a significant and largely positive experience, the challenge of *making collaboratively* was evident. The use of journals encouraged children to commit to and develop their raw ideas, which were then required to be subject to group critique. Unsurprisingly, as in Xander's case (see 5.4) many children were not, easily open to re-negotiating, giving up some or all of an idea and adapting to suit the team's view of the 'best idea' to meet the brief. For some children, this early stage resulted in some disaffection, and some individuals withdrew from discussion or sought to distract others, apparently to undermine the group effort. Many noted that whilst 'we had lots of ideas ... we had different ideas and sometimes it was hard to put them together… We all wanted our ideas to be put in' (Adila, interview). The constraints of the brief did not allow this and whilst most children allied with the group decision and were able to reattach their engagement to the negotiated group design, it was not easy and some could not. This was easier where children saw an element of their idea incorporated, but this did not always happen or necessarily negate the difficult feelings they had experienced at these moments. Darius admitted that he had 'felt quite irritated because I couldn't add any of my own ideas' (interview).

As vignette 5.4 indicated, the skill of negotiation was a huge challenge, that children had limited prior experience of both interpersonally but also in terms of creative design processes. As Adila explained, 'sometimes we couldn't develop a lot of [our ideas] because we didn't know how to put them together' (interview). They were unpractised in recognising the potential of ideas, and how such varied ideas could be combined. They

noted the limitation of the time allowed to an activity within a session meant that it was often 'difficult to think up something quickly' (Kiran, field notes) which added to the challenge of collaborative negotiation. Later as they worked with materials a similar dynamic was evident where there was a lack of familiarity with the property of materials, or with available and suitable means of joining different materials.

Some children attributed their achievements in the project to collaborative practice. A year on, most of the children interviewed spoke of the project being about 'teamwork' and what they had learnt from this emphasis. Almost all children interviewed thought they worked better and learnt more with others than alone because 'I get inspired by other people in my group' (Haroon, interview) and 'everyone's ideas [are] helpful because .... everyone thinks different' (Kiran, interview). Many simply noted a preference. 'I like learning from other people' (Adrian, interview). Their comments reflect Vygotsky's (1978) famous theory of the zone of proximal development, that through working (or experimenting) with more (or differently) experienced others, a child may develop further than if he/she approached the same challenges alone. Whilst for Vygotsky the 'more experienced' might be older experts, here a mix of 'expert' adult imagineers operate alongside the more horizontal relationship with peers which recognises expertise in different aspects of the work, as Lave and Wenger (1991) have also noted. This generated a positive and broader conception of what expertise might look like and was affirmed as a positive experience working in a team for the children involved. Often learning would be worked out between children following observed or momentary suggestions from an adult. Children saw the character of group work, as they experienced it in *The Imagineerium* project, as different from 'usual'. The words 'with', 'from' and 'by' in the children's voices and in field notes above suggests a more engaged and attentive interaction with each other, to the 'alongside' sense of being placed in a group.

Limitations in time, experience and skill generated frustrations that had a different effect in different children. In some it generated moments of disinterest, perhaps where the level of challenge exceeded the appeal of the challenge to them, where 'flow' was not achieved (see Czsikszentmihalyi, 1997). But in others such challenges, fuelled by the

sociality of activity, fed a desire to fully engage with making, to touch, feel and work at a problem. Having a problem in front of them, and others to share or reflect on it with, seemed for many to motivate action. Amid the bustle of collective activity, there were regular extended moments, noted by myself, imagineers and teaching staff where children, alone, in pairs or groups or alongside an adult imagineer, were immersed in crafting new skills, engaged in experiment, growing or honing skills and thus understanding. Ingold notes the significance of such practice-based discovery, which he describes as coming 'from the inside of one's being', for learning. He argues that it is indeed

> [t]he only way one can really know things …. To know things you have to grow into them and let them grow into you, so that they become part of who you are…The mere provision of information holds no guarantee of knowledge, let alone of understanding… It is … by watching, listening and feeling – by paying attention to what the world has to tell us – that we learn. ..knowing is a process of active following, of going along. (Ingold 2013:1)

Children often stood alongside an imagineer, observing as they explained and modelled, for example how to take an exact measure to create an axle, and why this mattered for the movement of wheels. Two boys engaged in making a second one alone followed the behaviours as well as actions and having reported that they 'were marking the wood so we knew where to cut it' (field notes) were particular in sourcing a sharp pencil and carefully measuring the length of dowling to be cut. Elsewhere children applied their understandings, for example attaching sticks 'to give support' to the horse's tail on their model which they recognised was not rigid enough to withstand movement, or drilling gently into a plastic bottle to attach flames to a 'jet pack'. Ingold suggests that such practice is learning in the form of enquiry.

> The way of the craftsman is to allow knowledge to grow from the crucible of our practical and observational engagements with the beings and things around us (Dormer, 1994; Adamason, 2007). This is to practice what I would like to call an art of inquiry. In the art of inquiry, the conduct of thought goes along with and continually answers to, the fluxes and flows of materials with which we work. These materials think in us as we think through them. Here, every work is an experiment: not in the natural scientific sense of testing a preconceived

> hypothesis, or of engineering a confrontation between ideas 'in the head' and 'facts on the ground', but in the sense of prising and opening and following where it leads. You try things out and see what happens. (Ingold 2013: 6-7)

Sennett echoes these ideas, drawing our attention to significance, in terms of self-respect and self-view, of such crafting. Both Ingold and Sennett's ideas appeared to be alive in the experience of making that children exhibited and reflected on. A year after the project, a number of children reported altered views of their inherent capabilities.

A sense of resilience, of heightened awareness of what might be possible for them was apparent: in engineering, in design, in themselves. Maarika reflected a common view of enhanced self-belief. 'Before I'd be "well I won't be able to do that", but imagineering has opened my eyes and I think "I can do this!" ' (focus group, 2015). Earlene reported that the experience had been about 'finding the parts of you that you've never seen' (ibid) and thus recognised that she must have more potential to be realised. The insight appeared significant and empowering for her, a girl who had had little voice when I met her, but here was almost the first to offer a suggestion about what had mattered about the project to her. This sense of capability and openness to expanded possibilities appeared to be a dominant effect of making – that doing fostered the desire to do and a self-belief in one's capability to do so well. Art-making: the site, its forms and practices emphasise the significance of doing, of movement in learning: that embodied and affective attunement are central to learning and that such movement and making are social acts.

6.6 The embodied nature of art-making

As we saw in vignette 5.6, when children entered the Imagineerium space and were greeted by the giant, mechanised Godiva, their eyes widened, jaws dropped, heads craned as they gazed, seeking apparently, to keep eye contact with her. Animated by puppeteers, her eyes moved across, stopped and blinked, she might raise her arm or tilt her head towards them. This appeared to be received as a quasi-human, visceral

encounter, albeit that they knew and could see her as a puppet. Many children commented that she seemed to be following them with her eyes, 'She's looking at me!' (Dakota, interview). Their interest was furthered as they were able to look closely at what mechanisms were causing her to move, perhaps having opportunity to step onto the puppeteer's seat and activate her arm or head turning mechanism, or to hold the remote control and move her eyes, guided and informed by Kathi, Mark, Sarah or Roger. These responses articulate learning as an enactive, whole body process.

Children's questionnaires and post project interviews suggested that working physically, with technologies, materials and movement work was a positive learning experience. 'They did more action - doing - like building structures, or with our bodies then also explaining it again but in a different way - that's what I liked …..' (Darius, interview). If weighting of words alone constituted data, it might suggest that this positive view of embodied learning was located in the hands-on activities and technologies involved with model making, rather than with the whole body drama/dance-like movement,. However this evidence does not tell the whole story. Interviewing often revealed children partially enacting, or indicating a whole body movement with their hands. Observations of practice, echo the tendency to explain in embodied ways either instead of or alongside verbal explanations, as in Abaar's account of how 'Sarah and Mark helped me because I just connected [how braces work] from push and pull … because if you hold and lean back (leans back with arms outstretched in front), your arm is like a brace (interview). As the literature on embodiment shows, our consciousness and attunement to our interoceptive apprehension of experiences is limited. The dominant view is that cognitive processing constitutes knowing. Argyle at al. (1972) counter this suggesting that words are both a less immediate and less effective form of communication than non-verbal forms. Ingold suggests that rather than movement as a precursor to cognition, 'movement *is* knowing' (original italics Ingold, 2013:1) hence it is plausible that a reflective spoken method of capturing children's perceptions simply cannot capture the learning occurring at the time, but that such learning might be more apparent, to outsiders or perhaps just not immediately to the self.

Engineers, Roger especially, were delighted by seeing children understand scientific concepts through 'putting engineering into your body' (post-project interview).

> The body as a piece of engineering – I wish I'd learnt my engineering that way… Just the arm - extended and bent [extends one arm and pushes it with the other arm – it moves easily, then folds it at the elbow and pushes again, and the movement is much less.] So easy!' (Roger, field notes).

And in turn artists delighted in engineers 'see[ing] how our way of working, our way of approaching things, inspired the engineers and then that inspired them to inspire the children' (Mark post-project interview). Mark's favourite moment from the project was witnessing Roger respond to a child's complaint about a weak structure not by explaining but by silently echoing Mark's modelling of bracing himself with his arms from a previous session and saying, 'How am I making myself strong?' (field notes). Certainly children appeared to grasp concepts such as centre of gravity, equivalence, bracing, tension and that the length of a lever might effect a more easy movement. This could be enacted and felt through the body and provided a strong reference point for subsequent modelling building as these principles were translated to hand-eye exercises, such as building strong structures with potatoes and sticks.

Overall, as suggested earlier children were often also engaged by whole body and enactive practices, with many suggesting 'I enjoyed myself' (Aazaad, interview) and that they had 'fun' (Madhila, interview). Of course this was not wholesale. Some, often those with larger physiques or more reserved behaviours, 'didn't really like the feeling' of whole body movement and were 'a bit nervous about it' (Adrian, post-project interview), with one boy remembering a year later that he 'didn't like that at all' (Aabid). Their feelings appeared to negate a positive learning outcome. Indeed even in hands-on making imagineers felt that some children did not fully engage because 'they didn't like making mistakes … it's easier to not even try because then you don't have to fail'. (Mark, post-project interview). Imagineers' familiarity with open-endedness and experimental practices were often at odds with children's habituated anxieties, whether individual or schooled, suggesting that regular and diversity practice would be needed to avert such responses .

Teachers saw the significance of movement for their pedagogy beyond the project: for creating 'more joy' (Teacher A, post-project interview) by seeking opportunities to enact and be more physically expressive. One teacher particularly reflected on how he intended to take this forward, by using physical enaction of key words and concepts – particularly for science.

> I'm thinking more small-scale. … Actions to describe one word: actions to describe a sentence, so forces: push pull. …I'm just thinking of another way to engage them while I'm talking… something that will appeal to a more kinaesthetic learning style… something they can see or physically do.' (Teacher B, post-project interview).

A year later, at a Headteacher's meeting, the head of his school stood up in front of peers and explained how her school had taken this intention forward and as a result had moved from being an Oftsed 'cause for concern' in Science to 'outstanding'.

From the outset the dynamic between individual and collective, often noted in theatre, in ensemble and mimetic practices is a feature of the project. Children formed a circle in open space to receive the commission and enact the Hummingbird story. This circle shape generates a collective watching, attending to each other and an initiation of copying of actions and behaviours. This draws upon innate human mimetic tendencies, recognised to be at the heart of empathetic behaviour, thus building relationships. The touch and weight-bearing demands of physical theatre exercises in which children are testing stability and strength require eye-contact and thus build a sense of physical and emotional relationship and trust. That children, at least at first, might avert eyes is testimony to the discomfort or unfamiliarity of such intimacy. A group of four girls in testing balance and weight-sharing as they placed feet close in as a small circle, braced their arms and leant out causing flushed cheeks, giggling and embarrassment. Once they had been offered the idea of their emotions and physical sensations, as helpful guides to necessary position, balance, or physical tension, they persevered and were able to adjust and achieve a strong group structure. Whilst physical practice was not without difficulties - indeed several children simply opted out from the more challenging work - it did build trust and a desire to support each other. Teachers and artists also noted this as contributing to the improved empathy, negotiation and thus collaborative behaviour that

was evident throughout the project. 'Doing' here typically meant 'doing together', or at least in relation to each other. Tomasello's view of animals as essentially collaborative, programmed, perhaps by mirror neurones, to support each other in physical tasks, offers a scientific account for Vygotsky's (1978) psychological argument, and Lave and Wenger's (1991) socio-cultural one, that social interaction precedes, and indeed is necessary to, development, consciousness and cognition.

Yet both within and around the group work, individual voices were also invited and valued – noted by the almost universally positive response of children to their own journals, where they could note thoughts, sketches and ideas. The experience of collaboration, and indeed what constitutes positive collaboration, as suggested in literature on the topic, is challenging as well as rewarding. Whilst this remained a dynamic aspect of the project, it was also widely recognised that helping others in the team was a rewarding and motivational aspect, and that learning with and from each other, often copying one another, whilst expedient for the task also fostered a positive sense of valuing and being valued by each other. The effect is noted by Wulf who, in discussing mimetic behaviour as innately human, explains that this is not that we copy 'to become like another', as in a dependency behaviour, but that 'one needs the other to develop in relation to the other' (Wulf, 2012), i.e. that the individual grows in relation to and because of being with others or that 'the act of relating to other persons and worlds in a mimetic way leads to an enhancement of one's own world view, action and behaviour' (2008, 56). Sennett's argument that mutually respectful behaviour is learnt through practising it: 'in social life as in art, mutuality requires expressive work. It must be enacted, performed' (Sennett 2002:.59)

This chapter has focused upon the educatively valuable dimensions of art-making by considering the forms, materials, spatial, embodied, relational and affective dimensions of art-making as practiced in *The Imagineerium* project. The next chapter focuses upon the structures and character of such art-making.

Chapter 7 - What kind of educative structure is offered by the site and practice of art-making?

Introduction

In the last chapter I discussed the significance of describing art-making as a site of practice, rather than purely a practice. In doing so I suggested that art-making constitutes a particular kind of cultural space which is at once physical and symbolic, one which has been intentionally made but is also dynamic, always in the making, stimulating new possibilities. I argued that the embodied forms, practices, cultures, spaces and dynamic of *The Imagineerium* project as an art-making site can generate educative benefit. In this chapter I consider that educative role further, focusing upon how the organising principles of art-making structure and shape possibilities for learning. I draw particularly upon Lave and Wenger (1991) to argue that art-making in *The Imagineerium* project constitutes a particular, potentially unique, emergent community of practice. I claim that the practices of the imagineers and the culture of such practices structure children's experience in ways which best reflect the character of a community of practice, wherein learning is 'situated' (ibid). My use of the term 'structure' here is intended here to convey the complex interrelationship of the various resources that come together (and need to come together) to provide an effective educative environment.

In 7.1 I draw upon critical and cultural reproduction theories to argue that the responses of teachers in this study of *The Imagineerium* project reflect a tension or 'struggle' between dual positions within the field of education. Whilst the dominant and legislated frame of English education is concerned with acquiring and understanding particular canons of knowledge (Ball, 2017, Snow, 2019), this is in tension with commitments these teachers also demonstrate to child-centred, 'progressive' and constructivist pedagogies, advanced by Hadow (1931), Dewey (1938) and popularised in the 1960s (Plowden, 1967) and which shape teacher education today. In 7.2 I consider how the art-making practices and culture of the imagineers characterise and define *The Imagineerium* project, and

thus structure education differently to default schooling. I argue for *The Imagineerium* project as a site which, literally and symbolically, structures children's learning experience differently to default schooling. In 7.3 I analyse how imagineers conceived of and enacted the emergent art-making community of practice which the project afforded. I note their emphasis upon learning through doing, acquiring knowledge through (and as) making and their experiential understanding of the virtuous circle initiated by physical and relational character of making practices: that they can build a sense of capability and belonging that feeds confidence. I consider also problematic aspects inherent in this organic structure. In 7.4 I explain how children were inducted into the community of imagineers, drawing particularly upon Lave and Wenger's notion of 'legitimate peripheral participant' engagement in communities of practice. I draw attention to the sense of belonging and emergent competence thus conferred, which feeds the appetite to make and thereby learn. In 7.5 I identify key features of *The Imagineerium* project as a community of practice, as identified and valued by children engaged in the project. This emphasised, firstly, collaboration and secondly, a sense of freedom and agency. In 7.6 I conclude by considering how the socio-cultural conception of communities of practice focused on art-making proposes both a 'generative and interpretative' culture for schooling and, as Lave and Wenger suggest, how practice here also suggests curriculum 'in the broadest sense' (Lave and Wenger, 1991:92).

7.1 Teacher expectations of education in schools

As mentioned in Chapter Three, the three schools involved in this project were purposively identified as being receptive to *The Imagineerium* project due to their prior interest and experience in developing creative curricula and pedagogies. Their receptivity to the project's intentions was evident in all three schools: teachers were familiar with planning to enable children to imagine themselves into experiences, using novelty, artefacts and scenarios to engage and provoke children's interest in learning. Teacher C told of 'living history' days and a project where learning was initiated by using a fantastical egg that had 'appeared' in school (pre-project interview). Children at another

school were familiar with 'project weeks', where they explore a topic, such as 'Alexander Fleming and bacteria', or 'composing and recording a song'. In such topic weeks children identify what they want to explore and learn through activities which might be described as 'creative' (teacher A, pre-project interview). This was also true of the third school, where at least half of curriculum time was topic-based. At times these reflected local or culturally connected issues, always drew in knowledge from a range of subjects and developed 'transferrable', cross-subject skills, such as 'being curious', 'collaborating' or 'persevering' (teacher B, pre-project interview). Planning meetings and pre-project interviews suggested that teachers began *The Imagineerium* project with an expectation that this arts-making experience would be 'creative', with the associated positive implication that being creative would be valuable, make learning engaging and appealing to the children. This appeal in part resided in an expectation that the project would be 'visual and kinaesthetic', which was significant for teachers, as discussed in 6.6, given the high numbers of children for whom English was an additional language (teacher A, pre-project interviews).

Probing their ideas about their own beliefs and preferred pedagogies, and particularly what opportunities for choice and decision-making they sought to enable for children, revealed that all three teachers' advocated child-centred pedagogies with views such as:

> It's important that [children] find out things for themselves … if they're learning what they want to learn, addressing their concerns about the learning - the areas that they're interested in learning rather than just going along with what we want them to do… I think it's more pertinent to them and I think they'll have a bigger interest in what they're doing. (teacher C, pre-project interview)

Teachers suggested that they believed being enabled to actively pursue individual interests, preferences and the relevance of learning 'outside of the classroom environment' were positive in motivating learning. One thought that 'children learn in different ways … We try and adapt the activities to suit all children. We like to make things more practical or creative' (teacher A, pre-project interview). Another suggested that they:

> leave blank spaces on my medium-term planning in topic work sometimes where I know I want the children to dictate where it's going to go …. because if they are

> dictating the topic area, they must be interested in it and therefore its more engaging for them. (teacher B, pre-project interview)

Their views and reference to 'enquiry' (Teachers B and C, pre-project interviews) might align with the self-directed, or 'discovery learning' through active 'experiencing' which Dewey (1934; 1938) recommends, as well as the emancipatory purpose for education which Rancière (1991) and Freire (1970) advance. Such views might imply a curriculum led, or significantly shaped, by children's interests. However, they might also simply reflect the rhetoric of contemporary educational discourse for learning to feel relevant, to appeal and actively engage. Such rationales appeared to reflect expediency, rather than any pedagogic or moral philosophy of learning. The reference to 'my … planning ... where I know I want the children to …' , a tone common to all teachers, suggested that their views are contextualised by their own experiences of teaching a directed curriculum model. There was a notable absence of any constructivist view of knowledge in interviews or discussion, which might be associated with experiential learning. As one teacher said, 'it saves me having to try and grab their attention and get them hooked' (Teacher B, pre-project interviews), with the implication that what is to be attended to is outside of the children themselves.

Here, and elsewhere in the teacher interviews, is a sense that the way these teachers think about learning is shaped by a particular conception of curriculum and knowledge. Trained and contracted in relation to the legislated National Curriculum and Ofsted, their thinking has been habituated and conditioned to believe that the particular conceptions, forms and domains of knowledge underpinning this legislation constitutes education. Teachers repeatedly used the language, and reflected the values and priorities, of the National Curriculum in their thinking. One teacher reflected on how the project planning for *The Imagineerium* project might have been improved by articulation in terms of learning outcomes: 'I did have an outline of what activities were going on but not really clear learning outcomes' (teacher A, post-project interviews). Another expressed concern about 'not always being quite sure about why things were happening or why things were happening in a particular way' (teacher B, post-project interviews). The observation was expressed as a critique of pre-project information, rather than as a point

of reflection. A third, a senior leader, suggested that schools 'tend to work on the first premise of curriculum… you have to know what you're doing in a term. So, you think "How can this project fit into as many aspects of the curriculum as possible?" ' (teacher D, post-project interviews).

All teachers referred to 'literacy' or 'English' and 'Maths' as focal. Many referred to 'topics', or 'projects' as 'creative' in part because they allowed teachers to draw from different subject areas in a 'cross-curricular' way. Curriculum, here, appears to be understood as 'bodies of information and skills that have been worked out' and mapped for 'transmission' (Dewey 1938:17) as separate subjects in regularly sized units of time, in designated spaces. Apart from teacher B's personal aim to try to leave some 'blank space' in his planned Scheme of Work, there was no discussion of open and responsive planning, such as suggested by Ofsted (2003), that curriculum might be structured otherwise, to reflect any other 'form of social organisation', perhaps co-designing responsively to a child's 'natural endowments' (ibid:17-18).

Teachers' analyses tended to separate out the positive aspects of the project in terms of learning skills, which might be relevant in more than one subject, particularly 'persevering more', 'being curious' or 'working together' but also in terms of subject specific knowledge. From this latter perspective, their inexperience of engineering, and of making, loomed large and they talked about the value of having access to expert resources and knowledge in terms of science, and design and technology. So, whilst teachers expressed value for engaging children through offering choices, or through enactive, visual and collaborative methods central to a child-centred, experiential approach, this was not the only expression of value. Rather than focusing on the project, or they might draw on it to generate a negotiated and child-motivated structuring of learning, teachers appeared to focus upon their obligation to enable understanding of a prescribed knowledge-based curriculum.

Bourdieu's field theory (1977) has been significant in explaining both the inequitable, reproductive tendencies and shifting agendas in education (see for example Grenfell, 2009, Tzanakis, 2011) and is useful here. His conception of social spheres, such as

education and the arts (1993), in terms of 'fields' probes how 'behaviour [is] regulated without being the product of obedience to rules' (Bourdieu 1990a:65) and argues that whilst an individual may exercise a level of agency, this is conditioned and thus imperceptibly controlled by powerful and influential social structures. These teachers identify with the Deweyan ideals of a democratic education, shaped by child-led enquiry when they say for example 'if they are dictating the topic area, they must be interested in it'. But their comments, about preferring pre-defined 'learning outcomes', that 'I want the children to [learn]….', or more generally accepting a prescribed subject knowledge-based curriculum as normal, reveal a contradictory impulse. These latter comments reflect teachers having internalised and normalised the dominant conception of schooling as concerned with acquiring and understanding particular canons of knowledge. Thomson, Jones and Hall (2009) use the term 'default pedagogy' to describe a 'transmission mode of teaching / learning … [and] assessment' in response to the drivers of the legislated curriculum. They note that whilst 'rarely found in its pure form' the 'traces' of such a pedagogy are 'evident at many points in schools' (Thomson, Jones and Hall, 2009:35). Likewise in this thesis I use the term 'default' as a shorthand for these dominant ideas of curriculum, pedagogy and schooling.

Bourdieu suggests that each social field, which is at once symbolic (social, cultural) and material, 'forms their own microcosm of power endowed with their own rules' (Blackshaw, 2012:165). The particular set of rules or values constitute a field's 'truths', its 'doxa', criteria by which economic and cultural distinction in the field is awarded and which thus structure how 'actors' behave. Actors absorb, enact and embody the doxa of the field which structure their 'belief … that the capital(s) of the field are worth fighting for' (ibid). Here the capital teachers are 'fighting for' is attainment of National Curriculum defined knowledge and understanding. As Bourdieu (1990a) puts it, such belief in the doxa forms, the crucial 'habitus' of a field, the

> embodied internalised schema … [which] is both structured by and structuring of social actors' practices, attitudes and dispositions… The habitus constitutes and is constituted by [their] practical sense of knowing the world … their "feel for the game" … [through which] they come to see that world and the position of themselves and others in that world as unexceptional. (Blackshaw, 2012:165)

Habitus thus describes the normalising of the ways of seeing and behaving advanced by those in power. Bourdieu compares the phenomenon to the unconscious ease of 'the acquisition of the mother tongue' to emphasise how these rules are irresistibly and imperceptibly embodied, so that developing the way of thinking and behaving of the field is, as if one were 'born into, born with' it (Bourdieu, 1990b:67).

Following Bourdieu, the ruling classes aim to reproduce a sense of elitism, 'an elaborate code' (Bernstein, 1971/2003), which perpetuates a belief that learning is difficult and that ' "legitimate knowledge" – the knowledge that "we all must have" '(Apple, 1979:63) is beyond and outside of oneself rather than nascent, in construction, inter-active and emergent through young people experiencing and growing in society. The accounts of these teachers suggest that they are positioned as reproducing structures of inequality, despite their best intentions and efforts. Their accounts reflect a complex tension, a 'struggle', of managing two different 'positions' in the 'field of [educational] production' (Bourdieu, 1993). The result is that teachers often focus on making the transmission of propositional knowledge more appealing, of reducing the gap between what is prescribed and what might be of intrinsic interest to the child.

Conditioned by such structures, it is unsurprising that these teachers suggested a preference for a more tightly planned and signalled route; that it would have been

> better if [the children] had a clear learning journey. Maybe if they were given objectives or statements of what was going to take place on a journey to achieve your end outcome, so then they were able to look back and reflect on what they've achieved … like 'We're here and we've got to get to here'. (Teacher A, post-project interview).

This teacher reflected how such outcome-driven thinking was a pressure for teachers in school, referring to

> high expectations that the end outcome is going to be amazing all the time … like a judging panel … like 'Let's look at the end outcome of what your children have achieved' and it's more of a reflection of me, whereas it shouldn't really be like that. (ibid)

The sense of high accountability, of experimentation as too risky due to the possibility of

failure (conceived negatively) and limited freedoms of schools were enacting, was very apparent in discussion. One teacher's view was that 'for teachers, it goes against the grain to let children lead their own work', so that whilst 'it would be encouraging for children…you are culpable if it doesn't work' (Teacher B, pre-project interviews). Another teacher's anxiety about giving children freedom echoed the inherited and traditional view of the teacher controlling learning as typical. As one teacher put it:

> 'the fact that children will be doing their own thing, moving about and making their own decisions and basically being in control – it's not something we do an awful lot of so - just I'm a bit wary about how it's going to work out. Having to stand back and let them get on with it and not say 'Why don't you do it this way?' – you know … I think will be quite difficult … letting them have free rein.' (teacher C, pre-project interviews)

Teachers expressed contradictory views reflecting the complex tensions inherent in their lived experience of schooling (Bourdieu, 1971). Alongside concerns from some teachers about the project's potential to interfere with their ability to control and direct, they also expressed value for the differently structured learning that the project facilitated. They talked glowingly about the positive human behavioural effects of the project such as 'seeing the children's faces and the smiles', (teacher A, post-project interview) and 'the determination to work things out … them having the independence to think through things for themselves and rising to the challenge' (teacher C, post-project interview). Some recognised that this was generated by being part of a community of professionals practising their work, which 'would have opened their eyes, opened their imaginations as to what the possibilities are' (teacher B, post-project interview).

The teachers all expressed concern that their children were not given enough opportunity in school to explore their own learning interests and identify outcomes that appealed to them personally. One precise example of such a contradiction is that the same teacher who had worried about teacher control before the project, talked of the 'free rein you gave them, which we don't do enough of in school' (teacher C, post-project interview). Another who sought to build in flexibility for this in their planning recognised that this was not something that they were habituated in doing but felt the project

reinforced his sense of the need to 'challenge myself' (teacher B, post-project interview) in order to develop more opportunities for children to lead. A third bemoaned how the structures of schooling had prohibited children from realising the full potential of *The Imagineerium* project: 'The end-outcome in school is already pre-set for you and that restricts the children from being creative … their imagination is not used to its full potential' (teacher A, post-project interview). This teacher suggested that their particular school structuring of curriculum was 'military'. Whilst children's interests could shape learning in a 'topic week' which happened every six weeks, this was not possible in the 'normal' five 'intense weeks' that constituted the large part of curriculum. In teacher C's school, mixed year groups were seen as problematic in maximizing the potential of the project due the need to train year 6 children for legislated Standard Assessment Testing alongside the project for year 5 children. So, teachers critiqued but also embodied the model of curriculum, pedagogy and assessment that reflects the values and beliefs of those dominant in society. Their logistical objections and rationales reflected an inherited and cultivated belief in a directed (National) Curriculum as the legitimate conception of curriculum and ensured that, whilst they held other values, they did not consider enacting curriculum and learning otherwise. The 'habitus' of schooling structured the behaviours of the adults who in turn reproduced these for the children. The result was that whilst teachers showed an affective sensibility and concern for how learning might best be promoted, the structure of a particular curriculum rendered the former unintelligible.

In the next section, I consider how *The Imagineerium* project proposed a different structure on which to design learning. I argue that the commission, to imagine, design and make a kinetic model for a performance art event initiated a particular kind of community of practice. This structured and, to a significant degree, facilitated learning differently and facilitated different dimensions of learning from school. I suggest that it illuminated the educative value of such an art-making model.

7.2 Defining art-making as a community of practice

In the introduction to this chapter I suggested that Lave and Wenger's (1991) conceptualisation of communities of practice provides a resonant and illuminating frame for analysing the practice and site of art-making as a structure for learning. In this section I identify how the concept helps in defining and characterising the art-making of *The Imagineerium* project. Here I begin with Lave and Wenger's source for their model: the productive workplace, where skilled crafts are acquired by apprentices by virtue of being part of such a community; the development of different kinds of knowledges is inherent and situated in being part of a community where work is being produced by skilled professionals. In 7.2.1 I advance that the initiation and frame of the commission echoes that of the working community, as simultaneously educating and making. It is also resonant of another historic educative model, Prestolee primary school (Burke, 2005; Holmes, 1952). In 7.2.2 I draw upon Lave and Wenger's account of communities of practice, as being essentially practical, which require members to gain and use a range of skills and consider how the process of *The Imagineerium* project was likewise inherently interdisciplinary, multi-skilled and practical. In 7.2.3 I emphasise Lave and Wenger's social constructivist account of community of practice, which argues that learning is inherent to, and situated within, both the sociality and the tasks of that community, in order to review how children learnt through the demands of art-making. In 7.2.4 I consider how Lave and Wenger's notion of sociocultural practice illuminates how particular behaviours were emulated and thus cultivated. Through being and working within the physical art-making spaces of *The Imagineerium* project, ways of being and behaving were fostered that appeared positive and conducive to learning.

Lave and Wenger's account of situated learning, locates learning in the practice of work; that is, in the processes involved in becoming skilled in a profession. In *The Imagineerium* project children are drawn in to a commission to imagine, make and design and become part of a working community, which is at once authentic and imagined. It is authentic in that it emerges from the real, if emergent, community of practice of art-makers, and imagined in that it is framed by an invented, metaphoric narrative. This authentic

community is characterised by the practical, daily life experience of imagineers, both artists and engineers. Imagineers explore the properties and potential of form, skills, techniques, processes, materials and ideas through working with particular and varied forms, skills, techniques, processes, materials and people. They work in, or create anew, particular and varied spaces. Their intrinsic motivation, having chosen to work as art-makers, is to explore, develop and express their own, individual and / or collective ideas, skills and talents on any given project. The symbolic, 'generative and interpretative' (Ross, 1989:18), character of such making is at the heart of how they approach their own practices. *The Imagineerium*, then, is at once a physical space and practice, and an educative and emergent construct. It is imagined as a means of furthering innovative practice and developing education in broader terms. When children are engaged they do so 'as if' imagineers, in role as community members. Here working 'involves participation as a way of learning – of both absorbing and being absorbed in - the "culture of practice"' (Lave and Wenger, 1991:95). The culture and practice of art-making is fundamentally shaped by how the imagineers thought about and enacted their practice during the project with young people. It was both educative and product focused, and constituted a particular kind of pedagogy as a particular emergent community of practice.

7.2.1 Commissioned as art-makers

In this section I consider the character of the commission as simultaneously a form of cultural production, and an educative structure realised through learners being situated as participants in a particular community of practice. Here I draw upon the idea of a community of practice as concerned both with the process and production of pieces of work, and the educatively generative character of that process for apprentices who join the community. *The Imagineerium* project was both designed and enacted as an exploration of how a particular model of cultural production, led by the practice of artists and engineers, might translate and signify as an educational experience for school children. The experiment constituted an intentional challenge to the principles upon which mainstream, default schooling has, traditionally, been structured: around an industrial, factory model (Robinson, 2010; Kulz, 2017) which foregrounds Cartesian

intellectualism.

At the outset, Kathi, lead imagineer, expressed her intention for learning in the project to be 'authentic', and to embrace and stimulate affective and embodied ways of apprehending experience. She wanted the project to 'value those who respond intellectually, but also emotionally, visually, physically, with hands, vocally' (Kathi, pre-project interview). The intention is resonant of Prestolee primary school, a particularly successful, localized model, predating the 1944 Education Reform Act, in which the head teacher, O'Neill, developed his school from 'his observation that young children were naturally attracted to making, modeling and building' (Burke, 2005:274) and consequently developed a school curriculum around opportunities for making. He 'reorganized the artificial demarcations of time and space within school in order to support research, discovery, construction and invention' abandoning the timetable (ibid:266) so that a visiting colleague noted that 'it was somewhat difficult to distinguish between the hours of work and play' (Woods, cited in Burke 2005:270). He believed that a timetable killed initiative and persistence which were key to a self-motivated learner (Holmes, 1952: 27). The school was physically organised 'as a library and a workshop [where].. children were moving around, looking up information they needed or engaged in practical work' (Sawyer, cited in Burke 2005:273).

O'Neill was educated and began to practice at a time when the theories of Dewey and Montessori were becoming known and when debate about schools being modeled on doing and thinking in the workshop rather than reproducing (and thinking) in the classroom were current. Although not focal for this study, de-schooling and anarchist voices have since continued to make the argument for schools to be configured to different models (see Suissa, 2006). Prestolee appears to have enacted a community of practice model of education, which *The Imagineerium* project echoes: where the making task, or commission, initiates self-directed learning fostered by the opportunities of a making environment and process. Perhaps, like Prestolee, *The Imagineerium* project advances a 'space', and possibly also a 'model', for an 'innovative and extraordinary environment for learning' (Burke 2005). Such a model looks backwards to historic, locally and culturally shaped notions of what curriculum and education of young people might

be needed, but also looks forwards towards situated, wicked problem-based learning or perhaps more pertinently outwards, towards 'real-world' and 'un-schooling' models of learning, situated in life and work.

7.2.2 The multi-skilled and multi-faceted nature of the project design

The Imagineerium project as a community of practice model, similarly to O'Neill's Prestolee model, is founded upon the commissioning of pieces of work and the learning inherent in their production. Both recognise the multiple, interconnected and often simultaneous skills and activities involved in such art-making commissions. In this section I consider the different kinds of knowledge and skills interwoven and 'undergone' (Dewey, 1938:12; Ingold 2017:12) through experiencing the practice and culture of this kind of art-making community of practice. The analysis draws upon Lave and Wenger's recognition of the inherently interdisciplinary, multi-skilled and practical nature of learning natural to the workplace. As discussed in Chapter Four, *The Imagineerium* project was modelled on the recent experience of an art-making organisation, rooted in socially committed and thus broadly educative values, working ambitiously alongside professional design, engineering and business partners. Whilst most of the imagineers who led this project were relatively inexperienced in designing and enacting an educational project, they were however drawing upon this new, pre-existing, albeit emergent, community of practice of art-making and their collective experiences, formally and informally, in order to educate and develop young people.

As discussed earlier in 4.3, children's process in *The Imagineerium* project reflected that of imagineers involved in 'Godiva Awakes'. They sketched and talked through ideas, honing their imagined ideas to develop their designs. Drawing on newly acquired scientific understanding of structure and mechanisms, and artistic understanding of art-making children created 2D prototypes, and final 3D models, testing possibilities and iterations, in a much simpler, but essentially not dissimilar way to that of professional artists, designers and engineers. Professionals had paid attention to realising Godiva's beauty, as well as to the functional demands of working in such scale; of how to create

an illusion of natural human movement, as well as the environments she would need to move in as well as the budget of the project. Whilst the detail was less fine grained, the children were likewise considering a range of aspects and perspectives, making judgements based on both the desired aesthetic and functionality of their designs. The level of demand for the children, and the time period of making may have been less and different, but nonetheless the character of the challenge was similar. The children's designs had to be robust enough to withstand different forces of movement, of mechanical actions and environment but they also had to appeal and communicate the ideas of the design: of the inventive nature of Coventry 'imagineers' suggested by the children's 'Tree of Ideas' design; of the generous character of Godiva suggested by 'The Raining Tree of Gold' and 'The 22-Handed Princess'. Just as puppeteers had to train, devise and rehearse the performance of Godiva, children devised and rehearsed their performances to complement the ideas they wanted their animated performance vehicle to communicate. Their experience of making their models involved interweaving scientific and aesthetic principles in practice. The educative value of such integration of artistic and scientific perspectives, whilst not new has been increasingly advanced in recent years, not just by advocates for STEAM (CLA 2017; Colucci-Gray et al., 2017) but also more recently by the OECD (Snow, 2019) who advise developing curricula to better enable children to develop curiosity and resilience, to practise *using* what they know.

The commitment to the ideas and to the team with whom they practiced, both adult and child imagineers, appeared central to their determination and pleasure in working and learning. The community of practice afforded opportunity for the different interests of children within a group to be encouraged and thus enhanced commitment. For example, Adrian's interest in building structures, noted in 6.2 led to the idea he had proposed for his group (also of a moving character) being developed and adapted for the 22-handed princess: of a braced, wide base and internal levers for hands. Hema and Mason had stronger views on where the levers should be placed and how they should be operated for effect, and Maarika had views on the colour and qualities of materials. The project commission was structured in the image of the interdisciplinary, personally informed practice of imagineers, drawing on and generating varied and interconnecting dimensions of making and a set of diverse skills, knowledges and understandings.

7.2. 3 Acquiring knowledge as required

Lave and Wenger (1991) argue that learning is inherent and a natural consequence of the social interaction which characterises a community of practice. In this respect in *The Imagineerium* project knowledge and understanding, normally foregrounded in default schooling models, was inherent to and situated within the social process of art-making as the work of the project demanded. Creating a robust, kinetic structure required application of the principles of forces and gravity, so children learnt about these things through the practice, through experiencing, trying out ideas, designing and testing. At times the scientific concept of forces, or structures and mechanisms were directly addressed, but an individual's desire to understand was generated by the challenge of the commission in practice and the social context of learning. If a structure was weak or unstable, the need for strengthening was apparent and thus bracing or different materials could be explored, with children testing what triangular brace shape might suit the design and what material might be effective. Trying out and talking through with probing and questioning imagineers about the relative value and need of flexibility or tension in a material was a natural and educative part of the process. In this respect the community of practice enables an apprentice to be as peripheral or central to the art-making activity as they choose and thus ensures the principles Dewey also defined as central to educative experiences, namely 'continuity and interaction' (Dewey, 1938:55). For a child, such as Adrian, who had prior experience of making, the challenge of a weak or unstable structure would draw on previous experiences and understanding. Through interaction with imagineers, Adrian applied and extended his learning. Another child, like Hema, who also likes to understand the principles, needed more observation and questioning before she moved from a peripheral to more central position. In each case the learner initiated their own deeper involvement and participation with the community of practicing imagineers. Following Lave and Wenger (1991:29), Adrian and Hema's 'intentions to learn are engaged and the meaning of learning is configured through the process of becoming a full participant in a socio-cultural practice.'

Through whole body movement children enacted and illustrated an understanding of

how a movement might be realised in a mechanism in their design. The discipline of having to explain to each other during the process, and then in teams in order to pitch the design idea to others, required clear explanation of the aesthetic appeal of ideas, and how movement or effects would happen. The process enabled children to discover and explain how and why they were achieving the desired effect, whether mechanical, structural, visual or aesthetic. As discussed earlier, in 6.6, engineers found this enactment and explanation quite compelling: 'The way Sarah and Mark [teach], it's really engaging … the kids get it…. It's in your body – brilliant!' (Roger, post project interview); 'I realised how much Physical Theatre … you could bring to engineering' (Phil, post-project interview). For the imagineers, learning happened when it was experienced, by being situated: sensed through one's own body, through materials, through working collectively for a purpose. Sarah affirmed this effect in relation to her experience of teaching mathematics through physical theatre. She had witnessed that enacting number and ratio through movement patterns enabled children and adults to explore and solve number problems. The focus on movement in relation to and with others appeared to be significant. Those 'who were particularly disengaged' with the idea of 'doing maths, and who weren't willing to give it a go' became 'animated and excited' and 'understood mathematical concepts' (Sarah, pre-project interview). These comments are echoed in the accounts of the children, with over 80% of children suggesting in questionnaires that their understanding of science had improved through this physical theatre-based approach.

Situated learning (Lave and Wenger, 1991) reflects the view of imagineers, such that rather than a 'subject', maths was a tool in 'actually creating something' (Phil, project field notes). Roger noted, for example, that in 'measur[ing] and scal[ing] an oblong' children were 'giv[en] a meaning for the arithmetic' (post-project interview). The work-based task of the commission and the educative social practice of making the commission were undertaken in a space, and generated a space, which allowed both the physical and social practice to happen. In the next section I focus upon how, in the interplay of its constituent elements, *The Imagineerium* project constructed a particular and new space, that of a community of imagineers, learners and doers practising 'as if' imagineers.

7.2.4 Structuring through spaces

As Lave and Wenger (1991) argue the site and sociality of the community's practice generates a sense of belonging to a community, to a valued practice. The social character of the community is developed and fed by the interactive nature of practice and thus the physical space of practice shapes and is shaped by the sociality. In this section I draw also on Lave and Wenger but also on other social theorists' notions of spatiality (Massey, 2005) to consider how *The Imagineerium* project, as an art-making space, structured learning. I begin by noting how art-making spaces, per se, structure the experiences of those who practice within them, before moving on to focus upon the particularity of *The Imagineerium* project as a structuring space.

Art-makers create their work in workshop spaces suited to and generative of the physical practices of making; the Imagineerium space is an example of this. Such spaces are typically characterised by large areas of open space, by both flexible and highly particular uses of space, by both varied and particular equipment and resources. Projects in some stage of development are usually in evidence articulating the ideas, skills and practices of those who practice there. In such respects, art-making spaces can be considered similar: they communicate and enable the practice of the making communities that inhabit them. Children who join this art-making community experience a live working space, with sketches and prototype models related to current commissions being undertaken by other art-makers. However, as well as being generically characterised as suggested, art-making spaces are often highly bespoke, with technology reflecting the particular practices, products and skills of the makers, as well as being adaptive spaces which can be re-purposed to respond to the particular collaborations and projects of the moment. In such ways the physical spaces, materials and equipment evoke a sense of possibility and reality.

The generative activity of members of such communities of practice is thus a constant presence ensuring that 'learning [with and from each other] is an integral part of the generative social practice in the lived-in world' (Lave and Wenger, 1999:34). Art-making

spaces are ones in which ideas can be at once tentative and concrete, where it is 'normal' to try out something in order to find out about it, to create drafts and prototypes in the expectation that further iterations will be necessary. In emphasising art-making as a generative, tentative but highly physical activity, the physical spaces of art-making afford and structure a similar psychic one. What the space and its activity gives rise to, also shapes what can be conceived within it. Art-making spaces define and structure not just practice, but ways of behaving and thinking. I argue in this thesis that they cultivate highly interactive, generative and interpretative behaviours and habits of mind.

As discussed in Chapter Four the project neither reflected nor generated a 'default' learning 'space'. It did not use physical spaces in typical ways or confine itself to a single space, but involved a series of different, and differently adapted physical spaces: school playgrounds; school halls; classrooms; corridors; a professional dance space; a tall large structure making space, where Godiva was housed at the time; an engineering workshop; and a large making workshop equipped with tall workstations at which children and adults stood to work - a space wall-lined with found, recycled and purpose-bought materials and objects of every colour and texture. This choice of space - bespoke, found and adapted - reflected the focus of the project: to be actively involved in practice, in making, as a motivating, holistically educative activity.

This was a project which, whilst located within the boundaries of formal schooling, sought to blur and make porous the dividing lines between school and the world beyond school as sites of learning, which drew upon professional practices and personal lives. Significantly then, it began outside the school as children gathered at the beginning of the day in the playground (see 5.1). This was a moment when family and home life were still recent and the wider world beyond school was, in some cases still visible. This choice of location and time reflected an intention to signal how and what the 'spaces' beyond school signify for young people.

Moving inside the school, imagineers' deliberate request to use hall spaces whenever possible, and to adapt the default configuration of furniture in the classroom, echoed O'Neill's choice of library and workshop as the two core learning spaces for his Prestolee

school (Burke, 2005). It signalled a practice-based recognition that 'the material physical environment…[and] the network space of relations and objects' actively shapes and creates 'interactions and communications' between people (McGregor, 2004:348-55). The immediate decision for the first project meeting in the classroom to take place in a circle (see 5.2) where everyone can see everyone else and everyone has an equal place reflects the 'social and ethical' qualities of the 'ensemble'. Both professional theatre directors and educational practitioners have noted these qualities as a willingness and enthusiasm to participate, to listen to and respect each other (Neelands 2009:185-6). In the first instance, then, a spatiality was created which immediately challenged the 'relatively stable… assemblage of objects, relationships and activities' reflecting 'hegemonic notions of what constitute relationships in schooling'. (McGregor, 2004:255). As McGregor argues, 'artefacts and technologies' (ibid:349) are significant here too, so the introduction of unusual technologies was part of this: suitcases and trunks (5.1), bicycles, wheelbarrows, giant pulleys and cams (5.3), carnival costumes (5.6), design boards (5.5). Their novelty, scale and the invitation to directly engage with some of these, unmediated by adults, contribute to collaborative social and ethical character of relations that the imagineers' practices propose.

Some default configuration of furniture was evident. But when children gathered at grouped tables (5.4) to share, debate and develop ideas, the character of the commission (the development of a group design) directed children to look at each other as they talked for extended periods of time, and less at the table. This emphasis upon relationality, which is foundational to Lave and Wenger's conception of communities of practice, is also a critique of 'default' pedagogies that view learning as an individual and internalised process. Eye contact and conversation as the basis of this learning activity reflect a view that sociality is 'the primary, generative phenomenon and learning is one of its characteristics' (Lave and Wenger, 1991:34). Some children reflected this in their suggestions that discussing the design and drawing together on the same paper, felt novel, 'exciting' and 'helped you develop your ideas' (Madhila, interview).

This same sense of being part of a socio-cultural community was apparent when children took on a particular role on behalf of their group and worked with a specialist imagineer

(See 5.5). The particular art-making needs made different demands on physical space but the new formation of children into three larger groups also stimulated and required new relationships. Mimetic attunement to each other in collective movement, as discussed in 6.6, fostered empathetic relationships. Occurring in larger spaces it encouraged and facilitated an embodied expression. Building structures required an extended worksurface for large drawing and building materials. The demands required adults and children to move around the surfaces cooperatively in closer proximity together, in a hands-on activity. Developing the look of the design required touching and feeling the materials; it involved moving between drawings, materials, the evolving design board and the expert advice of the imagineer, typically in a smaller 'in-between' space outside of the classroom. The sense of movement, inherent in all making tasks, created and required different kinds of relationality, cooperation and self-direction, between people, spaces, materials and time with children often determining what they needed. This 'spatiality' (Massey, 2005) allowed children greater freedom to decide for themselves what materials, spaces and processes to focus on, for how long, based on their judgement of what was important in their work.

In the workshop space, each group had a workstation, a tasks board, freedom to access resources and the support of imagineers for advice or to lead tasks which required a skilled and experienced eye, or which for health and safety reasons were led by adults. Upstairs and outside they had access to costumes and open space to develop their performance pieces. Despite safety constraints, it was clear to the children this was a working space, which emphasised 'the fact that you could build stuff' and that 'we were doing a project task' (Haroon, interview). The delight in what this space offered as a resource, and symbolically for the freedoms and generative activity it signalled, was evident in the behaviours and expressions of the children. They spoke of valuing it for offering 'more room', 'different ways of working', 'choice' of resources - of a range and type they 'normally don't have', and for being 'a professional working space' with 'professional tools' (project field notes). Teachers commented on how purposeful children were here (focus group). Having agreed tasks and responsibilities, children appeared to relish knowing that their role was important to the group task and this fostered a heightened sense of commitment and pleasure in their work. Children's

behaviour, both here and in discussion, even a year later, reflected a sense of pride in being trusted and respected to work in this environment (see Sennett, 2004).

These physical spaces, and the messages communicated by the constructed 'spaces' that the project design generated, gave children permission to experience, explore and to seek help in order to address the challenges involved in achieving the commission. For a number of children, the role they took in their group (in construction, performance or look and feel), and the 'fit' of this to their interests, appeared to be instrumental in this. Most imagineers recalled Mason, a child who was notoriously unfocused and unproductive in school, but in the project, 'when things were specific', such as being given the challenge of adding moving wheels to his group's structure, 'was totally and utterly persistent, curious … would dive in and be amazing' (Phil, post-project interview). Teachers' comments focused upon the significance of the project as an insight into how people work together to make things in the real world because it was 'taking [learning] outside the classroom environment' (teacher A, post-project interview) and was 'an opportunity for children to see professionals at work: seeing engineers, seeing designers, seeing a team at work' (teacher B, Post-project interview). The Imagineerium was designed as a 'more fluid' (Kathi, post-project interview) learning space, grounded in the real practices of makers, where apprentice-like, particular skills and practices might be observed, tried out and experienced, but emphatically where individuals and groups learn to 'dream… play … explore' (ibid) and discover what they are capable of through the processes involved in art-making. Lave and Wenger's concept of community of practice illuminates how art-making spaces and the space of art-making might be considered as 'a place to learn where to educate oneself' (Kelly, 1928).

7.3 Imagineers' concept of their 'community of practice'

In the last section I argued that Lave and Wenger's conceptualisation of community of practice illuminates how *The Imagineerium* project as a site of art-making structures learning for the children involved. In this section I focus on how their framework might

further understanding of how the imagineers' conceive of, plan and enact their practice in ways that are broadly educative. Their accounts emphasise a belief in making as inherently an activity which, if appropriately situated, can generate and structure learning. They identify positive behaviours fostered by such making in the arts, which feed and sustain learning (7.3.2). Whilst Lave and Wenger's concept of a community of practice is both highly resonant and useful, I note a problematic aspect, in relation to this emergent community of imagineers. Imagineers are hybrids, practitioners who are members of several, different communities of practice, of engineers, of artists, of physical theatre for example. Whilst this in itself is usual, the alignment of each of these different communities to educative models and particularly to the dominant model of schooling discussed in 7.1 generates tensions. Engineers, for example, whilst practical problem solvers, may unconsciously reflect respect for the hierarchies of subjects and expertise inherent in transmissive pedagogies. In 7.3.1 I review imagineers' accounts of their own professional development and situated learning habits. In 7.3.2 I focus upon the sense of confidence and capability that they believe is fostered by making. The importance of the physical body in making is apparent here but also in a third aspect, taken up in 7.3.3. I focus on the relational, ensemble context of practice, which is in part revealed and formed by how language is used, as well as the framing context of a commission as a focus for the project. I conclude in 7.3.4 by noting a problematizing dimension of this emergent community of practice.

7.3.1 Imagineers' art-making as 'situated learning'

Observations and interviews confirmed that imagineers had neither instinct or intention to 'tell someone what to do', as Phil affirmed (pre-project interview). Rather they sought to echo what they themselves did as they practiced, namely to 'learn through discovery' (Roger, pre-project interview), to 'learn by doing' (Mark, pre-project interview), only 'offering advice through … working together' (Phil, pre-project interview). 'Seeing myself as a learner' (Sarah, pre-project interview) and a collaborative sense of 'equality' (Kathi, post-project interview) was considered natural to making in a professional project. Their accounts reflect Lave and Wenger's sense of apprenticeship as a horizontally orientated

process rather than any traditional master-pupil model. This horizontal orientation was echoed in accounts of their professional development. Each person took responsibility for directing and crafting their own learning, typically responsively to the demands suggested by projects, whether contracted or self-defined projects. Phil suggested that the impetus for him might be rooted in the brief from a director he was designing and making set for, such that his learning 'is steered by the projects' and 'if I need a new skill, I'll go away and acquire it … I'll go away and train' (Phil, pre-project interview). Roger likewise reflected a sense of 'doing a project' as the 'vehicle for' skill development (Phil, pre-project interview). The same ideas were evident with artists, whose projects might be more self-defined. Kathi emphasised 'researching the context' in a variety of forms. Mark spoke of learning new approaches and technique, through undertaking 'workshops with other artists' outside of project collaborations (Mark, pre-project interview). Learning was thus envisaged as practical and purposeful in character, situated in the commission and the social context of the partners and spaces they worked in. The imagineers' suggested that they envisaged inducting children into imagineering, just as they had developed their own craft: through immersion in their community of practice.

7.3.2 The affordances of art-making as situated learning

The imagineers recognised that doing and making in the arts and engineering is about more than simply teaching knowledge and can have more positive educative effect on children. Learning about forces, structures, materials and motion through the body may appear simply as good pedagogy, an engaging, enactive, arts-based approach to learning science. Indeed Roger, whose own education in the sciences had been purely conceptual, considered the 'clarity' and 'vivid' quality of 'a real-life demonstration [of the concept where] you just study your body working' to be a far superior way of learning. But imagineers recognised a much broader educational effect; that being educated embraces 'know-how' (Ryle, 1949), the affective (Clough, 2010) and tacit (Polyani, 1967) forms of learning, as well as propositional forms and is a complex, holistic process. Their highly embodied practices of making in the arts is situated in, and thus dependent upon, interpersonal and affective dimensions which all are involved in learning. The context of

the commission enables a form of situated learning, such that the development of trusting human interactions, of broader aims of education and scientific understanding were interconnected.

Across imagineers, teachers and children, the sense communicated was that situated, practice-based learning underpinned all kinds of learning. Roger suggested that the habit of hands-on doing had, for him, fostered an appetite for inquisitiveness which he had also witnessed in young people. He spoke about

> 'discover[ing] through practical experience … If you get a bag of bits and you can yourself put it together and you get an outcome which you didn't expect, it encourages you … it encourages you to be inquisitive'.

Sarah added that, 'when you're genuinely curious there's an energy … to engage, to want to ask more questions and know more.' Most of the imagineers felt the practical emphasis of *The Imagineerium* project was very successful in fostering children's interest in learning, that they had 'real curiosity' (Mark, post-project interview), had 'so many questions … [and were] making discoveries for themselves' (Sarah, post-project interview). Roger suggested that 'by making things, [children will] reflect their capabilities, what they can do'. Sarah likewise spoke of the significance of making as 'a journey… that we go on together', of children being 'presented with a challenge 'that they perceive is completely outside of their ability' at first, but through 'the process … making the work', they develop 'the skills to achieve it, so that they feel that they've really accomplished something'. Her account is echoed by girls who talked of feeling unconfident at first, but, that 'once you make your project ... you have that proudness inside of you' (Hema, focus group 2015), or of how the experience 'opened my eyes and made me think "I can do this if I did that" ' (Maarika focus group, 2015) or who discovered that not feeling skilled or having 'artistic' skill, wasn't a problem because 'you can design in your head… write down ideas using your mind' (Jasmene, focus group, 2015). Such accounts echo Sarah's view that making enables children, 'to say "I did that … competently… [and] it has really increased [my] confidence" ' (pre-project interview).

The 'virtuous circle' (Sorrell et al., 2014) effect of making, of feeling both encouraged to be, and capable of being, inquisitive through being 'hands-on' and enactive was affirmed

by children. This occurred not just when they experienced success but also when there were challenges in what they were doing and making. Observations and interviews revealed that rather than giving up at the first failure, which teachers reported as a common behaviour pre-project, children persisted. Spoken accounts and the behaviours of teachers, children and imagineers revealed that children demonstrated a stronger sense of ownership as they made connections with 'what they're interested in' (Phil, pre-project interview) - something the artists particularly saw as inherent in making. It was also apparent when affective dimensions were cited by children as motivating their interest. It was evident when Adrian spoke of building things with his grandfather, when Mason mentioned working on cars on visits to his father, when Earlene discovered that her memories and ideas were valued by others, and when Maarika talked of a career interest in fashion explaining her excitement about taking responsibility for the colour and visual effect of her group's design. The result of these affective associations was often a determination, previously unseen at school, to solve problems of structure, movement and aesthetics, showing concentration, persistence, and increasingly, the judgement to seek and select materials or people with the skills to help them achieve their intended purpose.

For Sarah having a sense of ownership was central to such determination,

> 'without them thinking that they have some kind of authority and some kind of ownership over what they are doing it, I don't think that they … fully engage with the subject matter.' (pre-project interview)

For Mark having ownership, through making, was a precondition for learning and positive self-view

> 'The process of creating something for themselves, something that they have ownership over, something that they're proud of and them displaying it … sharing what they have achieved … that's what gives them the self- confidence'. (Mark, pre-project interview)

Such accounts of being seen and feeling oneself to be successful or talented are at the heart of Sennett's (2004) account of self-respect, formation of character and social harmony. The lack of any autonomy he argues is the root, the immobilizing cause of the absence of respect; of what Mark, here, calls self-confidence. Mark's account allies with

Sennett's analysis of how simply self-respect and confidence can be enabled; and equally denied. His account of craftsmanship (Sennett, 2008) argues forcefully for the honing and focusing of making practices, for their contribution to generating a person's fundamental sense of self-respect and confidence. It resonates also with Phil's view that children's learning might benefit from focusing on a more 'agricultural level of technology' where kids 'think and use their hands' (pre-project interview) and reflects Marchand's (2016) view of crafting and making as a holistic and integrating form of problem-solving, where thinking is embedded within and thus integral to the activity of making (1934).

7.3.3 The relational affordances of a community of practice

If making, constitutes the key structuring principle of learning, in the broadest sense, for imagineers, it is, following Lave and Wenger, dependent upon the socio-cultural context, the relationality of making: how things are done, with whom and in what context or for what purpose. In this section I consider these aspects as a key characteristic of *The Imagineerium* as a communities of practice.

Imagineers reflected Vygotsky's and Dewey's emphasis upon social relationships as the foundational context for learning. This is echoed also in children's comments in 5.1, such as Hema's comment that as she 'started to know people, what they're like' her anxiety about whether she would be competent enough disappeared. Likewise, encouraging children to experience making mistakes and see this as a natural part of learning, which Mark facilitated during the 'Whoosh' storytelling of the Hummingbird (see 5.2), affirmed the ensemble as a safe context for learning and development. Adults working alongside, building trust and empathy and identifying with children's feelings about the process of making was something Sarah emphasised when she spoke of

> 'seeing myself always as the learner … willing to make mistakes, to fail, adapting what I do to fit. …. I appreciate where they are coming from. I'm open with them about the … feelings they might have about it, so that they can acknowledge what

> it feels like to be a learner and allow themselves to … do things that don't work or don't go right and that that's ok' (post-project interview).

Such perspectives reflect a social constructivist view of relationality as foundational to any conception of society (Gergen, 2009) and thereby learning. This idea was evident in the accounts of imagineers which echo the 'decentring' (Lave and Wenger 1991:93 of the dyadic relationships typical in 'default' models of education. Roger spoke of engineering as being 'all about team-work' and Phil of 'being part of a team', where no one person 'is on top', but more 'like a solar system – [where] we're all planets ... revolving around this problem, but we can come at it in different ways… look at it from different angles … [because] we've all got different gravitational pulls' (Phil, pre-project interview). His comments reflect Lave and Wenger's sense that whilst power relations are not removed, the potential of a 'richly diverse field of essential actors' (Lave and Wenger 19991:56) can be recognised and mobilized through emphasizing and ensuring participation and relationships. Phil's words also echo Dewey when he explained how such a focus creates 'a balance, and if you've got a balance, it's not a lesson anymore it's a shared experience' (Phil, post-project interview). Signaling the value of participation was recognised as mutually beneficial for the work and the person. As Sarah noted, if 'each contribution is just as valued as someone else's … they feel more motivated to follow an instinct' (Sarah, post-project interview).

Such valuing of individuals was situated in the context of completing the given work-based brief, so that value ascribed was simultaneously developmental in human terms, and in terms of the achievement of the given task. Through being part of this work-based community, young imagineers were exposed to adults' training and experience which ensured they were supported with the skills to realise a task. Young imagineers are provided 'with the toolkit' and constraints such as 'you've got this long, or use these ideas' (Phil, pre-project interview). Unlike the hierarchical structures common in default schooling, Phil spoke of 'treating [children] like a bunch of colleagues coming together to make a show' reflecting 'the way we work as professionals' operating to 'a timescale … [because] we've got a deadline'. The discipline of the project was that of professional cultural production, where peers are expected, respected and supported to create work

together. Before the project he suggested that they should say to the children 'you're an imagineer now' to signal permission for particular kinds of behaviours, of imagining, trying out, playing, working together, but also of discipline, 'we've got a task, a timescale … deadlines.' He believed that there was a need to 'move them out of their comfort zones' and that with their 'enthusiasm and energy', they would 'soon adapt and use their heads … think laterally,' creatively. Imagineers all commented on the significance of the language used with children to develop such mindsets.

> 'If you talk to a child as if they're an adult, they will begin to become confident like an adult. You can't talk to children any differently' (pre-project interview).

Implied in Phil's account is the importance of situated talk, of talking about an experience as one of the community. This was evident in observation of his and all imagineer's practice and is noted by Lave and Wenger who talk of the difference, 'between talking about practice and talking within it' (Lave and Wenger, 1991:107). Implied always in the imagineer's accounts is the inclusive sense of children behaving 'as if' imagineers and thus they are coached by the imagineers 'to talk as' (ibid) imagineers, as 'legitimate peripheral participants' (ibid). Thus, talk reflects the mutual respect, the sense of belonging to the community and a sense that the children and iImagineers are a 'we'.
Language was also important in other ways. In a simple sense using scientific terminology in a work-based context expanded vocabulary. Children learnt new terminology, for example that engineers tend to us the word 'fulcrum' in preference to or at least synonymously with 'pivo,'. More significantly perhaps was the way different associations in relation to the terminology used about experiences provoked new understandings. Phil, Mark and Kathi spoke about the significance of 'playing' as a creative habit. Whilst the term was used alongside and perhaps synonymously with 'fun', 'exploring', 'discovering' and 'creating' it was also used with the term 'experiment' which appeared to have different, unacknowledged associations for the engineers. For the artists the term 'experiment' appeared to conjure up a suggestion of exploratory, possibility development behaviour. In engineers' minds a very different purpose was signified. For them the term described scientifically testing an expected outcome in a 'systematic' way. In interview, children reflected familiarity with the latter sense, in relation to the scientific experiments they conducted in schools where children and teachers were conducting an

activity to witness an expected outcome. This distinction was one noted through a recent research commission into STEAM education (Colucci-Gray et al., 2017) but the association that science is testing hypotheses and is never, in the artistic sense, open to possibilities was also resisted by a number of scientists (ibid). As such the provocation of artists to nuance the term differently encouraged children to consider other possibilities than their existing experience of the scientific. Likewise, children's eyes and laughter suggested that the idea of 'playing' with an idea, or a material to explore its properties was both a delightful and an unusual suggestion, perhaps reflecting a sense of it being childish and inappropriate for learning at school. In these and other moments the different use of language across the arts, sciences and education could appear both emotive and slippery, but was also provocative of learning.

7.3.4 The emergent nature of the Imagineers' community of practice

In this section, whilst recognising the inherently changeable character of art-making as a practice and space, I consider the Imagineers' community of practice as still in an emergent form at the point of this research. I note how imagineers characterised *The Imagineerium* project in alternative ways to default pedagogies, often as an intended disruption. This was a point of noticeable difference between individual imagineers and was perhaps reflective of their membership of other communities of practice and the alignment of such communities to the dominant model of schooling discussed in 7.1. This multiple membership, whilst not necessarily in tension with Lave and Wenger's conceptualisation of communities of practice, suggested a need for further attention to, and perhaps theorisation of such a situated learning, community of practice model to pedagogies and its relationship to those which are central in formal schooling. Wenger et al. (2014) suggest 'landscapes' as a descriptor of multiple fields, but this term does not quite reflect the nested character of imagineers' membership, or children's membership, of communities of practice. Children are not separately and simultaneously imagineers, children and pupils, but being children shapes both their position as pupils and their role as imagineers.

The project planning, and the project itself, was the initiation of the community of imagineers. Whilst Kathi, Sarah, Mark and Roger knew each other, having worked together before and during 'Godiva Awakes', this was not the case for Phil. Kathi, Sarah, and Mark approached the collaboration with knowledge or and respect for each other's' work, a shared belief in young people's creativity and a commitment to working in practical and symbolic ways through art-making. Whilst Roger was known, his practice was less known, certainly to Sarah and Mark. But all, including Phil, recognised that as a community of imagineers, they shared a 'forward-looking', 'positive', 'open-minded', 'can-do' attitude and 'a passion' for the project (project field notes).

The imagineers' often expressed a conscious desire to disrupt the negative, 'factory' (Kulz, 2017) aspects of 'default' (Thomson, Jones and Hall 2009) schooling and to establish different conditions and habits for learning. In reflecting on the project, a number of comments suggested pride in achievements which might not necessarily be focal in default schooling models such as helping children to 'cross-over' (Kathi, post-project interview) or 'make links' (Sarah, post-project interview) between the arts and sciences, to 'think laterally … concentrate, … explain things, think artistically' (Phil, post-project interview) because they had experienced the 'overlaps [in the].. processes that [artists and engineers] both use' (Sarah, post-project interview). The idea of artists in schools as an 'invited disturbance' (Trowsdale, 2004) suggests the, often unspoken, agreement between schools and arts practitioners to disrupt default practices in order to introduce or re-emphasise alternative ways of being and learning. Schools as institutions may find it less easy to initiate such ideas and practice but their partnership in the project signalled some complicity in this ambition, which was a focal purpose for Kathi, who like Phil, had not had a positive experience of learning through school. However, both have achieved noteworthy successes in their professional lives and might, in educational terms, be considered to be successful 'lifelong learners'.

Imagineers had all experienced the dominant model of schooling as children, as well as having different professional and personal relationships to it as adults. This fostered a complexity as a well as a variety of attitudes. Imagineers, like the teachers discussed in 7.1, are not immune to the cultural values of a society that normalises a directed

curriculum and the institution of schools as the default mode of education (Bourdieu, 1971). Imagineers are all themselves graduates and have been schooled by an industrialized (Robinson, 2010) and Cartesian mind-body model which has habituated reverence for an academic conception of knowledge whereby, for example, mathematics is a more highly esteemed subject than art. This was revealed for example in the word order of Roger's comment (see 7.2.3 p.191), unwittingly revealing how an active task involving Maths gave 'meaning for the arithmetic', suggesting a heightened value for propositional knowing. It was also present in his view that children's lack of experience in working practically meant they needed time to simply develop the skill of 'dexterity' when he would have preferred the time to be focused on discovering and understanding things that 'were really important, like the length of the lever or where to put the pivot to make things happen more easily' rather than 'just dexterity' (Roger, post-project interview).

Sarah's frustration with some of the fluid aspects of *The Imagineerium* project design, and a desire to 'be more clear what engineering we are teaching ... and what [teachers] have got to achieve in the classroom' (post-project interview) appeared, at least in part, to reflect an ingrained expectation that learning was tied to the National Curriculum. She often expressed concern about 'the teacher's point of view' and 'this being a benefit for them in terms of what they've got to achieve in the classroom' (ibid). This was perhaps unsurprising. Whilst imagineers were without responsibility for curriculum or accountability for attainment scores, Sarah co-directs a company which works in schools, often with the express purpose of finding novel ways for children to access directed curriculum knowledge through physical theatre. She is aware, in negotiating work in schools, of an economic need to align herself to the dominant model in school and is thus attuned to respecting and responding to teachers' needs and concerns in relation to the curriculum. Perhaps unlike the other imagineers, Sarah and Mark can be considered members of several communities of practice related to young people, to schooling and to performance, with art-making as a shared characteristic. Such multiple membership of communities, or occupancy of multiple fields (following Bourdieu, 1971) where are both dominant values and on-going dynamic of political struggles exist, no position is constant. Sarah also embraced a provocative role in educational settings, echoing other

imagineers, particularly Phil and Kathi who perhaps vocalized a critique of the dominant model more frequently and more strongly. Bourdieu's (1993) analysis suggests that practitioners may occupy more than one position to achieve enough visibility for economic viability, and still be able to continue cultural practices which do not align with the current dominant and regulating tastes of those in power. They may generate communities of practice in such positions. As such, in different ways and to different levels, whilst imagineers' practice and rhetoric advocated embodied practice in the arts as the site and driver of learning, imagineers appeared also to reflect some culturally shared values of academic learning as having strong currency. This generated a complexity and perhaps contributed to the challenges of this emergent model of *The Imagineerium* project.

There was debate and concern about how children might be engaged and inducted into the practice, the pedagogy, of imagineering. A key issue seemed to be how children might access, the internalised expertise of the imagineer, the doer rather than the talker, particularly those uninitiated in teaching or supporting apprentices. Imagineers, and perhaps engineers especially, whose default behaviour is to find out by doing, have developed the 'know-how' (Ryle, 1949) to make astute unspoken judgments of materials, tools, techniques and movement, 'from the inside'. They have 'grown into' their expertise, 'by listening and feeling' Ingold (2014:1) and thus have tended in their daily work to do and talk little. Where they might debate what decision to take, it was typically debated in action, such that questioning was tacit, embodied and internalized. Talk might be focused on seeking or giving specific advice or opinion when working with someone else. This level of explanation, account or commentary however did not necessarily expound imagineers' thinking and questioning. As such, unless they individually asked questions, which many did, children were not always able to understand the intention, or decision of an imagineer and thus to fully access the expertise and knowledge shaping the imagineers' actions.

Given the time pressure of a commission deadline, and with respect to the demands of schooling, the project required imagineers to make ideas explicit and voice their thinking. Children needed to be inducted into the community of practicing imagineers, to be

attuned to what to look at, what to focus on, to immerse themselves in order to develop the habit of informed and thoughtful doing. This role was taken on by the artists amongst the imagineers. They had more expertise in working with the children and were more adept in asking questions, and thus able to facilitate 'higher order thinking' (Bloom, 1956). Artists were often modelling this for the engineers. By the time of the children's visits to the full-scale build, this habit was becoming part of Phil's behaviour in the project. Whilst he had from the outset framed the children as fellow practitioners, he deployed questioning more to explicitly prompt children to identify what needed thinking through and to decide the actions that needed to be completed to address such needs (project field notes). In one session a physics specialist STEM educator supported, modeling questioning. This was influential for Phil who 'found it really useful to hear how to ask young children' and not 'lead them' (project field notes). As pioneers of an emergent community of practice, imagineers were discovering through their own experience of doing, newly nuanced by their own relationships and collaborations with each other, how to enable situated learning experiences. They were exploring the relationship of arts to sciences in ways both comprehensible and useful to young people. As an emergent educative model imagineers were testing the emphasis of direction needed and the balance of demonstration in relation to facilitation. They were developing awareness, in practice, of where and how much freedom was needed in relation to structure to foster learning.

7.4 Being inducted into the community of practice

In this next section, I draw upon Lave and Wenger's concept of 'legitimate peripheral participation' to illustrate how apprentice imagineers were inducted into the imagineers' community of practice. The children's sense of belonging and of competence that being part of the project generated, reflects Lave and Wenger's characterisation of the degree and character of participation in a community of practice as naturally being something decided and owned by the participant. In 7.4.1 I focus upon the significance that Lave and Wenger attribute to peripherality in participation, namely that being an apprentice

in a community can foster a commitment to and sense of belonging to the community, regardless of the degree of responsibility enacted. Peripherality recognises the 'not yet' nature of apprenticeship and is thus 'a positive term' (Lave and Wenger, 1991:36). In 7.4.2 I note different motivations for involvement in *The Imagineerium* project, expressed by imagineers, which were valued by children. The children identified with particular imagineers as simultaneously having individual strengths and behaving recognizably as imagineers, the collective community. In this second, and longer section, I draw on the cases of particular children to illustrate this.

7.4.1 Participating peripherally and belonging

Children learned through: being drawn into undertaking a commission to imagine, design and make something 'for real' (Karl, post-project interview); through working practically with professional artists and engineers; and through experiencing the physicality of working in the Imagineerium space, the real-world context of the Imagineers as a particular art-making community. Lave and Wenger's accounts of 'legitimate peripheral participation' which developed out of research into adults in apprenticeship-like contexts, have several resonances to learning in *The Imagineerium* project. Being and behaving like an apprentice imagineer, was both spoken and practised, projecting onto the children a sense that they were capable in this respect. The decision to take and wear a hummingbird badge, which symbolised a commitment to demonstrate persistence and imagination, was one made by the children. As such, a sense of belonging was a choice of the child. Children, individually, in pairs or groups learned alongside an imagineer who demonstrated and drew the learner into the task, perhaps as a partner, perhaps contributing a particular small action or aspect, or as an observer who was talked to about the activity as they watched. An imagineer might be coaching, co-working or enacting but always, as Hanks suggests 'a learner participates in the actual practice of an expert, but only to a limited degree and with limited responsibility for the ultimate product as a whole' (Hanks cited in Lave and Wenger, 1991: 5). Here Lave and Wenger's notion of 'legitimate peripheral participation' is key. Although responsibility may be limited, engagement is not; 'a person's intentions to learn are engaged' (ibid: 29) by

virtue of agreeing to be part of the community, to wear the hummingbird badge, to watch and be present. As they suggest children are naturally primed for apprenticeship-like learning because 'children are, after all, quintessentially legitimate peripheral participants in adult social worlds' (Lave and Wenger, 1991: 32).

Lave and Wenger's observation here suggests a mirror-neuron quality to 'legitimate peripheral participation', namely that observing and copying are 'pervasive' and 'automatic' learning behaviours in humans which also promote empathy and thought (Iacobini, 2008: 653). The sense of not just learning through watching and copying (albeit in one's own way) but also empathising with those one copies suggests a relational dynamic: of being inducted into and becoming part of the community. Field notes refer to numerous occasions when children watched an imagineer undertake a task for them or were aided in a task but talked about 'when we did… ourselves' as if they had led and enacted more fully. Even when children knew I had witnessed activity, when probed as to who had done what, the common response was a 'we'. It is not possible to know whether this would be the response in a more traditional classroom context. However, children appeared to feel as if they were fully part of activity, even when to an observer it might have appeared that they were less involved, had not actually achieved mastery or had less autonomy than their accounts suggested. The choice of the term 'we' suggests a sense of feeling absorbed and thus part of the learning of the activity. Peripherality thus is a factual recognition of the position of the child as an apprentice in the community of practice, reflecting the 'not yet' nature of apprenticeship and is thus advanced 'a positive term' suggesting that 'gaining access to sources for understanding [happens] through growing involvement' (Lave and Wenger, 1991: 36)

7.4.2 Children's identification with, and emerging identity in the community of practice

Kathi noticed the significance of the physical Imagineerium space in facilitating participation in the practices of the community, promoting the co-existence of different practices of school and work, of engineer and artist and of individual to individual. She noted that children 'adapt quickly … they pick up and learn' (post-project interview)

practices and terms, so that 'the meaning of learning is configured through the process' (Lave and Wenger, 1991:29). Children worried less than teachers about whether particular terminology was used, using interchangeably the term 'pivot' advanced in school curriculum accounts of levers, and that of 'fulcrum' preferred by engineers.

Kathi considered the structures of schooling 'exhausting' for the imagineers; the need to attend to times, spaces and particular language in ways which were unfamiliar to them. She considered the practice of the community, situated in the Imagineerium space, a more natural context for learning because 'there are so many different ways of doing things and actually that's the beauty of it … the kids were asking questions here and you just give the answers on an adult level' (post-project interview). It was apparent from interviews that whilst the imagineers shared similar values and beliefs about young people, making and learning, each also had different motivations for, or conceptions of, the project's core purpose. Whilst for Roger the project was using 'creation' to 'get kids excited about [and] … take the mystique out of … engineering' (post-project interview), for Kathi this was a 'by-product', to the central purpose to 'work with children to inspire us to create fantastic work … encourag[e] children to develop their creativity' (post-project interview). Phil spoke of wanting to 'get children a little more aware of the nuts and bolts of everyday life and how things work … think and use their hands … to give them a practical way to show confidence and assert themselves [by] working like professional [makers]' (post-project interview) and Mark of developing positive learning dispositions and skills such as 'getting their imaginations flowing, making sure they are confident … [and] can work as a team' as well as wanting to 'extend their knowledge' (pre-project interview).

Sarah and Mark appeared more driven by broader educational purposes, than other imagineers. Sarah expressed some confusion about the particular learning focus at different stages of the project whilst engineers saw themselves as having greater experience of making models to a deadline so felt they had responsibility to focus on the end point and 'push things along' (project field notes). Jane was alone in feeling that there was 'equal importance' between broad and domain specific learning aims as well as a company desire to create 'a new aesthetic' of 'exquisite' work through imagineers

working with children. The richness from the children's point of view, seemed to lie in this very diversity: that different priorities, values and connections were introduced as possible and advocated. In the Imagineerium day children could regularly be seen seeking out or directing peers to particular Imagineers whose skills or priorities aligned with their own. They often commented about 'they were different' but also 'all good' (Abaar and Maarika, interviews).

Children's accounts of the imagineers enabling learning, through a crafted mix of demonstration, observation, conversational explanation and exploratory activities highlights diverse and complementary ways of apprehending and forming knowledge and understanding through practice. As Darius suggested, 'they did more action, doing, like building structures, … or with our bodies and then explaining it – that's what I liked.' Oja, a high achieving pupil, revealed how making, both through physical theatre and model-making, she had developed a good scientific understanding. 'We were kind of leaning backwards (demonstrates action) and we learnt that the person who is smaller and lighter they have to pull more backwards so they wouldn't fall … on the other person' (Oja, interview) and in developing the model of their design.

> We learnt about keeping the [centre of] gravity point low … when we had the cardboard rolls at the same height we weren't able to balance the bottle [for the wings opening] … so we had to tilt the front legs and keep the back legs straight so that it would actually balance (ibid).

Here Oja illustrates Pring's (1995) argument that in a curriculum employing situated or applied practice contexts, where 'know-how' is prioritised, propositional knowledge ('know-that') is also acquired, in addition to providing a motivational application and context for learning. A number of children, like Oja (above), could explain the experience of feeling stability through equalising forces in physical theatre sessions using the whole body, but fewer were able to draw on technical language or explain model making using propositional scientific knowledge.

Adrian, for example, valued talking to, watching and working with Phil: 'when I was with Phil – he talked a lot about pivots and levers and technical stuff like that'. He relished the hands-on approach to problem-solving that he saw in Phil, mentioned in 6.2. Whilst

Adrian attributed his tendency to gravitate towards the maker-engineer imagineers to his childhood pleasure in making things with his grandad, it was clear that feeling part of the community of imagineers also deepened and developed this. Watching him attend to and question imagineers as they visited the engineer's work spaces it was clear that being and feeling part of this community was significant for him. After listening to Roger explain how carbon steel was invented Adrian mentioned that he was 'interested in how that was made' (project field notes). The idea that the community of the project gave children access to a practice that they valued is reflected in the numerous comments about how they 'found out about things we don't normally learn about' (Abaar, interview) or 'things we didn't know about' (Kiran, interview). When probed the following year, children suggested that they had not been aware of the breadth or character of engineering, of design and invention that imagineering encompassed, of the processes involved and the character of invention within engineering how things might be made (focus group, 2015).

Hema's comments reflected similarly how she was drawn into learning through her listening to and watching experts at work.

> Roger has had a lot of experience in engineering … the way they showed us everything it looked really fascinating and interesting … first we looked at the pulley and then we looked at how the pivot points work and we looked at friction. It was really inspiring.… I find it really interesting how everything moves … how … forces are a part of how levers, pulleys and the pivot point work. (Hema, interview)

The experience of applying her interest in and knowledge about forces and pivot points, proved more challenging. She noted that 'it was hard to brace it all together' and that at first she 'didn't really understand the structure'. But she also referred to a later occasion when she had learnt from the community imagineering practice. She recalled a moment when she had gone to the group table just to collect her journal and been unable to go straight back to the task she was involved in because her attention was taken by a demonstration and discussion in progress.

> Adrian was explaining the structure to Kazia and I heard a bit about forces and I found it really interesting and that's when I thought "Oh structures work like this!" …. just listening to Adrian talking to Kazia and Phil about how to brace it ... [I

> understood … and it] made me think of all the possibilities we could have…. (ibid).

Here the mix of demonstration of how forces were operating in their model structure as parts moved, alongside the explanation and discussion of alternative ways to address the problem of instability, appeared to enable Hema to make the connection between how forces work in mechanisms and how they also work to effect stability in the core structure. This was a moment where the process of learning was an 'interaction', taking 'place in a participation framework, not in an individual mind … it [wa]s mediated by the differences of perspectives among the coparticipants' (Hanks cited in Lave and Wenger, 1991: 15). Later she reflected on the pedagogy of this community of practice approach, as being 'really helpful' in relation to her typical experience of learning in school. She suggested that learning science here was not

> 'as though it's an experiment, where the teacher says. "Work out what the variables are", the method and stuff like that… They took us step by step, they didn't just rush through – they took all the time they needed, and they went step by step - they didn't leave anybody behind' (Hema, interview).

Hema's account reflects the sense of 'belonging' that results from 'community membership', where participation is definitional and is 'not only a crucial condition of learning, but a constitutive element of its content' (Lave and Wenger, 1991: 35) such that '[t]his social process includes, indeed it subsumes, the learning of knowledgeable skills' (Ibid: 29).

The relational attunement to each other, and the care that is suggested by Hema's repeated reference to time, pace and understanding suggests that, for her at least, learning in *The Imagineerium* project was such a social process. Others independently spoke of feeling 'like you [the Imagineers] cared' (Louise, focus group, 2015) and that their relationships with the imagineers were 'friendly' (Madhila, interview) and 'chatty' (project field notes). The importance of the relationships between children and children and adults and children echoes discussion in Chapter Four of Jane and Kathi, the lead imagineers, as rooted in the traditions and culture of participatory, community arts. Children's comments reflect imagineers as attuned to and champions of democratic values, of children's voices, where the arts signify 'a means of self-expression, even of

self-definition' (Matarasso, 2007:457). Hema's account of the practice as inclusive, relational and developmental reflects the significance of the culture enabled by this improvisatory, participatory crafting practice.

This focus upon social attunement as more than a pre-condition, but a necessary dynamic, evident in Lave and Wenger's analysis of situated, apprenticeship-like practice is echoed by Ingold (2017). Much as Hema suggested, Ingold argues that learning, rather than a traditional process of intentional and directed transmission is embedded and natural to particular kinds of social engagement and practices. As suggested earlier, in the literature review, he draws upon the etymology of 'transmission' and 'attention' in relation to learning, emphasising how paying attention, attending to a practice is a means of engaging with the rich qualities and dynamic, 'the stretch of life', rather than simply the 'replication' of life suggested by the former term (Ingold, 2017:20). Hema's account of how learning happened reflects the careful interactive attention of the imagineers, to the stages and elements of understanding as it deepened, as well as the situated experience of 'doing and undergoing' that Ingold discusses that is characteristic of art-makers.

The Imagineerium project situates learning in the professional practices and craft of makers, and vitally also immerses children in the culture of the community of the practices, enabling them to absorb the ways of behaving, the practices and the lived values of that community. Children's comments suggest this situated, relational and embodied practice appealed to them, whether that might be of the science domain or more generically. 'You were moving people around … When you taught us science and art it felt like you mixed the together and they were both really fun … it wasn't like a normal class, it was much funner' (Madhila, interview). This was evident also in the humanitarian values which children articulated in their project ideas. Whilst there were playful elements, all that were selected (and most others) characterised human engagement with technology and the economy with care, creativity and compassion.

7.5 Features of *The Imagineerium* project as an art-making 'Community of Practice'

In the previous section I discussed how children were inducted into and felt that they became part of an art-making community of practice through their experience of *The Imagineerium* project. In this, final section of the chapter I consider the most important features that emerged, namely developing as collaborative team players and having agency as learners, and their significance for education.

7.5.1 Learning as a social practice: the importance of collaboration

The significance of peers as part of this community of practice was notable in children's accounts. Almost all children interviewed thought they worked better and learnt more with others than alone. Many children commented upon enjoying 'learning from other people and helping them' and that 'doing lots of things together' (Abaar, interview), was both more expedient and more pleasurable. As noted earlier (6.5), children recognised that working with others offered new perspectives and expanded their communicative skills. Some children attributed their achievements in the project to collaborative practice, suggesting 'I think I work better when I work together than when I work independently' (Kiran, interview). A year on, most of the children interviewed spoke of the project being about 'teamwork' and what they had learnt from this emphasis. Their comments reflect Vygotsky's (1978) famous theory of the zone of proximal development, noted earlier in the literature review as central to communities of practice. Through working (or experimenting) with more (or differently) experienced others, a child may develop further than if she/he approached the same challenges alone. Whilst for Vygotsky the 'more experienced' might be older experts, here a mix of 'expert' adult imagineers operate alongside the more horizontal relationship with peers which recognises expertise in different aspects of the work. This generates a positive and broader conception of what expertise might look like. Learning from peers was mentioned frequently in the data, as was the positive experience of contributing one's

expertise to the group. This was reported as being affirming for the children involved. At times, adult imagineers were significant in developing children's understanding and practice and worked for extended periods with individuals. But often learning would be worked out between children following observed or momentary suggestions from an adult.

Madhila thought that collaborating was helpful in engaging in the tinkering-like, hands-on challenge of learning in the project, that even though 'it was a bit hard at times' that by working together 'we just figured things out' (interview). As Issac suggested, '[w]e had to communicate, we had to persevere' (interview). Several children considered that they 'got more involved than I usually do' (Darius, interview). Their comments reflect Lave and Wenger's argument that 'apprentices learn mostly in relation with other apprentices' (Lave and Wenger 1991: 93). Given that the lived experience of team working had challenges and moments of friction, the dominantly positive feedback on collaborating is interesting. Some of the positive comments above were made by children who also spoke about feeling upset that their ideas were not valued and taken forward by the group. This suggests that in some ways, some children at least, recognised that differences, and the struggle of encountering and possibly of resolving differences, is integral and perhaps a valuable dimension of working collaboratively, indeed that it feeds learning. The recognition of themselves as capable and resourceful learners appeared to grow throughout the project, as groups were facilitated to learn from and with each other.

The practice of group work led children to negotiate better where they experienced challenge so that they 'started combining all of our ideas' (Dakota, interview). As Matarasso (2012: 7) suggests, this reflects the creative process where 'a vision emerges through the creative process rather than being established beforehand and worked towards'. This improvisatory habit of adapting and inventing Sawyer (2007: 21-2), was evident in *The Imagineerium* project with children collaboratively changing previously agreed ideas as new ones emerged and were deemed better. Sawyer, who argues that creativity is an interactive, group process, notes that Csikszentmihalyi's (1997) research into 'flow' (the state of immersion, optimum focus and learning) 'found that the most common place people experienced flow was in conversation with others' (Sawyer, 2007:

22). Indeed, he suggests that even 'the insights that emerge when you are completely alone can be traced back to group collaboration' and 'a string of successive ideas each spark lighting the next' (ibid:4). Earlene's account of group talk appears to concur with this idea: 'I felt that they were improving my idea' noting some aspects which 'never really had a meaning until the group started talking about it' (Earlene, interview).

Although the character of collaboration and the efficacy of group practice fluctuated from group to group, within and between sessions, children's awareness of their and peers' strengths typically developed. Involving children as occasional co-researchers (noting observations and comments within their team with regard to particular creative learning behaviours, including collaboration) may have fed such awareness. A year on, the idea of the project having generated understanding of what teamwork really involved was recurrent comment and one of the girls talked about feeling 'a part of something big' and learning to 'think together' (Jasmeen, focus group, 2015) through the experience of the project. Her comment was part of a wider discussion characterised by peers' noting improved self-efficacy. Such comments echoed Matarasso's argument that

> the arts have the potential to define and symbolize alternative realities …working through them can build people's capacity for and interest in shared enterprise. They can form a nucleus of self-determination'. (Matarasso 2007:457)

Collective action here facilitated collaborative learning, and simultaneously empowered a sense of greater autonomy.

7.5.2 Freedom and agency

Children reported feeling a sense of 'freedom' on the project, both in relation to the physical working space of *The Imagineerium* project, but also the 'felt' psychic space of the project. Interviews and journals revealed a sense of autonomy generated by the commission brief which invited imaginative ideas, the various choices offered throughout, being given the responsibility of one aspect for the team task and also by the personal nature of the journal. Oja proudly voiced a shared value that 'we got to decide what we would do' and Zabia likewise reflected the importance of feeling that she

had some authority in shaping an aspect of the group design: '[w]e – only us, me and one other person get to choose the colour and materials' (post project interview). Teachers noted and valued differences from typical school practice, suggesting that in the project children could 'find out things for themselves … they could investigate, find out it doesn't work and change it' (teacher C, post-project interview). Some children expressed feeling a sense of anxiety about the new challenges the project presented. Others expressed feeling that 'making a mistake' or 'getting something wrong' was not as bad as they anticipated, and they were able to learnt from 'mistakes'. Journals were valued as places where 'we were able to sketch our own stuff … put what was on our mind' (Dakota, interview). Children said that they 'felt trusted' to attempt challenging tasks, which in turn made them feel capable and positively shaped their self-belief.

This sense of freedom was of course relative to the structures of school. In *The Imagineerium* project children experienced a structured agency. Just as the physical spaces included areas cordoned with hazard tape to indicate areas children could not go (where machinery or tools might pose dangers), so the choices they were given were framed and delineated. The collaborative practice central to the design, where children together initiated and shaped ideas, appeared to be significant in generating a sense of freedom and responsibility. Particularly at the Imagineerium space, children roamed and observed, focused and tested, talked and sought advice in fluid and responsive ways. Often suggestions would come from an imagineer seeing a possible connection and proposing a reference or collaboration, but these also occurred organically within children's groups.

The self-direction of groups grew from the demands of undertaking the commission, a 'situated' learning construct, situated in a community of practice, as a simultaneously personal and social process. Becoming part of the community of practice and especially the negotiation and re-negotiation of one's position as one first decides to join and perhaps to engage more deeply in that community is what shapes and drives learning. It is here that the sense of agency is active. The children have limited agency, for example, they are legally bound to be educated and work in groupings decided by their teacher. However, the level and character of their engagement in this community of practice is a

personal choice. 'Changing locations and perspectives are part of an actors' learning trajectories, developing identities and forms of membership' (Lave and Wenger, 1991:36). Through engagement with an art-making activity, as part of a community of practising Imaginers, children were able to be part of something that feels like 'it matters' or is 'my thing'. The consciousness that this is a preference and a choice characterises a different kind of engagement with and framing of learning.

In their analysis of artists working in schools, Thomson et al. (2012:18) talk about the 'third spaces' that artists generate, of the 'sociality' of such 'meeting spaces' and of the 'mobility' that characterise them. *The Imagineerium* project, echoes this sense of sociality, of possibility, where relating to apprentices and imagineers underpins wanting to be part of this community of practice. This was evident in the heightened interest children demonstrated the moment an imagineer was in sight, when working with peers on the activity and a year later when I arrived at their school, as a representative in their memories of *The Imagineerium* project. Lave and Wenger (1991), like Thomson et al. (2012), recognise that learning in a community of practising art-makers, by virtue of being an embedded, social and holistic activity, learners invest in that community as participants which is deeply connected to the formation of identity. If learning is relational, it also 'implies becoming a different person with respect to the possibilities enabled by these systems of relations ... learning involves the construction of identities … as long-term, living relations between persons and their place and participation in communities of practice.' (Lave and Wenger, 1991: 53). Certainly some children suggested that at school 'we don't usually get to be that creative and think of ideas like that' (Adila, interview) or 'normally we don't get to get our creative sides out' (Adrian, interview). An interesting and haunting comment was made by one child who reflected that working with Imagineers and peers had been important for him because 'at school we don't get to think a lot' (Abaar, interview).

7.6 Summary

In this chapter, my aim has been to better understand the educative structure of *The Imagineerium* project, a site for the practice of art-making. I have argued that Lave and Wenger's conceptualisation of a community of practice, wherein learning in inherently situated and is holistic in character is a helpful way to understand how *The Imagineerium* project structured children's learning. The primacy of the social character of a community of practice, in Lave and Wenger's argument, reflects the importance of relationships, of teamwork, and of the development of the individual through the social context found in children's account of their experience of the project. Lave and Wenger's notion of children as 'natural legitimate peripheral participants' (Lave and Wenger 1991:104), who have choice to follow their interests, explore different positions and roles and thus discover different perspectives, is particularly powerful given freedom and agency emerging as a key feature of the research data. Children's value of and learning through purposeful, embodied practices inherent in art-making is evident in the data and also both a natural and intentional purpose of the Imagineers.

If *The Imagineerium* project proposes insight into the structuring of models for education, it is in relation to the structures of communities engaged in practice, as both productive and educative, because 'engaging in practice, rather than being its object, may well be the condition for the effectiveness of learning' (Lave and Wenger, 1991: 93). The practice of a community, here of imagineers, thereby suggests a curriculum 'in the broadest sense' (Lave and Wenger, 19991:92).

Chapter 8: Conclusion

Introduction

This thesis investigated three research questions. The first asked: In what ways does *The Imagineerium* project foreground and articulate the practices of art-making in children's education? Art-making, as conceived and enacted in *The Imagineerium* project, foregrounded art-making as the site, the medium and space in which children's educational experience occurred, and also as the focal purpose of the project: an art-making commission. As such art-making was experienced as an integrating, embodied, affective and cognitive practice, fostering skills in interpretative and symbolic thinking, personal engagement, a sense of capability and esteem in learners – all important to a broad education.

The second question asked: What structures does *The Imagineerium* project require and propose that might be valuable to children's education? Art-making in *The Imagineerium* project structured children's education in ways unlike formal schooling, but more like a community of practice (Lave and Wenger, 1991). The mix of imagined, imaginative and real aspects of the structure was significant here. Using a 'mantle of the expert' type framework communicated a supportive belief in children as capable. It also formed the vehicle by which they engaged in this community of practice to undertake a real-world commission. Seeing examples of imagineers' work and experiencing their expert practice was also important in this framework. Thus, the commission within a community of practice constituted the curriculum of the project, where learning was inherent.

The third question asked: How can participants' experiences of *The Imagineerium* project be conceptualised to inform future similar practice? This case study of *The Imagineerium* project has drawn on several established theories. However, the way they were synthesised and applied to a particular school-based project generated distinctive ways of thinking about art-making which are valuable and topical for educational policy and

practice. The notion of art-making as a site, the character of an art-making educational experience, developed through use of Dewey and Ingold's theories, and the connection of schooling to a real community of practice (Lave and Wenger, 1991), where participation is inherently educative, are all aspects discussed more fully below. Having just outlined the character of this thesis in relation to the research questions, I continue next to discuss these more fully as contributions of the thesis working more flexibly between the sequence of questions. After this, I discuss the implications of these contributions and how further research might enable their development.

8.1 Contributions of the thesis

The major contribution of the thesis is to recuperate and rejuvenate arguments for the educative value of art-making. I argue that my conceptualisation of art-making in *The Imagineerium* articulates its broader (embodied, cognitive and affective) educative value. The importance of the arts in education has been persuasively argued (Dewey, 1934; Eisner, 2002a) and more recent empirical studies have evidenced the value for young people (Catterell, 2009; Thomson et al., 2018) but there are limited accounts of how they might be enacted and experienced in schools. I argue that this thesis makes an important contribution in this respect, suggesting how art-making could be at the centre of pedagogical and curricular practice in schools. It offers insight into the particularities of this case but also identifies characteristics which have significance for developing future practice. My argument relies on a number of interdependent claims, which I outline below.

- Conceptualisating art-making as a 'site'

  Centrally to my thesis, I argue that the conceptualisation of *art-making as a site* distinguishes it from being either, or simply, a practice, a physical place, or a 'space'. Whilst it draws significantly on theoretical discourses on spatiality, (Massey, 2005; McGregor 2004), 'site', here, connotes the crucible-like character

of learning in *The Imagineerium*. Here the affordances of the physical space (open, adaptive and resource-full and messy), a productive environment dynamic with making practices and the associated values of their makers all interact, shaping and being shaped by each other. Learning was thus being formed and re-formed through a network of interactions, collaborations and emergent relationships between the people involved, their diverse knowledges, the practices and habits they enacted and the opportunities and affordances of diverse art-makers' materials, equipment and spaces. The discourses of the art-makers and engineers, their and the children's behaviours and practice, embodied this account, which is consistent with Dewey and Ingold's accounts of art-making as an educative space.

This conceptualisation of art-making as a particular and dynamic site, where the interactions shape and are generative characterised how learning occurred and thus informs all subsequent claims in 8.1; including how knowledge and understanding was formed and developed; how children engaged with 'subject' material.

- Art-making facilitates a hybridising of knowledge (in a single educative experience)

I found that children learning science and arts in relation to each other generated unexpected insights; they were more attentive to how learning per se involved a breadth of dimensions including the social, affective and enactive. By virtue of arts and sciences practices co-existing, new, and often pleasurable, understandings were generated. As children noted, *The Imagineerium* project did more than connect and layer subjects and skills, it 'mixed them up' (Madhila, interview) differently in a 'real thing' (Karl, interview). By enabling 9-10 year olds to engage with ideas of science and engineering permeated by Imagineer productions' social equity values, children began to see how science processes, concepts and problems are interwoven and informed by cultural, historical and human issues. I argue then that the interdependence of scientific and artistic

knowledge, and of personal and social considerations, enabled a hybridisation of diverse knowledges and understandings into a single educative experience. As Colucci-Gray et al. (2017), noted, this is rare, with exceptions occurring in higher rather than primary education (see Guyotte et al., 2015 for an engineering and art example). This was important in fostering insight into, and motivating children to want to learn about, particular disciplines, practices, ideas and also themselves.

This hybridisation of knowledge and valuing of learning, as a more complex and interdependent process, required a new understanding of the relationship between the embodied, the haptic and the cognitive as learning.

- The embodied, haptic character of art-making is educatively, and affectively, important

I argue that this hybridisation of knowledge was reliant upon the embodied and haptic nature of art-making practices. In art-making the cognitive, embodied and haptic are interdependent and interwoven through enactive, critical, creative interpretative processes. I found that children were motivated and affirmed, showed pleasure in, and understood through the tactile and felt sense of tinkering, of trying emergent ideas out; often together. Embodied practice emphasised the social and collaborative character of learning: the multiple and intersecting connections formed as children interacted physically with materials, space, equipment, peers and experts, drawing on and valuing their own experiences and their own and each other's presences, interests and strengths. As children took on the 'mantle' of and behaved as expert imagineers, this physicality combined with the performative, sociality of role play. The novel, theatricality and relationality of imagineers engaged children affectively as well as practically. Being an imaginer, experiencing the haptic pleasures of making alongside adult imagineers in this real making community constituted an expansive embodied and collaborative way of learning through practice.

Imagineers beliefs about children been imaginative and capable, also fostered children's readiness to do and to try out, an important condition for learning.

The evident sociality of art-making practices is significant to its educative structure. I argue that the site of imagineering constituted an emergent 'community of practice' which structured learning differently to traditional schooling and foregrounded art-making, not as a vehicle for learning, but (following Ingold, 2013;2017) as learning.

- *The Imagineerium* required an emergent 'community of practice' model to be educative

I assert that *The Imagineerium* constituted an emergent 'community of practice' (Lave and Wenger, 1991), in which children learnt as 'legitimate peripheral participants' adopting and adapting common practices as well as discovering individual ways of behaving and learning between each other and for themselves. Typically, children relished being identified as an imagineer, and developing their abilities as a member of this community. Additionally, the 'nested' simultaneity of occupying multiple roles, as imagineers, as children and as pupils, ensured options and freedom to move between positions and thus generated a supportive, safe learning environment where children had agency.

Whilst imagineering as a practice was grounded in pre-project experiences of the imagineers, this was a newly forming community of artists and engineers developing through collective and collaborative experiences, through extant strengths, through conversations and the practice of the imagineers during the project. As such all participants were positioned as learners, learning about and through practice, each other and themselves. The pilot nature of this project cannot be ignored as a factor in characterising learning. However, I argue that other factors are at play. The particular imagineers (and young imagineers) are unique to each configuration of a project. Additionally, each commission is unique

and likewise challenges those involved in common and unique ways - as subsequent projects have demonstrated. I argue therefore that the 'emergent' nature is a virtue in ensuring a dialogic, dynamic and learning character to the community of practice where the feel of things being in formation is vitalising. The collaborative and communal nature of the activity generated by the commission appears critical to the shift from a community to a community of practice.

- Art-making 'communities of practice' propose valuable structures and approaches to learning

I argue that *The Imagineerium* proposes a practical, helpful, real-world example of how an art-making community of practice de-centres traditional school structures, highlighting the efficacy of horizontal structures, generating agency for young learners, and prioritising the significance of caring and supportive relationships in learning. I found that art-making in *The Imagineerium* project proposed different kinds of relationship between children and adults, peers, materials and spaces. Children, as participants in the practising community, witnessed and learnt from more expert imagineers who demonstrated and provoked practice development, but also, and perhaps mostly, they learnt from each other. The socially engaged and collaborative character of art-making, and the beliefs imagineers held about children, as being imaginative and capable, fostered a respectful culture in which all were valued.

The sociality of the community of practice was significantly informed by the collaborative, at times democratic and often horizontal character of practice, which emphasised the pro-activity and freedoms of learners in managing their own learning. It was also informed by the commission, a real-world task, characterised as socially significant which drew children together to support each other, and often thereby recognise their own and each other's strengths. It also

motivated the indirect acquisition and development of knowledge, which is brought to the fore as required for the project.

- Art-making is learning

Art-making in *The Imagineerium* constitutes learning. In the process of art-making children are not separately 'thinking' or 'learning'. They are involved in constructing and inventing not just as doers, or just as thinkers, or just as learners. It is a dynamic, synergistic relationship between sensing, observing, thinking and acting; a bounded way of constructing an educative experience for children. In placing the making practices of adults, rather than a pedagogy created specifically for children, central in learning, it provides a vibrant structure, focus and identity for learning.

The thesis also contributes to the theoretical literature in three ways. Firstly, in nuancing Dewey's account of 'experience' through lenses provided by Ingold, and Lave and Wenger. Secondly, through the development of 'communities of practice' literature in order to utilise it in the analysis of *The Imagineerium* project. Thirdly, because the analysis of the data required a clarification of key concepts, most notably as discussed above 'site', as a nuance in relation to spatiality literatures. I briefly outline each contribution.

Whilst Dewey's account of experience, and of art-making experiences particularly, are widely evident in educational research, Ingold's (2017) development of Dewey is less so; located as it is in anthropological descriptions of education. His focus upon attending to the embodied character of undergoing an experience of art-making, which this study draws upon, extends Dewey's account of experience. Further, Lave and Wenger's (1991) conception of situated learning in communities of practice emphasises the socio-cultural nature of educative experiences. Combining aspects of these theorists as salient for the study, Dewey's more psychologically grounded philosophy, Ingold's embodied anthropological emphasis and Lave and Wenger's socio-cultural perspective have been helpful in analysing the data of the thesis. Their use has generated a nuanced

understanding of educational experience, which has not been sufficiently problematised or attended to as intersecting elements in research literature to date.

Lave and Wenger's (1991) account of communities of practice whilst evident for professional learning in educational research literature, is less evident in learning innovations with young people in school. A database search revealed just five empirical projects (out of 489) in relation to research in schools drawing upon communities of practice theory. These all relate to the generation of an educational community of practice within a school (see for example Forbes and Skamp, 2019). Lave and Wenger's (1991) research focussed upon understanding the roles within, and the development of, pre-existing, distinct, socially well recognised, vocational communities. Importantly, their model highlighted key facets of *The Imagineerium* project but did not address all.

I conclude this account with mention of smaller contributions to the methodological literature. Whilst the values, and value, of participative methodology are well respected in sociological research (see chapter 3.2.1), the ways in which these can be operationalised is less clear in the literature. The design of this research study into *The Imagineerium* project, used a number of established methods but also adapted participatory action research (PAR) methods. Participants, as art-makers, were also empowered as evidence makers, collecting and reflecting upon data through art-making. Reflecting the political ambition of PAR this evidence generation valued the contributions they offered. During the project phase of the research, the methods of data collection were embedded as part of the everyday activity of the imagineers and designed in the light of the kinds of activities that were part of the community of practice of imagineers, for example, journaling. In seeking to operationalise the valuing of participants, the research design viewed the research process not only from the perspective of the researcher, but from the perspective of the participants, capturing a breadth, intensity and character of voices and feelings. What emerged was a 'naturalness' to the data collection methods as part of *The Imagineerium* project experience, not additional to it. This 'imaginatively taking the perspective of participants' in the design of the methods, rather than simply when the data was analysed, is a development of the methodological literature on participative methodologies. A contribution of the thesis is, thus, the

addition it makes to the existing body of research into how researchers might enact participatory methods in the messy, complexity of live, educational settings.

Finally, by virtue of children undertaking the project in school time, the real-world space of *The Imagineerium* project was signalled as being conceivable as part of education. This account of real-world practice is useful to educational research in highlighting how, differently to in default schooling, art-making, as modelled in the 'real-world', constitutes a socially educative practice. As the thesis identifies this hybrid, real-world practice is, however, a challenging model for teachers and schools. As the account of teachers' experiences revealed (see 7.1), this model of practice conflicts with teacher's doxa, their familiar and habituated ways of thinking about curriculum, knowledge, teaching, learning. It also challenges received notions of who constitutes an educator and the roles each plays in schooling. Questions about the depth of children's skills, knowledge and understanding, for example, of the maths and science involved, or the transferability of collaborative and persistent practice were not pursued in this study and remain areas for further research.

This original educational innovation provided a context in which to understand the conditions, approaches and difficulties of developing an alternative approach to default education located in 'art-making'. In the following section I explore the implications, for educators, for educational research and for contemporary educational policy, of this conception of 'art-making as a site' and the use of community of practice to investigate art-making as an educative experience.

8.2 Implications

In the introduction to this thesis (Chapter One), I positioned this research in the context of both a history of arts education and current schooling in England. It signalled that the argument of the thesis has a particular significance in both respects. In relation to the arts, I have argued that art-making, as conceived in *The Imagineerium* project, as a

practice and a site, has been overlooked and underdeveloped historically throughout English education. The thesis has advanced a counter-argument to this dominant view, which is evident in policy, of art-making as an optional enhancement in schooling, peripheral to the core business of literacy, numeracy and science. It argues instead that *The Imagineerium* project illustrates how and why art-making might be at the heart of education, and form its core integrating culture and medium. The advancement of a real-world practice-based approach to learning, where a mix of collaborative and self-directed drivers shape education, challenges current conceptions of schooling and of course requires further research. But this study suggests that it addresses a number of important aspects that our education system is either seeking to or ought to be seeking to achieve. Here I want to argue why it warrants further attention. I begin with a focus upon the political position of the arts in education moving towards broader implications.

Contemporary debates about the arts in education typically focus upon the proportion of time that children can exclusively experience and study an art form; for example that there has been a 21% reduction in time allocated to the arts in English schooling between 2010 and 2017 (CLA 2018). In the context of global testing of English, Maths and Science, counterarguments cannot gain traction politically. These arguments relate to the dominant curriculum, and associated timetable, model whereby one subject happens in one space and time. In this thesis children's interest and development in learning per se, and in learning science, maths, history and arts related knowledge and skills suggests that we might think differently about curriculum and timetable. We can develop hybrid accounts, such as *The Imagineerium* project, in which more than one subject can occupy the same time and space. This requires us to focus upon the widely recognised, broader educational benefits of experiencing the culture of practising art-making, rather than the skills and knowledge of individual arts subjects. Thus we can conceive of and develop projects, and possibly curricula, whereby art-making is the core practice in which educative experiences are situated. Tasks requiring a connected, possibly hybrid or trans-disciplinary use of subjects, as happens in *The Imagineerium* project, enacted through art-making processes might achieve multiple goals simultaneously. As such children would simultaneously be learning about art forms, genres and practices. They would also be developing generic and practice-specific skills through the project. A child might, for

example, learn how to create a translucent and light effect in textiles through the flexible and aerodynamic demands of building a mechanism to move a wing up and down. Learning how to lift each other might be a skill developed through wanting to suggest the flight of a bird in performance alongside the winged structure. Here, rather than being purely a subject, art-making is the site of educative practice drawing into it other content and skills as required by the art-making task.

The argument is also of interest in debates beyond the arts for a broad and balanced curriculum, which seeks to embrace a range of disciplines and perspectives whilst also honouring core curriculum obligations. In negotiating a model, which sought to address aspects of the extant National Curriculum for England, as well as testing an alternative model for learning, *The Imagineerium* project offers a practical model for educators and educational researchers for how such apparently conflicting drivers might be addressed. In the context of the recent decade of increasing regulation, and consequent narrowing of curriculum and educational experience for young people in school in England, this thesis advances a model for further research and practice. In doing so it argues for a different conception of curriculum and of knowledge. The commission to children as art-makers, in *The Imagineerium* project, shaped what values, skills and knowledges would be developed and constituted a kind of curriculum. The components of the course of study was shaped by the need to coach particular behaviours and dispositions, to develop particular skills, draw on and teach particular knowledges. This model fostered a hybridity of subject knowledge development, whereby imagined, planned and realised designs interwove with aesthetic, social and scientific understandings. The practice of working as imagineers thus constituted the medium in which a blend of knowledge, skills and habits of mind were developed, with each informing the other. Practicing as an imagineer required children to actively investigate and thus acquire particular knowledge, at times through collective adult-led activities. At other times these were more individual experiences, personally led, or supported more one-to-one, or one-to-few by imagineers. The mix provided the agency for children to engage in their own knowledge construction.

The thesis resonates with current debates about how the arts and sciences might better interrelate in schooling (see for example Colucci-Gray et al., 2017). Whilst the

handmaiden role of the arts in STEAM education might be dominant, *The Imagineerium* project as analysed in this thesis, adds to the small but growing body of literature that seeks to extend modes beyond inter-disciplinary into trans-disciplinary creative enquiries (see for example Costantino, 2017; Guyotte et al, 2015; Katz-Buonincontro, 2018). Such studies, typically led by the arts, and in Higher Education, reflect a value for the hybrid character of projects which test and argue for structural equality (Allina, 2017) much as Neelands et al, (2015) did. Some demonstrate a need to find ways of brokering a cultural exchange which feeds new ways of seeing, thinking and behaving to be genuinely trans disciplinary (see Costantino, 2017; Guyotte et al, 2015). In this respect the focus here upon art-making as a site and the inherent culture seems significant. It echoes the critique of current English schooling for not developing young people with the skills for a future world. Schleicher, director of the international PISA programme, has accused England of enacting a reproductive schooling system. Giving evidence to the Education Select Committee this year, he has argued that 'arts may be more important than maths', that the social and emotional skills developed by experiencing the arts, currently considered as 'soft' and less important than maths and science, might become the 'hard' skills. He advised the committee to consider about 'how to design our curriculum around these needs' and that 'the challenge for education is to focus upon those skills where humans have the advantage … perspective taking .. looking at problems from multiple angles, making judgements' (Schleicher, cited in Snow, 2019). In this respect, this study has a timeliness. It speaks to debates about how schooling might better develop young people's creative and critical capabilities to equip them with the social skills, adaptability and resilience that future society and employment is likely to demand of them (Claxton and Lucas 2015; Eisner, 2005; Robinson and Aronica, 2015).

This conception of a single educative experience as a curriculum, and of knowledge generated through the experience being as important as any pre-determined, prescribed knowledge was at odds with teachers' habituated ways of thinking, their 'doxa' and 'habitus' (see chapter 7.1) as well as their contractual obligations. It generated concern amongst teachers about, having adequate 'time to cover everything' (Teacher D post-project interview), but also about children being adequately prepared, through a practice-based learning experience to be able to communicate such knowledge in

relation to standardised, age related, assessment processes. Indeed, in a recent, different, iteration of an Imagineerium project, teachers in two schools responded very differently to this challenge. In one, the commission was used as the context for teachers to enhance historical and probe scientific understandings, using tasks and discussion in relation to pupils' emerging designs and their journals to evidence learning through the project. In another school, teachers observed that children's understanding in a particular scientific aspect was inadequate and so taught a formal lesson on the topic in a separate time, identified as that subject (see Trowsdale, forthcoming). Further research and development is required to investigate how depth and progression can be fostered through this model. Evidence is required to generate teachers' confidence and belief in such a model and also overcome the lack of familiarity and gain traction as an educational practice.

Teachers' concerns reflect an implicit view of their primary role as educators being to ensure knowledge acquisition and skill development, and of themselves as qualified to do so. Nonetheless they valued the expertise of imagineers which they recognised as different from their own and also alluring to children. *The Imagineerium* project drew attention to other adults in society as having a potential role as educators, of their practices as having inherent educative potential and pedagogies. Whilst the engineering imagineers, Phil and Roger, and teachers recognised the value of more pedagogical skills of Sarah, Mark and Kathi, familiar with working with young people and in schools, all adults reflected how children learnt differently from each of the imagineers. Teacher B's reflection that the expertise of engineers might have been a stronger pedagogy (post-project interview) suggested an importance of children witnessing and experiencing such situated expertise. Children's interest in and accounts of learning from both their own experience and from the imagineers raises questions for schooling about what constitutes an educator. Positive responses from teachers and children alike to the Imagineerium space and the adaptation of physical school spaces into art-making spaces, highlights the importance of the physical character and associated culture of educative spaces. The location of the project beyond the school signalled education as a life-wide activity. In the mould of other authentic / enquiry / problem-based learning models, *The*

Imagineerium project situated the real commission in the local community, connecting children with local civic and business people in their own city.

The Imagineerium project foregrounds the importance of the relational and embodied in children's educative experiences. This presents both a challenge and a solution to some current educational concerns. Children's observed behaviour and comments of feeling that imagineers were 'interested in us' (Almira, interview, 2015) 'like you cared' (Louise, interview, 2015) suggested that their relationships with the imagineers mattered, and made them feel good about themselves. Imagineers constituted valuable role models, evidenced in repeated accounts of aspirations to be an imagineer, or like a particular kind of imagineer. Children's comments also that they didn't know previously that this kind of thing was possible revealed that imagineers' practice had signalled that creative, aesthetic and scientific practices might interact, co-exist and complement each other. Children saw that inventing and imagineering were real and viable future professions. Making alongside imagineers and working physically brought both the possibility of being such an art-maker into view and signalled that learning through such practice interweaves bodily action, social interaction and thought. Imagineers' appearance as both regular people and extraordinary, expert, inspirational art-makers fed interest and aspiration. Their skilled social, interpersonal behaviours signalled the importance of human relationships, of collaborating and learning from each other. Imagineers relational and more highly embodied behaviour also gave permission for teachers, at times, to behave differently, to be more relational, more active, ready to try new things and thus to model desired learning behaviours.

In summary, the thesis argues that time is not a necessary condition for increasing art-making if structured through a community of practicing art-makers, as an integrated educative practice. Indeed, the thesis identified the distinctive contribution of experiencing art-making, as a site of learning, how it can be part of and hybridised with developing knowledge and skills in a range of subjects. It contributes to the critical conversation, ideas, practice and body of educational and sociological literature that seeks to refocus schooling in England. This argument however also generates different challenges. This is a conceptual challenge to existing ways of thinking about, training for

and practicing in schools. Strategic engagement, at scale, with extant vocational communities of practice would require the brokering and development of relationships and resourcing across schools in a way that is almost trans-school. It would significantly disturb how schools and teachers think about curriculum, knowledge, teaching, learning, pedagogy, teachers and learning spaces. For many this may be an 'uninvited disturbance'. However the thesis provides a provocation, which further research might extend, as to how a diversity of adults who have both a social commitment to education and to developing young people, who have expertise that teachers, pupils and schools value, might engage in education for the good of all concerned. It argues that art-making, as conceived in *The Imagineerium* project as a site for learning, constitutes a model for a more porous notion of school, attuning teachers and pupils to the value of an education in which children are developed holistically, as polymaths, and to do so in ways that are practicably possible.

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Appendices

Appendix A: Ethical Consent

a) Ethical consent information (2014)

b) Ethical consent form (2014)

c) Updated ethical consent information and form for Imagineers (2017)

IMAGINEER PRODUCTIONS

THE UNIVERSITY OF WARWICK

ETHICAL CONSENT INFORMATION SHEET

2nd Feb 2014

Project title: Imagineerium Pilot 1: 'Not yet Invented'

The Imagineerium Pilot 1 is a first step in an initiative being developed by *Imagineer Productions* and *Imagineer Technologies* to help young people connect arts and engineering practices, *'coach the habit of invention' and* feed the appetite for and valuing of applied and innovative craft. The project will research

- how a hands-on arts and engineering project can develop children's learning, creative, arts and STEM skills, understanding and interest
- how artists and engineers' have developed collaborative and altered practices
- the quality of the partnerships.

To that end we seek your consent to share data gathered by University of Warwick, Coventry University, Imagineer Productions and their funding partners with other funders, partners, academic and other interested audiences.

We give assurance that:

- All research presentations, reports and publications will protect the real identities of all individuals (adults and children) and schools.
- Separate consent will be obtained for photographs or video where participants could be identified.
- Where appropriate, children have been made aware of the reason for asking questions to improve their learning opportunities
- All sensitive data records will be stored on password protected accounts hosted by the University of Warwick.
- The lead researcher is a researcher in the Centre for Education Studies at the University of Warwick where she has been trained in research methods.
- All adults involved have been checked by the Criminal Records Bureau, normal practice for all adults working with children and vulnerable adults

- School teachers and Imagineer staff will advise researchers of planned and conducted risk assessments in relation to the safety and well-being of individuals during sessions, special events and visits as part of the project.
- School staff are always with adults and researchers in sessions and are trained to support if sensitive issues are raised or a participant becomes upset

Our data has drawn upon a range of methodologies and we may draw upon and use all of the following.

- *Pupil data re.NC levels, FFT targets, FSM, ethnicity, attendance, home postcode*
- *Curriculum planning documentation*
- *Questionnaires*
- *Semi structured interviews*
- *Project planning and review meetings notes*
- *Observation / journal notes*
- *Photographs, audio and video recording*
- *Discussions with students*
- *Artefacts and evidence gathered throughout the project arising from creative methodologies designed as part of planning and delivery*

CONSENT FORM

Project Title: *The Imagineerium Pilot 1:* 'Not Yet Invented'

Name of Researchers: Jo Trowsdale, University of Warwick (lead)

I confirm that I have read and understood the Ethical Consent Information dated 2nd Feb 2014 which I may keep for my records and have had the opportunity to ask any questions I may have.

I agree to take part in the above study and am willing for:

Researchers involved in the project to be given access to any or all of the data detailed below: Pupil data gathered by the school re. levels, progress, FFT, FSM, ethnicity; home postcode; Curriculum planning documentation; Questionnaires; Semi structured interviews; Planning and review meetings notes; Observation / journal notes; Photographs, audio and video recording; Discussions with students; Artefacts and evidence gathered throughout the project arising from creative methodologies designed as part of planning and delivery
I understand that this may involve additional site visits and/or meetings outside the project time. I also understand that where images and video is concerned, schools will assure permission for anonymous use by the parties listed below and that and further consent will be sought if identity by image or footage is considered necessary.

I understand that my information will be held and processed for the following purposes:

Development of educational research, reports, presentations and accounts generated by the above researchers working on behalf of University of Warwick, Coventry University, Imagineer or Arts Connect West Midlands, other funders, partners or interested audiences.

I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason without being penalised or disadvantaged in any way.

_____	_____	_____
Name of Participant	**Date**	**Signature**

_____	_____	_____
Name of person taking consent if different from Researcher	**Date**	**Signature**

_____	_____	_____
Researcher	**Date**	**Signature**

WARWICK
THE UNIVERSITY OF WARWICK

21st September 2017

Dear

You may recall at the beginning of *The Imagineerium* pilot that I asked for, and you gave, consent for me to gather data from you and use it within my doctorate research. At this point, following ethical research procedure, the consent form stated that data would be reported confidentially.

However since this time, *The Imagineerium* has been further developed and received profile in the city and beyond. As original partners on the pilot project, it is likely / possible that your association with the project and thus identity may also be recognisable.

As a consequence I would like to ask if you would agree to me using your real name in the text. If you would like, I can send you an electronic version of the final text. If you agree, your name will appear in (i) a prologue which explains the history of relationships prior to *The Imagineerium*, may appear in (ii) the design of the project and in (iii) discussion of issues. If you would prefer to remain unnamed I can use a pseudonym without altering the character of the thesis.
Please indicate your decisions below.

I have read the information above and

- agree for my real name to be used in Jo Trowsdale's final published doctoral thesis — YES / NO

If you circled NO

- I recognise that it may still be possible to identify me, but would prefer that a pseudonym rather than real name is used in Jo Trowsdale's final published doctoral thesis — YES / NO

- I would like to see a copy of the final text YES / NO

NAME:

SIGNATURE:

DATE:

Jo Trowsdale

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Appendix B: Questionnaires

Pre-project

a) Text for imagineers and teachers' pre-project (online) questionnaire (Feb 2014)

b) Children's pre-project questionnaire (Feb 2014)

c) Children's post-card (pre and post)

Post-project 2014

d) Text for imagineers and teachers' post-project (online) questionnaire (April 2014)

e) Children's post-project questionnaire (April 2014)

f) Children's post-project questionnaire (June 2014)

Post-project 2015

g) Children's questionnaire for sample children (July 2015)

Text for imagineers' and teachers' pre-project (online) questionnaire (Feb 2014)

SECTION A: Arts and Engineering

What skills come to mind when you think of artists?
What skills come to mind when you think of engineers?
What kinds of personality traits come to mind when you think of artists?
What kinds of personality traits come to mind when you think of engineers?
If a child I knew showed interest in the arts I would encourage them to pursue a career in it
Strongly Agree / Agree / Neutral / Disagree / Strongly disagree /(No Opinion)

If a child I knew showed interest in engineering I would encourage them to pursue a career in it

Strongly Agree / Agree / Neutral / Disagree / Strongly disagree /(No Opinion)

I am generally interested in the arts
Strongly Agree / Agree / Neutral / Disagree / Strongly disagree /(No Opinion)

I am generally interested in engineering (how things work and are made using scientific or technological tools and processes)
Strongly Agree / Agree / Neutral / Disagree / Strongly disagree /(No Opinion)

SECTION B: Partnership Working

What do you think are the three key elements in a successful partnership? Please rank them

When people are working together professionally, how important are these elements? Please rank them from 1 – 9, where 1 = most important and 9 = least important.
clear communications

similar values
well defined roles
understanding each other's purpose in the partnership
listening to each other's concerns and ideas
willingness to resolve issues together
giving enough time for planning and reflection
giving time to work things out together
quick response to problems

How effective is this partnership at the moment?
Ineffective effective highly effective

What do you anticipate will be the benefit to you / your organisation of working with this partnership?

What appeals to you about working with others on this project?

What might challenge you about working with others on this project?

SECTION C: Working with Young people

What do you do when beginning planning your work with children? (Choose up to 3)
find out what children are interested in about the topic
Find out what children know about the topic and using it to adjust my planning
Research the topic myself
Finding out what children are interested in and using that to define topic
Using their questions about what they want to know to shape topic
Scaffolding experiences I have planned to build confidence and learning
Knowing how the work will unfold
Ensuring learning from peers
Defining clear expectations through instruction
Work out how the work will unfold

What matters to you during working sessions with children?
achieving the planned objectives

responding to ideas and interests which emerge
recognising unexpected achievements
helping children to achieve in different ways
exciting curiosity, enabling learning from peers
building self-confidence of learners
Other please specify

What matters to you most in your work with children?

How would you rate the quality of your work with young people?
Very good / Good / OK / Could do better

What, if anything, would you like to improve about your work with YP?

How, if at all, do you think that your practice feeds children's curiosity?

How, if at all, do you think that your practice feeds children's imagination?

How, if at all, do you think that your practice feeds children's self-confidence?

How, if at all, does your practice connect learning across different disciplines?

NAME: **(Feb 2014)**

What do you like doing in your own time?

(Tick/ circle as many as you like)

Playing outside/ in the park	Being with my family
Watching TV	Religious activities
Dancing	Drama
Playing digital games	Music
Reading	Sports
Cooking	Making things
Being with / talking to friends	Doing homework
Drawing	Writing

What do you spend most time on? (Please write a word or two)

(Please tick / circle ONE answer only for each of the following questions)

How interested are you in learning at school, usually?

Not much A little bit Quite a lot Very

Do you enjoy maths?

Not much A little bit Quite a lot Lots

Do you enjoy science?

Not much A little bit Quite a lot Lots

Do you enjoy literacy?

Not much A little bit Quite a lot Lots

Do you enjoy art?

Not much A little bit Quite a lot Lots

Do you enjoy drama?

Not much A little bit Quite a lot Lots

Do you enjoy design and technology?

Not much A little bit Quite a lot Lots

When you start a new topic in school, how do you usually feel? (You may tick / circle one OR two)

excited nothing particularly a bit anxious scared

Or something else?

Do you often feel worried about school?

(Please tick / circle ONE answer)

Not at all Not much A little bit Quite a lot

What makes you worry most?

What sort of learning do you like best?

(Please tick / circle as many as you like)

Being physically active

Drawing or painting,

Making things – with our hands / or bodies

Coming up with ideas

Working with others in groups

Working on my own

Finding things out (like searching the internet)

How well do you work? (Please tick / circle ONE answer)

Don't know Not very Quite well Very well

How would anyone watching know how well you were working?

(Tick / circle) as many as you like

Not messing about
Smiling and happy
Busy and involved
Listening to others
Keep on trying even when the work is difficult
Helping others

Suggesting ideas
Asking questions
Solve problems without adults helping
Paying attention to the teacher

Does learning in one subject ever help you in another?

For example, learning times tables in maths helps calculating results in science

YES NO

If you answered YES can you give an example of what helps you?

---------- helps me in ----------

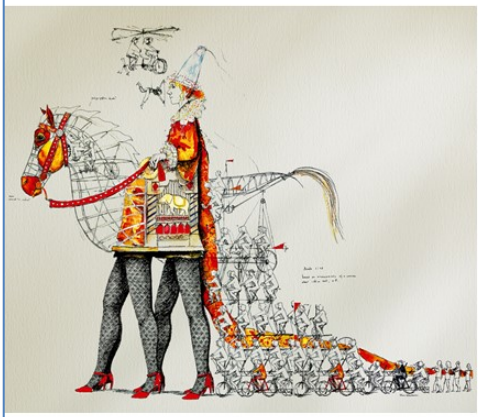
---------- helps me in ----------

What are you looking forward to in this project?

What don't you want to happen?

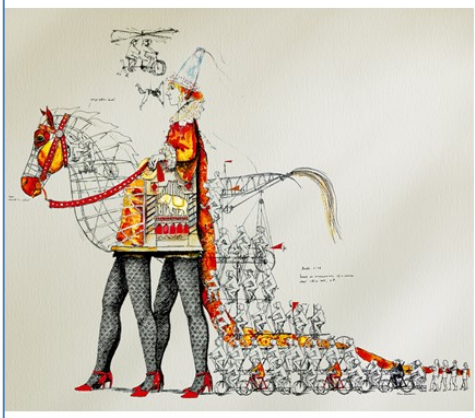
Your name:

What do artists do?



PRODUCTIONS
IMAGINEER

What do engineers do?



TECHNOLOGIES
IMAGINEER
CREATIVE ENGINEERING

Text for imagineers' and teachers' post-project (online) questionnaire (April 2014)

SECTION A: Arts and Engineering

What was your best moment in this project so far?

What was your least favourite moment / aspect of this project?

What skills and attributes come to mind when you think of artists?

Skill 1

Skill 2

Skill 3

Attribute 1

Attribute 2

Attribute 3

What skills and attributes come to mind when you think of engineers?

Skill 1

Skill 2

Skill 3

Attribute 1

Attribute 2

Attribute 3

If a child I knew showed interest in the arts I would encourage them to pursue a career in it

Strongly Agree / Agree / Neutral / Disagree / Strongly disagree /(No Opinion)

If a child I knew showed interest in engineering I would encourage them to pursue a career in it

Strongly Agree / Agree / Neutral / Disagree / Strongly disagree /(No Opinion)

SECTION B: Partnership Working

From your experience of the project, how important are these elements in helping people to work together professionally? Please rank them from 1 – 9, where 1 = most important and 9 = least important. elements below in terms of their significance in a successful partnership

understanding each other's purpose in the partnership

clear communications

listening to each other's concerns and ideas

giving enough time for planning and reflection

giving time to work things out together

willingness to resolve issues together

quick response to problems

similar values

well defined roles

What do you think are the three most important behaviours that create clear communication?

From your perspective, what has been happening to help the project team work together professionally? Please suggests up to 3 ideas and write them in RANK order

1

2

3

Is there anything that has not helped the partnership?

How effective was this partnership during the project?

Ineffective effective highly effective

What has been the benefit to you and your organisation of working with this partnership?

What did you value about working with others on this project?

What challenged you about working with others on this project?

SECTION C: Working with Young people

In this project did your planning and delivery?
allow you to find out what the children were interested in
a lot / some / a little / none

involve you in researching the topic
a lot / some / a little / none

involve consulting how others were approaching aspects
a lot / some / a little / none

allow you to find out what the children wanted to know about the topic
a lot / some / a little / none

What mattered to you most in these sessions with children?
achieving the planned objectives
a lot / some / a little / none

responding to ideas and interests which emerge
a lot / some / a little / none

helping children to achieve in different ways
a lot / some / a little / none

exciting curiosity

a lot / some / a little / none

enabling learning from peers

a lot / some / a little / none

building self-confidence of learners

a lot / some / a little / none

How would you rate the quality of your work with young people on this project?
Very good / Good / OK / Could do better

What, if anything, did you improve about your work with YP?

When and how, were you / the team effective in feeding children's curiosity?

When and how, were you / the team effective in feeding children's imagination?

When and how, were you / the team effective in feeding children's self-confidence?

How, if at all, did your practices connect learning across different disciplines?

Is there anything that has happened in the project that has changed or will change your own professional practice? If so, please say how

NAME: **(April 2014)**

(Please tick / circle ONE answer)

Do you usually enjoy design/technology?

Not much A little bit Quite a lot Lots

How well did the project help you understand the science and engineering of gravity, centre of gravity, forces and making strong structures?

Not much: I don't think I learnt anything new

A little: I understood a little about gravity and forces

Well: I understood most things about gravity, forces and how to brace a structure to make it strong

Very well: I understood about gravity, forces, how to brace a structure to make it strong and how the lever / pulley on our model works

How well did the project help you understand the process of making in the arts and sciences?

Not much: I don't think I learnt anything new

A little: I understood a little about gravity and forces

Well: I understood most things about gravity, forces and how to brace a structure to make it strong

Very well: I understood about gravity, forces, how to brace a structure to make it strong and how the lever / pulley on our model works

During the Imagineering project,

How helpful was working physically with Sarah and Mark to understand scientific and engineering ideas through your own bodies?

Not helpful A little bit Not sure Quite helpful Very helpful

During the Imagineering project,
How helpful was working with your hands to understand scientific and engineering ideas?

Not helpful A little bit Not sure Quite helpful Very helpful

What were you doing to show that you were learning well?

What was your best moment in this project?

What was your least favourite moment?

What interested you in the Imagineering project sessions?

Day 1:					
Arrival of travellator and the challenge	Yes, very interested	A bit	Not sure	Not much	No, not interested
Hummingbird story	*Yes, very interested*	*A bit*	*Not sure*	*Not much*	*No, not interested*
Looking at clues about Godiva	Yes, very interested	A bit	Not sure	Not much	No, not interested
Comic strip of the Godiva story	*Yes, very interested*	*A bit*	*Not sure*	*Not much*	*No, not interested*
Ideas for inventions	Yes, very interested	A bit	Not sure	Not much	No, not interested
Day 2:					
Learning about forces through our bodies	*Yes, very interested*	*A bit*	*Not sure*	*Not much*	*No, not interested*

Experimenting with levers, pulleys, cams	Yes, very interested	A bit	Not sure	Not much	No, not interested
Developing your ideas for designs in pairs	*Yes, very interested*	*A bit*	*Not sure*	*Not much*	*No, not interested*
Day 3:					
Developing ideas for design as a group	Yes, very interested	A bit	Not sure	Not much	No, not interested
Learning how to make strong structures with our bodies	*Yes, very interested*	*A bit*	*Not sure*	*Not much*	*No, not interested*
Creating strong structures with potatoes, sticks and card	Yes, very interested	A bit	Not sure	Not much	No, not interested
Day 4:					
Presentation on how Godiva was imagineered and processions	*Yes, very interested*	*A bit*	*Not sure*	*Not much*	*No, not interested*
Developing your group design idea	Yes, very interested	A bit	Not sure	Not much	No, not interested
Taking a role: performance, look and feel, model build	*Yes, very interested*	*A bit*	*Not sure*	*Not much*	*No, not interested*
Day 5:					
Meeting Godiva	Yes, very interested	A bit	Not sure	Not much	No, not interested

Seeing where the hummingbird is being made	*Yes, very interested*	*A bit*	*Not sure*	*Not much*	*No, not interested*
Developing your group project (your role)	Yes, very interested	A bit	Not sure	Not much	No, not interested
Performance work	*Yes, very interested*	*A bit*	*Not sure*	*Not much*	*No, not interested*
Practising your pitch to the Imagineers	Yes, very interested	A bit	Not sure	Not much	No, not interested

What inspired you most?

Did you want to ask more questions than usual? YES NO

(Please tick / circle ONE answer) **If yes when did this happen?**

Were you thinking 'what if?' more than usual? YES NO

(Please tick / circle ONE answer) **If yes when did this happen?**

Did you find it helpful to develop ideas together? YES NO

(Please tick / circle ONE answer)

What gave you the idea for your design?

What did you do in the project that helped you understand about structures (bracing)? *Draw a picture if it helps you explain*

forces (pull and push)? *Draw a picture if it helps you explain*

Lifting and moving mechanisms (e.g. levers) *Draw a picture if it helps you explain*

When you built your model did it change your ideas? How?

Would you like to be an imagineer / artist / engineer / something else when you grow up?
Why?

NAME: **(June 2014)**

(Please tick / circle ONE answer)

Thinking back to the Imagineering project …..

How important was the project to you personally?

Not very A little Quite Very

How much did you enjoy the project?

Not very A little Quite Very

How much did you learn through the project?

Not much A little Quite a bit Lots

How curious has it made you about designing and making?

Not very A little Quite Very

How curious has it made you about engineering?

Not very A little Quite Very

Did it matter to you that you were creating a performance model for a real moving structure and event?

Not very A bit Quite a lot Very

How important to you was it to work with real Imagineers with design, engineering and artist skills?

Not very A bit Quite a lot Very Important

How important was seeing Godiva, the Hummingbird and the Imagineerium as a place?

Not very A bit Quite a lot Very Important

How important were the things that the Imagineers brought in to show you / use with or you found in the Imagineerium to make your model during the project?

Not very A bit Quite a lot Very Important

Did this feel like your project? Did you feel that you could imagine your own ideas and develop your own views during the project?

No Only a little Quite a bit Yes

How important to you was it to working with others as group?

Not much Only a little Quite a bit Lots

How well did the project help you understand the science and gravity, centre of gravity, forces and making strong structures?

Not much A little Quite Well Very well

How well did the project help you understand the process of art-making of 3-D ideas?

Not much A little Quite Well Very well

Are there any other thoughts you would like us to know about the project?

NAME: **(July 2015)**

THE IMAGINEERIUM – One year on…..

When you think back, what do you remember about the Imagineerium project? What was important to you?

What did you feel The Imagineerium was about? (What were you doing / learning about during the project?)

Do you think The Imagineerium Project was about….

(Please tick / circle ONE answer only for each of the following questions)

making something real?

Not at all A bit Quite a lot A lot

completing a challenge?

Not at all A bit Quite a lot A lot

finding out / practising how to be like an inventor?

Not at all A bit Quite a lot A lot

learning through doing, through trial and error / trying things out?

Not at all A bit Quite a lot A lot

feeling and learning how things work through your body?

Not at all A bit Quite a lot A lot

imagining and developing your own ideas?

Not at all A bit Quite a lot A lot

understanding the stages involved in developing something from an idea into reality

Not at all A bit Quite a lot A lot

thinking together – developing ideas from and with others

Not at all A bit Quite a lot A lot

finding out how things work, like how strong structures are built and how mechanisms move?

Not at all A bit Quite a lot A lot

thinking like a scientist?

Not at all A bit Quite a lot A lot

thinking like an artist?

Not at all A bit Quite a lot A lot

explaining ideas in words

Not at all A bit Quite a lot A lot

Could you imagine yourself as an Imagineer in the future?

If so what appeals?

If not what puts you off?

Do you enjoy any of the following subjects more since the project?

Science Design /Technology Art Maths English

Do you know why?

Appendix C: Interviews

Pre-project

a) Pre-project semi-structured interview questions with imagineers and teachers

b) Pre-project semi-structured interview questions with focus group of sample children

Post-project 2014

c) Post-project semi-structured interview questions with imagineers and teachers

d) Post-project semi-structured interview questions with individual children

Post-project 2015

e) Prompts for discussion questions with focus group of children

Pre-project semi-structured interview questions with imagineers and teachers

Do you think it's important for children to be able to take some lead in their learning? If so, why?

Can you think of any examples of where you / your school / your organisation does or has done that?

What do you think you do to help children to use their initiative? What signals or practices do you use?

Do you plan for young people to learn in different ways within your sessions - for example visually and aurally, kinaesthetically or aurally?

How you encourage a sense of curiosity in learners? You talked about XXX Would you tell me a little about how that happens? / How do you think this is best done?

How do you usually feed young people's imagination in your sessions? (OR if not an experienced in education: How do you think young people's imagination is best fed?)

What do you think you do to make children feel confident as learners? You talked about XXX Would you tell me a little about how that happens? How do you think this is best done?)

How do you help children to see the connections between the different subject areas? (For example that a skill that they use in one subject area being useful in another?)

What are you most looking forward to / what appeals to you about this project?

What are you most concerned about? / What will be our challenges do you think?

Pre-project semi-structured interview questions with children

When is learning interesting and good, for you?

Is that the same no matter what it is about / what subject? Or is it different in different subjects / areas? What is it about X that you like / dislike?

What do teachers do to make learning feel interesting and worthwhile? What's most helpful?

How does that make you feel?

Do you get chance to choose what you might do in your learning? When does that happen?

How do teachers help you to do things for yourself? What's most helpful?

What do you like about that?

Is there anything not so good about that?

Where and when do you learn best?

10. What good memories do you have of learning something?

Post-project interview questions for imagineers and teachers

In your questionnaire you said that you thought x was the best aspect of the project. Can you tell me a little more about that? Why was that? How might that be strengthened / developed?

What did you think was less valuable / effective? Why? What could we have done to improve on that?

*How could the project design have tied in better with school priorities, or your planning? If you were to do it again how might the project become more central in your teaching?

**How do you think the project design could have improved on that?

So could you say how you thought the how teachers, artists and engineers roles worked? And worked together? What were the team's strengths? What could have been better?

Has anything changed in your mind about the way you perceive artists and engineers as a result of the project? What kind of insight have you gained?

There was a range of priorities that we wanted the project to address. In your mind what should the project priorities have been? (Discussion from pre-project evaluation focus group session e.g. science / imagination / design)

Do you think the project helped children to understand the science involved (forces; strengthening structures; mechanisms)?

Where and when was the project in developing curiosity, imagination and collaboration / perseverance in children?

What did you see in (sample children) in this respect?

Any other thoughts?

* Green = focus phrased questions for teachers; ** Burgundy = focus phrased questions for imagineers only

Post-project semi-structured interview questions with children

You said on the first day you felt X about the project. Can you tell me a little more about what made you feel that way? And did that feeling change at all? Why was that?

You said you worked X on the project. Would you say you normally work X?
Can you tell me what it was in the project that helped you to work X?

What was different for you between normal school and the project?

Would you tell me a little bit about your best moment? You said it was X. Can you tell me more about that? …… and why that was your best moment?

Was there anything about the ways we were learning in the project that you found helpful? / What was it about X that inspired you?

Could I ask you a few questions about the things that you didn't rate as highly? Can you tell me a little bit about why you didn't think X was so good?.... Why was that? ….

What did you have to do to make your model strong?
What helped you understand forces? Did you find the work with our bodies or with our hands most helpful in that, or neither?

What mechanism (pulley, cam, lever) did you use to make your model move? How did it work?

You said you asked more questions – who were you asking questions to and what about? Why was that? / OR You said you didn't ask more questions that usual. Why was that do you think?

You said that working in a group was X? How did it help / challenge you? Did it effect the quality of your group idea? How?

Were there any moments in the project that were frustrating for you?

What did you think about keeping a journal? Was it enjoyable / a bit boring?

Prompts for discussions with focus groups 2015

Following image activity

- Can you tell us something about why X appeals to you?
- How did you find out about / what do you know about X?
- Is there anyone you know who does that kind of thing?
- What would you need to study or do to do this?

- What do people in your family do, your Mum or Dad for example?

Thinking back to The Imagineerium

- We are planning to work with your teachers before the project so that they can lead more of the work and also do more of it in the classroom. What aspects of the project do you think would be best to develop in school / make most difference to learning?
- What should happen at The Imagineerium?

- How could we weave the practical learning (through our bodies, experimenting with hands) so that these are not so separate?

- How do children best learn? Where was that happening in the Imagineerium?

- How could we keep all children's interest more?

- What would make the project better?

- How could we develop team work?

- How could we improve the learning about science and engineering?

- How could we improve the learning about making things in drama and 3D art?

Appendix D: Journal and observation prompts

During project 2014

a) Children's journal prompts

b) Children's observation prompts

c) Teaching staff observation prompts

Children's journal prompts

Think about whether, so far, you have:

Joined in well and involved yourself…

Asked questions….
What sorts of questions did you ask?
Is this different from usual for you?

Made suggestions or offered ideas…
If so did people listen to your ideas?
Did people do what you suggested?

Researched something? What did you do? Did your research help?

Helped others to develop ideas…
How did you do this?

Tried different ways of doing things …
Why they were different?
What did you find out?

Asked others for advice in solving a problem?
What for? What happened?

Stuck at a problem to find a solution
Did you work with others to achieve this?

Worked like an artist…. What were you doing?

Worked like an engineer…. What were you doing?

- What is the difference between learning in Imagineerium project and normal school?

- What things are better or worse in the project from normal school?

What are you enjoying? How does it make you feel?

Children's observation prompts

Can you see / hear children trying to find something out? They might be watching or listening closely asking a question doing something to test out an idea	**What are they saying / doing?** e.g. Zeechan was joining an extra bit onto the dragon's tail to make it longer. He said he was 'trying to balance out the heavy head'.

Can you see / hear children imagining ideas, asking 'what if'?	**What are they saying / doing?** e.g. Arzu said 'What can we make the golden coins from so that they won't hurt people when they fall?'

They might be talking about what might happen in particular conditions sketching an idea to explain it to others in their group	

Can you see / hear children persisting with and developing an idea?	**What are they saying / doing?**
They might be building OR sketching to show how an idea could be developed struggling to achieve something but not giving up	e.g Jayden was making flaming rockets for our trolley out of plastic bottles and tissue paper. He couldn't cut the plastic and got cross, but then he thought of a different way to do it by sticking the tissue to a circle of card and using the hot glue gun to stick the card to the end of the bottle.

Can you see / hear children working together to develop the group's design idea? They might be helping each other negotiating how people's ideas OR skills should be used to help the groups task	**What are they saying / doing?** e.g. I had the idea of a light coming on for a new idea and Sasha had the idea of a smiley face appearing. Kavita joined both ideas and suggested a smiley face on a light bulb which could 'light up when the inventor had an idea'.

Teachers' observation prompts

Can you see / hear children trying to find something out?	**What are they saying / doing?** *Please write down as precisely as possible* e.g. Iqra and Nea were wetting two different materials to see which absorbed less water to decide '*which is better to use on our model in case it rains*'. OR Zeechan said he was '*Adding an extra bit onto the dragon's tail to balance out the heavy head'*.
They might be watching or listening closely	
asking a question	

doing something to find out about something	

Can you see / hear children imagining 'what if'?	**What are they saying / doing?** *Please write down as precisely as possible* e.g. Mark had sketched Samanta's idea that golden coins should fall from tree's clouds to show Godiva's generosity. Arzu said 'What can we make the golden coins from so that they won't hurt people when they fall?'

They might be talking about what might happen in particular conditions	
sketching an idea to explain it to others in their group	

Can you see / hear children persisting with and developing an idea?	**What are they saying / doing?** *Please write down as precisely as possible* e.g. Jayden was trying to attach red, orange and yellow tissue paper to plastic bottles to look like rockets in action. The plastic was too hard to cut and the tissue wouldn't stick. At first he got frustrated and almost gave up but then had the idea of but then he thought of a different way to do it by sticking the tissue to a circle of card and asking for help with the hot glue gun to stick the card to the end of the bottle.
They might be building something OR sketching OR annotating a sketch to show how an idea could be developed	
struggling to achieve something,	

trying different ideas rather than giving up	

Can you see / hear children working together, making the best of the group's skills to develop their design idea?	**What are they saying / doing?** *Please write down as precisely as possible* e.g. Amaar had the idea of a light coming on for a new idea and Sasha had the idea of a smiley face appearing. Kavita joined both ideas and suggested a smiley face on a light bulb which could '*light up when the inventor had an idea'*.
They might be	

helping each other in a practical task	
working on their own on a task agreed by the group, taking it back to and checking in with the group	
negotiating how different people's ideas OR skills will best serve the group task	

Appendix E: *The Imagineerium* Project sessions

Before the project, teachers had been given a purposively constructed 'navigator badge' which looked like an oversized, slightly eccentric compass or watch, threaded on a ribbon so that it could be worn around the neck. This had been proposed as a device to enable teachers to legitimately have some a sense of something unexpected being expected on the day – as if the travellator was homing in on the navigator's 'signal'. The intention was that they could 'perform' 'looking curiously' at the navigator's badge on the day, or in the days before, to instigate children's interest.

Session One (half day in school)

The children first encountered the Imagineers when five arrived in their playground one morning cycling a 'travellator'[i] (a platform dressed to suggest a time machine and powered by three tricycles). Costumed as late nineteenth century inventors or aviators, with white collarless shirts, beige trousers, boots, waistcoat, bright neck scarves, long brown wax coats, flying helmets (reversed) and goggles, the imagineers looked slightly eccentric and larger than life. They told the children that they had been travelling time and space in search of 'imaginative children', and particularly a Year 5 class who could 'help them with a challenge' set by a Coventry City Councillor. They invited their way in, carrying leather suitcases and chests.

Once in the classroom, clues to what the task involved were discovered in the cases. Central was the commission, written on a scroll of fabric, 'To imagine, design and create a unique, moving performance vehicle powered by cycles to take part in the Festival of Imagineers, 9th August 2014'. The Festival was to be the first of its kind in a city, planned as the city was talking of bidding to be recognised as 'City of culture' in 2021. The children's work would be part of a procession led by Godiva animated and be 'in Broadgate Square in the city centre of Coventry. A model of the design must be completed by the end of March 2014. The vehicle will be made in the Imagineerium.

The theme for your performance vehicle is “Not Yet Invented”, signed Councillor Kelly, Coventry City Council’.

To introduce children to the mindset of an Imagineer, a story scroll had been placed in a suitcase as a ‘clue’. Children were asked to take part in a collective performance of the hummingbird story. In the narrative this bird, in the face of bigger more capable animals taking no action to allay a fire which has broken out in the jungle, persists in repeatedly taking a drop of water in his beak to ‘do what he can’ to quench the flames. Children understood the significance of ‘never giving up’ communicated by the narrative as relevant to their own task.

Their knowledge and curiosity about Godiva and what she signified was stimulated through an activity of moving in to one of three spaces signalling ‘agree’, ‘disagree’ and ‘not sure’ positioning in relation to a series of questions, such as ‘Was Godiva married?’. All ideas were heard, but Imagineers resisted giving answers. This fed into the next activity where, groups of five or six children, supported by an Imagineer, explored a small box full of pictures and objects and through observing closely and some use of prior knowledge, speculated on what these might tell them about Godiva, her story and the Coventry in which she lived.

The boxes contained pictures of paintings and drawings of medieval housing, of male and female dress, of Godiva and Leofric, a map of Mercia, a blue ribbon and a plait of hair. Children were encouraged to ‘think what these things might mean’, to ‘look closely’ for evidence to support their speculations and to draw on ‘what you already know between you’ in order to make sense of what they found. Children reported their groups ideas, with Imagineers still resisting making judgements or confirming correctness but valuing the children’s interpretations.

The final part of exploring Godiva was more physically active: collectively acting out the story of her legend. Each group were given three or four comic strip frames from a section of the Godiva to realise in still images brought to life for a few moments. Each

frame had a sentence or so of description and often, words or sounds in the form of speech bubbles or thoughts. These three activities introduced or developed children's understanding of Godiva's story and of her significance to the city. They were able to connect their own insights to others to develop a collective and a personal view.

The last part of the morning introduced the notion of invention: ideas from both the imagination and the engineering sciences. Roger spoke of the process of invention as a human drive to 'make things easier' from early man to the present day. Children were invited firstly to suggest famous inventors they knew of, such as Alexander Graham Bell or Thomas Edison and then to identify inventions in their classroom. To encourage the idea of doing, of trying out ideas, Phil had assembled a huge poster comprising sketches of his ideas for stage designs, some of which he had used, but most of which were still 'in waiting'. Referring back to the hummingbird story he compared the river to 'your imagination - every time you go to that river you are collecting a tiny idea, so no matter how tiny … keep every idea.' The morning ended with a reminder of the 'not yet invented' commission, and some drawings of fantastical, often theatrical, inventions inviting children to use their imaginations to start thinking up ideas.

Session Two (half day in school)

The second session in schools began in the school hall or, as in one school, in the playground. Various large mechanisms were positioned around the space: a large size pulley and cam structure, made for the project, wheelbarrow, wooden poles strapped together to form a primitive stretcher-like lever, scooter and a three wheeled cycle from the cyclopedia. Using contact improvisation children were offered an experiential introduction to scientific concepts key to mechanical movement. Imagineers Sarah and Mark (see Prologue) began with demonstrations, asking children to explain 'What is happening?' and inviting children to 'Show how you could stop Sarah with a push' or 'a pull', ' or 'Can anyone show how to use a pull to change Mark's direction as he walks along?' In pairs all tested these ideas through their own bodies: how the forces of push and pull speed up, slow down, change shape and change direction.

In these demonstrated, negotiated and experiential testing in pairs, they tested how movement becomes easier with a longer length on a lever (an extended arm) as opposed to with a short lever (a bent arm). They felt how stillness is sensed through counterbalancing equal weights at the pivot point and through bracing. In pairs with toes touching, holding at the wrists, arms stretched out arms and torsos leaning back) they felt for that point of stability. Activities were interwoven with demonstrations and questions to help children value the feelings in their bodies and thereby to explain for example, 'where is the pivot point here?', to say 'where the centre of gravity is', or where counterweighting or bracing was happening.

Engineers employed a range of large-scale models plus various everyday examples (bicycle, wheelbarrow, whisk, corkscrew) of levers, cogs, pulleys and cams for children to explore and test how movement can be affected more easily with mechanisms. Groups worked with one mechanism and then demonstrated and explained how it worked to their peers, suggesting ideas for how it might be useful for their design. Often engineers asked a child to demonstrate the body movement, to explain how forces were operating in a mechanism, for example asking a child to 'lie on the floor and cycle in the air' to show the 'push of each leg as you cycle'.

Back in the classroom, children gathered in their design teams (of 5 or 6 children) around tables entirely covered with large paper. Here they were coached to practice how ideas can be developed collaboratively through talking through ideas during or just after drawing. Different ideas were trialled in different schools, but typically pairs drew together first, then they worked in groups, with different models for collaboration. In one school one child sketched an idea until a signal was given for the paper to be passed on to the next person who added another sketch to the paper, perhaps something inspired by the previous person's sketch, either to extend or develop the original sketch. In this way the final drawing was cumulative. This practice or similar, introduced the idea of negotiating and developing the group's design idea from an individual one, or instead of combining the design from elements from each group member's design. Whilst this was most intense in this session, in all sessions, at

some point, children were sketching, drawing, detailing or annotating their group design idea. Phil had drawn the mini-cyclopedia and photocopied enough so that each child had one and could try how their ideas might look on the final platform.

Session Three (half day in school)

In design groups, children reviewed all individual design ideas and identified which one, and what ideas they were collectively committed to developing. The session then moved to the hall. Children revisited the idea of forces through the body, but his time with the focus upon how the forces of push and pull are useful in building strong structures. Following demonstrations, they tested and discovered what stability and instability feels like. Working first in pairs, one person tried to gently to push over their partner, pushing from the side whilst they were standing firstly with legs close together and then wider apart to see which shape was more stable. Having identified how triangle shapes were present strengthening all stable structures, they then worked in group exploring what shapes might make strong structures from all directions, adjusting using triangular brace shapes.

Children were then invited to examine an impromptu display of photographs pegged on a line of, apparently, gravity defying buildings. They included an upside-down house, buildings suspended from a single point, a tower which bent at 45 degrees, a building shaped like a piano as well as the odd familiar one like the Eiffel Tower. Children were invited to suggest how the buildings were staying up. The idea of hidden bracing to push against gravity and ensure stability, and a table base was discussed. Next Sarah modelled how to brace to create a stable base at different heights, firstly by kneeling on all fours, then secondly at mid height, bending forwards with legs slightly spread, knees bent, resting elbows on knees and clasping hands together. Mark then found the pivot point, at his pelvis, and holding his body tense, balanced on Sarah's stable base. Children were invited in pairs to try, imagining the base as the structure holding up their design and the person above as the design.

Back in the classroom, grouped around tables, children were then set a challenge to apply their experiences to build a strong, stable structure as a prototype for their design. With card, sticks and potatoes groups they were to build and test a scaled model, which might take a weight (a heavy potato) and thus simulate the problem of effectively supporting a weighty and potentially moving structure above the height of people. The engineers gently shook them to test 'how well they would cope' with the mild forces of nature (the jolt of the road and the wind and rain) or how a mechanised action might also test stability. Scientific and mathematical principles applied here, such as keeping the centre of gravity low and bracing a structure to strengthen it and working to scale, were explained during the activities. Attention was also given to the aesthetic appeal of the shapes created by the patterns and angles of sticks.

Using the original sketch, cam animations, photographs and examples of earlier prototypes, the lead Imagineer artists told children about the process of developing the 6-metre-tall Godiva Puppet, from initial idea through to model and build both her and her transport mechanisms. As many children had no experience of the kind of event they were designing for they were also shown photos, models and videos of carnival performance and children learnt how to 'chip', to move through a cavalcade. They experienced through performance not just 'chipping' but how, in carnival, devils lead the procession, sweeping away the evil of the last year in a playful, theatrically menacing way.

Session Four (half day in school)

For the last session in schools, children were organised to work differently, working in pairs (or sometimes singly in small groups) taking on one of three roles that needed completing ready for the final model build. In preparation for this pair work groups began by talking through and reaffirming their design concept so that all were sure of the group's intention and clear about both the big ideas of how this might look in the cavalcade and the details they might need to consider. Large scaled paper was introduced for their design to be drawn into. This clarified a maximum height of 3 metres and platform base of 1 metre.

From each group, two children worked with the engineers, Roger and Phil, to developing a prototype 3D model. This involved making a structure to support the design and drawing the design into squared paper so that it could be cut out and trialled on the structure for effect. Two children worked with Jane or Kathi investigating materials to see what qualities might be needed for the 'look and feel' of their design, both functional and aesthetic. The final two children in each group worked with Sarah and Mark or Kathi developing first a confident rhythm of 'chipping', the basic bouncy step of carnival movement. Then motifs and ideas from the design idea were developed as circular actions and vignettes which might be performed out from the core 'chipping' to support the communication of the core design idea and help the audience understand the ideas of their designed moving structure. Each pair then reported back to the group, sharing the work they had created.

Session Five (full day at The Imagineerium)

The final day of this intensive phase in the pilot offered a different environment: the Imagineerium, the name given to the Daimler building throughout the project. Children were greeted by the animated 6-metre-tall Godiva, set with lights and sound in the full height part of the building. Once comfortable in the space, they walked around her, tried out the remote-control eyes and head and looked closely at her mechanisms, with some children sitting alongside Mark helping to move her arms and head. In the main workshop area Jane had assembled the elements and stages from one of her design projects: from early sketches of ideas, through to more detailed drawings, a developed, dressed model and samples of materials suggesting colour, texture and effect. She talked through 'my creative process when I imagine, design and make my work' suggesting how this static model might be animated, enlisting Imagineers with training in engineering to help. She also modelled how to pitch her idea for an animated model and thereby set the task of the day: to develop their first 2D prototypes into 3D models and develop a pitch for why their design should be selected for build to scale.

Each group at their 'workstation' table, were given core resources and a whiteboard on which to plan their actions to achieve their task. Imagineers supported planning, sometimes suggesting materials to explore or showing techniques to create desired effects or to join and assemble parts. Children had access to a large range of diverse, colourful and tempting materials visible on the shelves of almost every wall of the workshop . Alongside model making, children created props, tried out and created some costume and headwear ideas.

Outdoors, children practised 'chipping' and rehearsed and developed the performance 'vignette' to be performed alongside their cyclopaedia. The project design phase concluded by groups creating an installation / display of their design idea using their model, fabric, journal sketches, other materials, props and costumes created. This was focal in each of their presentations where they pitched their ideas to the Imagineers and their peers explaining persuasively the rationale behind their choice of concept, materials and design.

Session 6 (in school)

Following feedback from the Imagineers, the following week, teachers supported each class to rehearse and again pitch their design ideas to either peers, key stage, the whole school, and in some cases also parents, as each school chose. Schools borrowed materials from Imagineer Productions to be able to reconstruct the kinds of displays they had made. In each school other children voted for the idea they thought was best which concluded the intensive part of the project.

Sessions 7 and 8 (third / half day visits to the Imagineerium)

The next stage of the project, which happened in the following school term was less intensive – characterised more by consultation, visits and (due to the event being in school holidays) optional involvement in performance rehearsals.
Technical drawings of the selected model were drawn up and an Imagineer visited the school to show this to the children (now positioned as if clients) and consulted for

clarification about structure, mechanisms and overall effect. In smaller groups of between 8 and 15, children visited the Imagineerium to see, advise on and help the build process. At the first visit the structure for their model was in development and, using the support of a STEM education partner, children explained how the structure might be fit for purpose, how mechanisms worked or might work and what potential challenges we needed to consider.

Some children bent metal for welding on to their structure. At the second visit when the structure was complete and basically dressed, children worked in the workshop making things to decorate: a hand shaped necklace for 'The 22-handed Princess', 'idea leaves' for 'The Tree of Ideas' and golden jewels for 'The Tremendous Raining Tree of Gold'.

The final event

As the first of its kind in the city, The Festival of Imagineers and its involvement of young people attracted media interest and a child from each school was invited to present on BBC Coventry and Warwickshire radio. This opportunity, alongside the children's presentations in school, and an additional informative review of the whole project which I ran for parents, gave families several opportunities to engage with the project. This meant that when children were invited to be part of the August event, which required parental support to bring them to a rehearsal and to the event in the city centre, parents had a better understanding of the project. The children who opted to be involved in this event and whose parents supported them, attended an after-school workshop to develop the performance vignette as well as an August session to rehearse it. These were performed alongside their animated kinetic structure which followed Godiva's cavalcade and opened the city's first Festival of Engineers on 14th August 2014, in the centre of Coventry in Broadgate square. Their performances attracted local media attention and the structures attracted the public, many of whom came and admired them and wanted to explore how they worked and know more about how they had been made.

[i] The terms 'travellator', 'imaginative children' and 'commission from the city council' were terms used repeatedly by the Imagineers in the first sessions in schools. Some also appeared in the written commission they were presented with to launch the project.